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PILOT STUDY

TO DETERMINE POSSIBLE ALTERNATIVE END-USES FOR PEPPER AND PEPPER PRODUCTS*

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INTRODUCTION

The International Pepper Community covers 92 % of the pepper market and is therefore the dominating pepper producer, processer and trader. With the help of the United Nations Industrial Development Organisation they were interested in the preparation of a pilot study to determine possible areas of further research for new end uses of pepper and pepper products. Pepper as a traditional spice has well established national and international markets with a rather saturated demand of pepper and processed pepper products. Pepper as a commodity is subject to considerable price fluctuations which is one of the main reason, which make market expansion most difficult.

A considerable unutilized pepper cultivation potential exists which can however only be exploited and used, if new untradional pepper base products can be developed, for which a market demand exists. A successful development of new pepper processes and products therefore will have a large impact also on rural development and on the improvement of the social aspects involved.

Good growing conditions for piper nigrum and piper longum in subtropical and tropical areas, particularly the nations Brazil, Indonesia, India and Malaysia, where there is rain fall of more than 250 mm per year and easy harvesting conditions of the pepper fruits may give a great chance for many people in many underdeveloped countries to increase their income. The aim for the pilot study is therefore to reveal new possibilities to enlarge the world-wide production of piper nigrum, which is stagnating for several years.

A study described in this paper was carried out from January 1988 to March 1989. It mainly consists of 3 parts, a comprehensive literature review, experimental part to check special aspects revealed by the literature research, and a consideration about the techno-economic aspects of the possible production of the products prepared by pepper.

Finally, the report includes recommendations for possible research areas, which could be the basis for the development of finally evaluated products by the international market of chemicals and commodities.

REVIEW OF LITERATURE

General aspects

This literature review contains all citations which were found in an on line retrieval in the below-mentioned 7 data bases and those citations, which were found in the original papers of the retrieval, and could be made available.

5 Biosis Previews 69-88/Feb. BA8504; PRM 3404
10 Agricola - 1979-87/Dec.
110 Agricola - 70-78/Dec.
50 Cab Abstracts - 1984-87/Nov.
51 FSTA - 69-87/Dec.
79 Foods Adlibra - 74-88/Jan.
399 CA Search 1967-1988 UD=10804
76 Life Sciences Collection - 78-87/Oct.

For the on line retrieval the following key-words have been used:

Pepper, processing or extraction
Pepper, use
Pepper, varieties
Pepper, volatiles or analytics
Pepper, processing, use, analysis (synopsis)
Pepper, vegetable
Pepper, antioxidative effects
Pepper, pharmaceutical effects

From the original papers, particularly that literature is citated which seems to give relevant contributions to the subject of the above-mentioned key-words.

The total citations from the on line retrieval are listed in addendum 1. Citations within each data base are chronological, starting with the youngest paper. Due to the retrieval in different data bases some citations occurred repeatedly. The total number of different citated papers is about 360.

In the following pages a review is given of the different subjects, which seems to be relevant to this pilot study, to determine the possible areas for new end uses of pepper and pepper products.

Pepper and pepper products are widely used as the most important spices in food. The small white, black or green berries are derived from one of the large amount of species of piper L., particularly that with the botanical name piper nigrum L. From the 40 species of piper L. several are known to be cultivated in different parts of the world. Piper nigrum L. is the most important species, and this review will mainly deal with piper nigrum L. More than 80 varieties have been obtained by hybridisation and are exploited in the different tropical and sub-tropical areas with rain-fall of more than 200 cm per annum at temperatures ranging from 10 to 40 ^{o}C. An excellent review concerning chemistry, technology, composition and botanical aspects of pepper and pepper products is given by V.S. Govindarajan[1)] in the Central Food Technological Research Institute, Mysore, India, in 1977. Many of the general and special aspects of the chemical quality evaluation and composition of pepper and pepper products are discussed and summarized in that paper listing 223 references, so that the main emphasis in this review is put on the papers published since 1976 and on some further aspects not so discussed in details by Govindarajan.

Reference: 1) V.S. Govindarajan, CRC Critical Rev. Fd. Sci. Nutr.

Analytics of pepper and pepper components

The normal analytical procedures to determine the quality standard of fresh pepper and graded pepper products are laid down in the ISO-specifications and recommendations as well as in the ISI-documentation, in the British Pharmacopoea and in the Essential OEC Association of American Specifications[4,9,16]. In addition a lot of papers have been published, concerning the isolation and identification of the different components, particularly in the extractable matter of pepper and pepper products[1,3,5,8,10,12,15]. All modern analytical separation techniques like TLC, GLC, HPLC and HP-TLC have been successfully applied in the investigation of volatile and non-volatile matters of pepper constituents[2,6,7,11,14]. For identification of the components mentioned in tables 3 - 5 UV- und IR-techniques as well as fluorescence-spectroscopy and mass-spectroscopy in combination with retention times in gas-chromatography and HPLC have been used[13,17].

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Chemical composition of pepper fruits

The chemical compositon of pepper is strongly depending on the stage of maturity of the harvested fruits. The major constituents of pepper are starch, fibre, protein and fat, but the more important ones are the volatile oil and the piperine. These are the characteristic constituents which contribute to the aroma and pungency of pepper and pepper products. In table 1 the lowest and highest reported contents for the main constituents of the different piper nigrum varieties, harvested at different stages of maturity, are iisted.

Table 1

Range of chemical composition (% w/w) of fruits of piper nigrum L. varieties (fresh berries non-dried)

Ref. 15

Moisture:	40.8 - 85
Starch:	2.5 - 46.3
Protein:	2 - 4
Fiber:	4 - 18
Total Ash:	0.9 - 1.8
Fat: 1.2 - 4	
Total extractable matter:	
Volatile oil:	2 - 8
Non-volatile ether extractable matter:	7 - 10-3
Piperine:	0.8 - 6.8

The large range of values for the different constituents is of great importance for selection of pepper for special uses.

In table 2 the ranges of the chemical compositions of pepper grades from different cultivars are compiled.

Table 2

Range of chemical composition (% w/w) of pepper grades
Ref. 30,32,33

Moisture:	4.6 - 14
Starch:	11.5 - 63
Protein:	10 - 14.1
Fiber:	5.2 - 27.8
Total Ash:	1.1 - 6.6
Fat: 1.9 - 9	
Total extractable matter:	
Volatile oil:	0.5 - 4.2
Non-volatile ether extractable matter:	7.1 - 13.5
Piperine:	0.8 - 6.8

Again the broad variation of the different constituents is obvious. The lower moisture content is due to the pre-drying of the harvested berries to obtain suitable graded products in the market. It is reported in several papers (see ref. 33) that the starch content in pepper increases drastically during maturation. Because of lack of systematic studies on various cultivars of piper nigrum conflicting figures are reported about the time-dependency of starch increase during maturation. The different analytical methods applied for the determination of constituents in pepper in the different studies certainly are responsible for the broad range of the analytical figures.

Pepper contains a mixture of chemical components which are extractable by solvents[9,10,27]. The common name of this mixture is pepper oleo-resin[12]. The amount of extractable matter depends on

the type of solvent used for the extraction procedure[18]. The total extractable material of freshly harvested berries is in the range of 9 - 18 % which is also due for pre-dryed pepper grades. This varies with the type of cultivar. The content of total extractable matter and the chemical composition varies also with the stage of maturity of the different pepper varieties[25].

Pepper oleo-resins are commonly separated into the volatile oil and the non-volatile extractable matter. The ranges of composition are given in tables 1 and 2.

The chemical components of the volatile oil have been carefully investigated by various authors[19,34,35]. Volatile oil of black pepper varieties mainly consists of monoterpene-hydrocarbons, sesquiterpene-hydrocarbons and oxygenated compounds like esters, ketons, alcohols of aliphatic and aromatic hydrocarbons.

In table 3 a list of the chemical names of the already identified components in volatile oil of piper nigrum is given. Many of the components occur in each investigated pepper variety in roughly the same range. But it should be mentioned that some components only occur in special varieties and do not exist in others[23,24,25].

The non-volatile extractable pepper constituents consist of alcaloids and lipids. The most important alcaloid piperine is responsible for the pungency of pepper and pepper products. Piperine contents (minimum and maximum values) are also given in tables 1 and 2.

Besides piperine[5] several minor alcaloid components have been isolated from pepper or pepper extracts recently. Similar alkaloids have been found in other species of piperaceae[3,4,6,7,11,14,31].

Table 3

Identified chemical compounds of volatile oil from piper nigrum L.
Ref.[2,20,21,22,23,24,25,26])

Monoterpene Hydrocarbons	Sesquiterpene Hydrocarbons	Oxygenated Compound
α-Thujene	α-Cubebene	Linalool
α-Pinene	α-Copaene	1-Terpinen-4-ol
Camphene	Calamenene	α-Terpinol
Sabinene	Ɛ-Caryophyllene	Carvone
Ɛ-Pinene	Ɛ-Farnesene	Caryophyllene-Ketone
Myrcene	Humulene	Pinocarveol
α-Phellandrene	Ɛ-Selinene	Myrtanol
δ-3-Carene	α-Salinene	Caryophyllene oxide
α-Terpinene	Ɛ-Bisabolene	Humulene oxide
p-Cymene	Δ3-Carene	Ɛ-Pinone
Ɛ-Phellandrene	γ-Murolene	Borneol
Limonene	α-cis-Bergamotene	1-Terpinen-5-ol
γ-Terpinene	α-Santolene	Myrtenol
Terpinolene	δ-Cadinene	Nerol
Ocimene	ar-Curcumene	Nerolidol
	α-Guaiene	Eudesmol
	Isocaryophyllene	Camphor
		Cavacrol
		1,8-Cineole
		ρ-Cymene-8-ol
		Myrtenol
		Eugenol
		Safrole
		Anethole

In table 4 the chemical structure of the identified major and minor alcaloid components are listed. Until now little is known about the content of the minor alcaloids in piper nigrum. It can be assumed reliably, however, that the content is between 0.1 and 1.5 %, depending on the pepper variety or the maturity of the harvested product.

In table 5 the lipid components as determined by Salzer[36] and Bedi[37] are collected. The lipids contain relatively high amounts of unsaturated fatty acids, but no extraordinary lipid structure has been identified up to now.

The protein composition of pepper has not been investigated in detail. It is reported to be rich in lysine, histidine and cystine.

Table 4

Chemical names of alkaloids identified in piper nigrum L.
Ref. 16, 17, 29

Piperine	
Piperanine:	(3,4-methylene-dioxyphenyl)-2-pent-enoic piperidide
Piperyline:	(3,4-methylene-dioxyphenol)-pyrrolidide
	N-trans-cafferoyl-tyramine
	N-trans-feryloyl-tyramine
	N-trans-feryloyl-piperidine
Coumaperine:	N-5-(4-Hydroxy-3-methoxyphenyl)-2E,4E-pentadienoyl piperidine
Pellitorine:	N-isobutyl-2E,4E-decadienamide
	N-isobutyl-2E,4E-octadienamide
	N-isobutyl-2E,4E,8Z-eicosatrienamide
	N-isobutyl-13-(3,4-methylenedioxyphenyl)-2E,4E,12E-tri-decatrienamide
Piperidide:	N-isobutyl-11-(3,4-methylenedioxyphenyl)-2E,4E,10E-undecatrienamide

Table 5

Fatty Acid Composition of Pepper Lipids

		Percent of total fatty acids	
Fatty acid	Carbon No.	Beci et al.[37]	Salzer[36]
Lauric acid	12	-	1.0
Myristic acid	14	-	1.6
Palmitic acid	16	16-32	27.3
Stearic acid	18	-	Traces
Oleic acid	18:1	18-29	30.6
Linoleic acid	18:2	25-35	29.6
Linolenic acid	18:3	8-19	5.0
Arachidic acid	20		Traces
Behenic acid	22	3- 6	3.4
Lingnoceric acid	24		-

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Processing

Pepper and pepper products are processed using three different steps. These are drying, grinding and the extraction procedures. The latter can be devided into solvent extraction and steam-destillation. Where the drying procedures for black and white pepper strongly depend on the local climatic conditions and on the growing habits in the different geographical areas in the world, little is known about the technical details of grinding and milling, because this is part of the manufacturer's know-how to get high retail prices in the market. With the exception of some common details, which are given in several patents, the same is true for the extraction and steam-destillation technologies[11,12,13,15].

For the grinding and milling technologies it is of high importance to prevent loss of volatiles by using tightly closed mills and pre-chilled products. A much more effective grinding procedure is the cyro-mill process, in which the pepper is cooled down by liquid air or carbon-dioxide in the grinding zone to be below -70 ^{o}C[18].

For the production of oleo-resins and essential oils from pepper several extraction solvents are in use[4,19]. The most important ones at present are dichloromethane and dichloroethane. Water and acetone have been accepted as extraction solvents for a long time[1]. Recently, ethanol was introduced as an extraction solvent in some factories in the United States, Canada and Western Germany. High-pressure extraction with carbon-dioxide[3,8,17,21] was very successfully applied in pilot plants, but the equipment for commercial production has to be ameliorated for economical reasons. Some other solvents have only been used on laboratory scale in smaller pilot plant trials[9,10]. Table 6 is a list of

extraction solvents and their physical properties, used for the production of pepper oleo-resins.

Table 6

Solvents for extractions of pepper oleo resins

Ref. 10,17,21

	Molecular weight	Chemical Formula	Boiling Point Degrees C (760 mm)	Density at 20°C (kg/l)
Acetone	58.08	$(CH_3)_2CO$	56.20	0.7911
Methylene Chloride	84.94	CH_2Cl_2	40.20	1.3200
Ethylene Dichloride	90.90	$CH_2Cl_2CH_2Cl_2$	83.50	1.2550
Ethanol	46.07	CH_3CH_2OH	78.32	0.7904
Ethylacetate	88.10	$CH_3COOC_2H_5$	77.11	0.9006
Water	18	H_2O	100	1.000
Hexane	86.17	C_6H_{14}	68.74	0.6594

Most of the pepper oleo-resin production is done with perculation equipment. Technical development of modern equipment is going to reduce the necessary amount of solvent and to enable the easy and total recovery of solvents from the miscella. Refining steps by degumming with phosphoric and citric acid are not described in details in the literature[16]. For storage the extracts are sometimes encapsulated to avoid loss of flavour[2]. The oleo-resins are mainly used as liquid spices or flavours[6,7,20]. Piperine is isolated from extracts for pharmaceutical use in small quantities[5].

Pepper oil as an essential oil is produced by a relatively simple steam destillation from waste and hull materials of piper nigrum L. Fresh green pepper is mainly canned for storage. Ascorbic acid is used to remain the colour and the fresh taste[14,22].

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Reported use of pepper components

It is reported in the literature in scattered papers, but recently with increasing emphasis that several components from piper nigrum show pharmaceutical, antimicrobial, antioxidative and insecticidal properties. The relevant papers are reviewed in the following:

Antimicrobial effects

Bacterial effects of compounds of piper nigrum have been studied by several authors, using different micro-organisms including staphylococcus aureus and streptococcus faecalis[2,4]. The antibacterial activities of the compounds studied were low, which is in agreement with the fact that pepper and pepper products have to be treated with fumigants or gamma-radiations for storage. Antibacterial treatment may become a problem in the future, if fumigation with ethylene-oxide, ethylene-dibromide and methylbromide or gamma-radiation will not be tolerated by the food and health authorities of the Western countries. As it is known from the food industry that pepper and pepper products with a relatively high moisture content may mould, the microbiocidic properties of components of piper nigrum cannot be considered to be of much relevance. Antifungi properties from essential oils of other piperacae have been reported[1,3].

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Insecticidal effects

Insecticidal properties of piperine and some other piperinic amides have been reported in several papers[1,3,4,7,8]. Results of laboratory tests revealed toxic effects to a lot of insects listed in table 7. In some cases, only repellant properties of pepper extracts and components have been described in the literature[5]. Some minor components like piperitine and pellatrine are reported to show synergism to pyrethrum and other piperinic amides with low insecticidal effects. Until now no field trials have been reported upon. It is worthwhile to note that extracts from other piper varieties sometimes show stronger insecticidal effects than those of piper nigrum[2,6].

Table 7

Insects to which components of piper nigrum L. show adverse effects

Insects	Biological effects of pepper components
adzukibeen weevil (callosobruchum chinensis)	toxic
red flour beatle (tribolimus custaneum)	repellant
cowpea weevil (calloso brachus maculotus)	toxic
house fly (musca domestica)	toxic
rice weevil (sitophilus orycae)	toxic
boll weevil	toxic
larvae of cratetis capitata	toxic
larvae of spodoptera littoralis	toxic
corn earworm (heliothis obsoleta)	repellant
drosophila melanogaster	toxic

Ref. 1, 3, 4, 5, 7, 8

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Pharmaceutical effects

Several extracts of plants or seeds of some species of the family peperaceae have been known for a long time to have pharmaceutical properties, particularly in the countries where the plants are grown[1,2,5,6,9]. In the literature before 1980 mainly the pharmacological effects of total plant extracts are reported, and some of these, in most cases in mixtures with others[7,8,13,16], are patented or described as a medical extract in the different pharmacopoeas. In the last years more systematical pharmacological studies on such plant extracts as well as on isolated components have been reported[3,14,17]. For piperine, the most important alcaloid of pepper nigrum, in animal studies a central nervous system depression property is described. Uterine disorders and antivertility effects[10,12] as well as vaso dilatorial effects[18] and anti-flammatory activity of several piperinic amides are described in different papers with somewhat conflicting results. No systematic pharmacodynamic or pharmacokinetic reports about the activity of the peperinic amides could be found in the literature until the time being. One paper was found dealing with the theoretical discussion of the potential carcenogenity of piper nigrum L.[4].

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Antioxidative effects

Antioxidative activity of spice extracts was recognized in some studies since the sixties[9,11]. Recently more systematic investigations on compounds prepared from piper nigrum and other species of the piperaceae have shown that the antioxidative activity of some isolated components is comparable to those of the presently used synthetic antioxidants like BHT or BHA and also comparable to alpha-tocopherol[1,2,4,5,6,7,8,10]. Some patents have already been filed[3]. Nothing is reported in the literature about the concentration of the components showing antioxidative activity and no report exists about the long-time stability and the taste of foods and pharmaceuticals used in the laboratory trials. No paper is found in the literature, describing the practical use of antioxidants isolated from pepper, piper nigrum, at present.

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Discussion of the Literature Review

After a first screening of an online literature survey (revealing more than 200 citates) about the already known possibilities of processing, the chemical and physical analyses and the use of piper nigrum, piper longum and piper cubeba some further alternatives to the only present use as spices have been turned out and should be considered within this study. However, it should not be taken out of mind that recent development of new types of pepper spices particularly that of green pepper may contribute to an increasing demand of pepper in the food industry. This aspect, however, will not be included in details in the study. The development of new spiced foods or drinks depends strongly on the marketing ideas of the food industry and cannot be propagated by an industrial pepper research study.

From the composition of pepper, particularly piper nigrum, several pathways may lead into new products and will be investigated in the study from the technological point of view as well as from the commercial side. The main ideas for research projects to enlarge the demand for pepper in the programme of this study will cover the following items:

1. Green pepper as a vegetable product.
2. Pepper components as natural antioxidants for the food industry.
3. Pepper components with pharmaceutical activities.
4. Pepper components showing insecticide or bactericide properties.

Items 2, 3 and 4 have already been reported in the literature of the last 15 years. Many of the information about the use and composition of piper nigrum is collected in the excellent review

given in the CRC Critical Review in Food Science and Nutrition by V.S. Govindarajan[1].

The above mentioned items have been investigated by collecting information from the literature as well as from the food industry and trading companies. Experimental work should only be carried out if a reasonable good chance is expected for setting up a detailed study for the development of a research project. The discussion of the main ideas and the problems occurring during manufacturing of pepper products are summarized as follows:

Item 1: Green pepper as a vegetable product

The use of pepper as a vegetable is only scarcely suggested in recent papers of food manufacturers. Green piper nigrum contains between 60 to 80 % of moisture when it is harvested prior to the period where the starch is developed strongly and the final ripening is obtained. At this stage green pepper could be possibly used as a vegetable product, if the strong flavour which is already present in the berries could be reduced by a technique which does not destroy the protein. The low amount of starch and protein in the pepper berries at this stage is comparable to peas or other vegetables like cabbage. The nutrition value is low, but sufficient if the taste of the pepper berries could be softened by reducing the pungent and strong aromatic flavour. The latter could be reduced by a simple steam destillation, but this procedure would destroy the protein components and the green colour. Another possibility will be the extraction of the oleo resin by suitable solvents. This procedure would need a careful freeze-drying of the product which seems to be too expensive to obtain a vegetable with a relatively poor nutrition value. Nevertheless, it seems to be worthwhile to look about manufacturing processes to obtain such products. The use of pepper as a vegetable would

increase the demand of pepper strongly. However, the chance to develop such a product with an acceptable taste to the consumer in the growing areas or in western countries seems to be low.

Activities to be carried out in this pilot study:

This item needs a some more detailed information about the pepper composition during growth and the optimal harvesting time as well as some more information about a simple technique for the elimination of the strong flavour and the preservation of the prepared fruits.

Item 2: Pepper components as natural antioxidants for the food industry

As reported in the literature[2)] that some phenolic amides and their isomers contained in piper nigrum do show antioxidants properties comparable to those of caroteen. This could be a possibility to manufacture these components from pepper for the food industry. In the western countries an increasing market for natural antioxidants is expected. For other countries like India or some African countries the availability of peperin derivates as antioxidants may be of some importance. For some toxicological reasons natural antioxidants are preferred from the food industry, but the relatively cheap price of the already available carotene makes it necessary to obtain such a product by a simple manufacturing procedure from pepper or from oleo resin mixtures at a comparable price. Another problem which may occur from using these components as an antioxidant in food is the pungent taste which might not be acceptable in each case. But the market for natural antioxidants is not very large, and even if the pepper component would work well the product is in competition with others which are prepared and marketed only by some western manufacturers.

Activities to be carried out in this pilot study:

Looking more deeply into these problems two other difficulties are coming up, which, however, are true not only for item 2, but also for 3 and 4. Special components of pepper or oleoresin which may be used as an active agent in the food, pharmaceutical or agricultural industry have to be separated or isolated from the bulk material. This means in most cases that any technical process to obtain these components in a more or less pure state has to be as simple as possible, otherwise the price of the product will go up and the marketing chances will decrease. Therefore a careful study of the possibilities to separate such components has to be carried out.

Secondly, the question will arise, what should happen to the remainder product. Most badly the remainder will be wasted and this will increase the price of the extracted components. Another use of this remainder product has to be carefully investigated and will be one of the aims in this study. Particular emphasize will be led on the efficiency of the pepper component as antioxidant. Environmental studies including sensoric tests will be carried out.

Item 3: Pepper components with pharmaceutical activities

It is reported in several papers[3, 4] that some of the pepper components show rather spasmolytic and fertility inhibitor properties. Apart from the already under item 2 mentioned problems of separation for the active components and the manipulation of the remainder of the received products it should be pointed out that on the one hand the pharmaceutical industry of the western countries has a strong interest in exploring tropical plants w.r.t. the content of pharmaceutical agents. Activities in more

than a dozen studies supported by the UNIDO and the GTZ are carried out on behalf of several big pharmaceutical manufacturers in the United States and Europe. On the other hand it cannot be neglected that the pharmaceutical industry in many western countries, e.g. USA, Germany, France, UK, has to fulfil a lot of legal requirements before a new pharmaceutical product is marketed. The work to cover all necessary investigations often tends to last more than 5 to 8 years. The amount of money which has to be spent to fulfil all the toxicological and pharmacokinetic investigations are often exceeds 5 to 8 million US-dollars. This means, that if the active components prepared from pepper do not show significant advantages to the already known pharmaceutical components, the interest to carry out an exhaustive investigation of the pharmaceutical industry will be comparable low.

Activities to be carried out in this pilot study:

Taking into account the above mentioned problems within this study all pharmaceutical aspects of pepper components will be carefully reviewed. All problems occurring from already existing substances showing similar pharmaceutical effects and the separation technique to receive the active agent to produce such a component will be carefully studied.

Item 4: <u>Pepper components showing insecticide or bactericide properties</u>

From a superficial view on the relevant literature[5)] the impression might arise that some pepper components will have insecticide or bactericide properties. This is true from the scientific point of view; but most of the mentioned properties of the special pepper components show growth inhibitions only for special insecticides like larves or some special germs. That pepper does

not contain components with general insecticide, bactericide and fungicide properties is pointed out by the fact, that pepper has to be treated with chemicals like ethylene oxides, dibrom ethylene and others or has to be radiated to avoid deterioration of pepper spiced foods. Special insects particularly larves from drosophila can be reduced by treatment with pepper components. But the same reduction could be obtained by other chemicals to be used in less quantities. Therefore the potential of making use of such a pepper product as an insecticide is given only in the case when a special insect plague is expected.

Activities to be carried out in this pilot study:

The chance to produce an insecticide from pepper material has to be seen very low, and a detailed discussion of the potential problems will be carefully discussed in this study.

Conclusion

No tider consequences about the possibility for a research project to increase the demand of pepper can be given at present. Most items mentioned do not show a great chance for new processes which would need pepper as a raw material, but, nevertheless, will be carefully investigated to reveal possible aspects for new end-uses.

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PREPARATION OF PEPPER EXTRACTS AND EXPERIMENTAL CHECKS

General aspects

This part of the report describes the experimental work to check practical application of the different aspects which are reported in the literature for the use of pepper components.
Furthermore it contains a short description of the experimental work for the preservation of green pepper by dewatering with super-critical carbondioxide.

1. Preparation of extracts from black, white and green pepper

Pepper extracts were made out of:

i) Black pepper from Sri Lanka, imported by Werner Bruhns, Hamburg. Nothing known about type and harvesting time.

ii) White pepper from Samarinda/Indonesia, imported by Rugedro, Hamburg. Nothing known about type and harvesting time.

iii) Black pepper from Sarawak/Malaysia, harvested July 1988

iv) White pepper from Lampung, harvested July 1988

v) Green pepper from Bangka/Indonesia, harvested July 1988 from 16 years old vines.

From all pepper products dichlormethane extracts were prepared according to the below given procedure. From the white pepper from Indonesia as well as from the green pepper extracts were prepared by using super-critical carbondioxide. The latter extracts were derived with a laboratory equipment which is of the size for the extraction of 5 kg raw material. Because only 200 g of each green and white pepper were available for the experiments the results may not be fully representative for a carbondioxide extract of pepper.

1.1. Preparation of dichlormethane extract

700 g of pepper were milled for 1 min in a Moulimex knife mill and the milled material was extracted in a 2 l soxhlet apparatus with 1.5 l of dichlormethane. After 8 h extraction

time the total extract was filtered through a glass filter plate and then the dichlormethane was removed in a rota visco glass vessel at 50 C. After the main amount of solvent was removed the extract was treated for 5 min at 50 C under vacuum at a pressure of 20 mbar to remove the residue amount of dichlormethane. The so obtained extract contained less than 1 mg/kg dichlormethane (determined by headspace GC) and was stored under nitrogene at 0 C.

1.2. Description of the raw extracts

The raw extract yields are given in table 1. All raw extracts from white pepper had a slight brownish colour. The colour of the extracts out of the black pepper was dark brownish, so that even in a glass vessel of 1 cm Ø no optical transparency could be recognized. After a while of storage at 0 C in all extracts sediments of grey-brownish crystals were formed. All extracts showed oilly and had a strong pungent taste.

The rough composition of the extract is given in table 1. The results were obtained by analysing the extracts with thin layer chromatography HPLC and steam destillation. The obtained figures for the composition are in good accordance with the literature.

1.3. Preparation of super-critical carbondioxide extracts

400 g of milled white pepper (No. iv) were treated with 1400 g carbondioxide at a pressure of 50 bar and a temperature of 25 C. The total extract after 5 treating cycles was removed from the extraction vessel and heated up to 40 C in a vacuum vessel at a pressure of 20 mbar for 15 min to re-

duce the solved carbondioxide. A pale, slightly yellow semi-solid extract was obtained. The extraction yield is given in table 1.

Table 1

Data for extracts from white, black and green pepper

No. of pepper type		Total yield g/100 g pepper	Volatile oil[1] g/100 g pepper	Piperine[2] components g/100 g pepper
i) black pepper	)	13.7	3.5)	9.4
ii) white pepper	)	15.8	4.9)	10.0
iii) black pepper	) 3)	14.3	4.9)	8.0
iv) white pepper	)	17.9	7.0)	9.1
v) green pepper*)	)	8.4	4.5	4.2
iv) white pepper	)	14.2	6.0) 4)	8.1
v) green pepper*)	)	7.9	4.9	3,0

1) Determined by steam destillation
2) Determined by nitrogene content and calculated as piperine
3) Extraction solvent: CH_2Cl_2
4) Extraction solvent: CO_2

*) Containing 44 % moisture

To prepare an extract from the green pepper (No. v) 200 g of it were smashed in a knife-mill and then treated in the same manne as described above. The amount of carbondioxide for the green pepper extraction was 1000 g. The obtained extract (extraction yield see table 1) shows a green-greyish colour, was partly solid and contained droplets of water and terpane oils. It had a much stronger flavour than the methylene dichloride extract.

1.4. Preparation of extract fractions

From extracts No. iv) and v) the volatile oil containing the most monoterpenes and sesquiterpenes were separated by steam destillation. Starting with 40 g extract a yield of 10-12 g destillate was obtained. By GC/MS-technique more than 20 terpene compounds were identified (s. Fig. 1). The destillate was a nearly colourless oil of low viscosity. Then the residue was separated into two fractions by column chromatography on silica gel using a mixture of acetone and ethanol as solvent. The first fraction contained according to infra-red spectroscopy, gaschromatography and mass spectroscopy a lot of components which were not analysed in detail. The second fraction contained mainly the piperine derivates from the piperidine and purolidine base.

Fig. 1

List of the identified terpenes from Sri Lanka Pepper Extracts

Scan-No.	Component
523	α-Thujene
537	α-Pinene
594	Sabinene
602	β-Pinene
611	Myrcene
633	not identified
647	Δ-3-Carene
674	Limonene
714	not identified
757	α-Terpinene
766	Linalool
881	Terpinene-4-ol
897	not identified
1074	δ-Elemene
1085	α-Cubebene
1117	not identified
1123	α-Copaene
1135	γ-Cadinene
1179	β-Caryophyllene
1190	α-Guajene
1213	Humulene
1239	not identified
1252	Guajene
1274	δ-Cadinene

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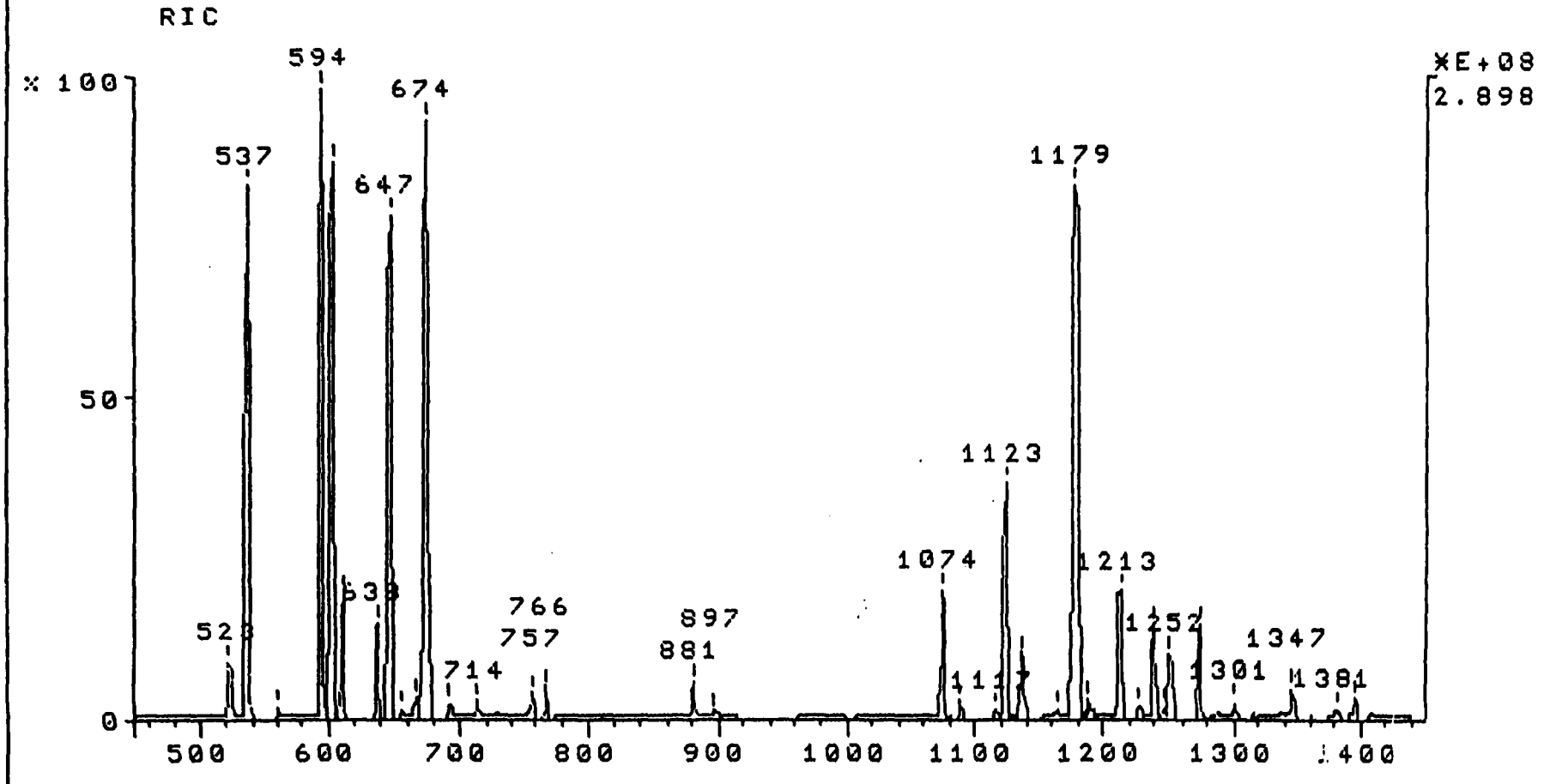
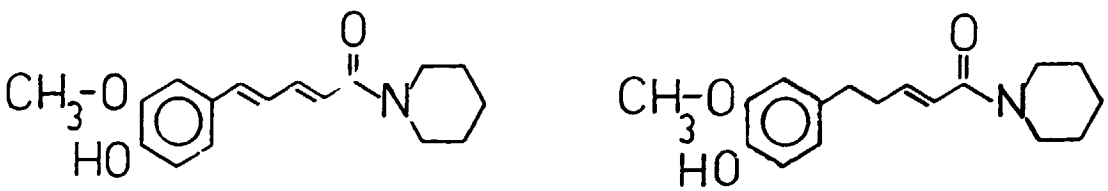


1.5. Preparation of purified piperidine amide

To obtain purified phenolic piperidine amides, 10 g of the methylene dichloride extract of white pepper No. iv) was diluted in aceton and then given on a aluminium oxide column. After elution with hexane 5 fractions were separated with an eluate of methanol : water : methyl acetic ester: 9 : 1 : 0.5. Each fraction was analysed with HPLC-technique and it was found that fraction No. 3 contains mainly phenolic piperidine amides (identification by NMR-spetroscopy). This fraction was then three-times crystalized from aceton. Finally an amount of 0.35 g phenolic piperidine amides of the following structure (determined by HPLC and mass spectroscopy) was obtained:



The product was a white, slightly yellow crystalin material and had a slight pungent taste.

2. Antioxidant check test

To check the antioxidant properties, which are mentioned in the literature, some tests were carried out with the different extracts and fractions which were added to oils containing higher amounts of unsaturated fatty acids. The tests were prepared as follows:

Fresh prepared soybean oil and safflower oil were mixed with 0.05, 0.1 and 0.5 % of the extracts or fractions. Then the oil was given in a glass vessel containing a glass stopper with a small tube so that air could come into the glass vessel continuously. The vessel was then shaked on a shaking machine with a frequency of 2 shakes per second. The peroxide number of the oil was then determined after 1, 4, 7, 14 and 20 days. For comparison oil without any extract or fraction and within addition of 0.1 % carotin was also included in the experiment. Peroxide numbers obtained in the experiments are given in table 2. In figures 2 and 3, as an example, the results are shown for the oxidation reaction of soybean and safflower oil with and without addition of extract No. i). From these results no antioxidative effect, but an acceleration of the oxidation reaction is obvious. Slight antioxidative activity was found in a fraction of the white pepper extract containing piperidine amides. Only the isolated phenolic piperidine amide showed a strong antioxidative activity.

This means that, if the antioxidative effect as mentioned in the literature of the unsaturated component available in piper nigrum and piper lognum shall be used, it is necessary to separate these components totally from all other components which more or less have no or the controverse influence on the oxidation process of fatty oils. Separation of such single component from the pepper is only possible by using the high sophisticated column chromatography. The latter is very expensive and for the next ten years such a component will therefore not be able to be a competitor to easier obtainable antioxidants, vitamin C, carotin and some others.

Table 2

Influence of pepper components on the oxidation reaction of soybean- and safflower-oil

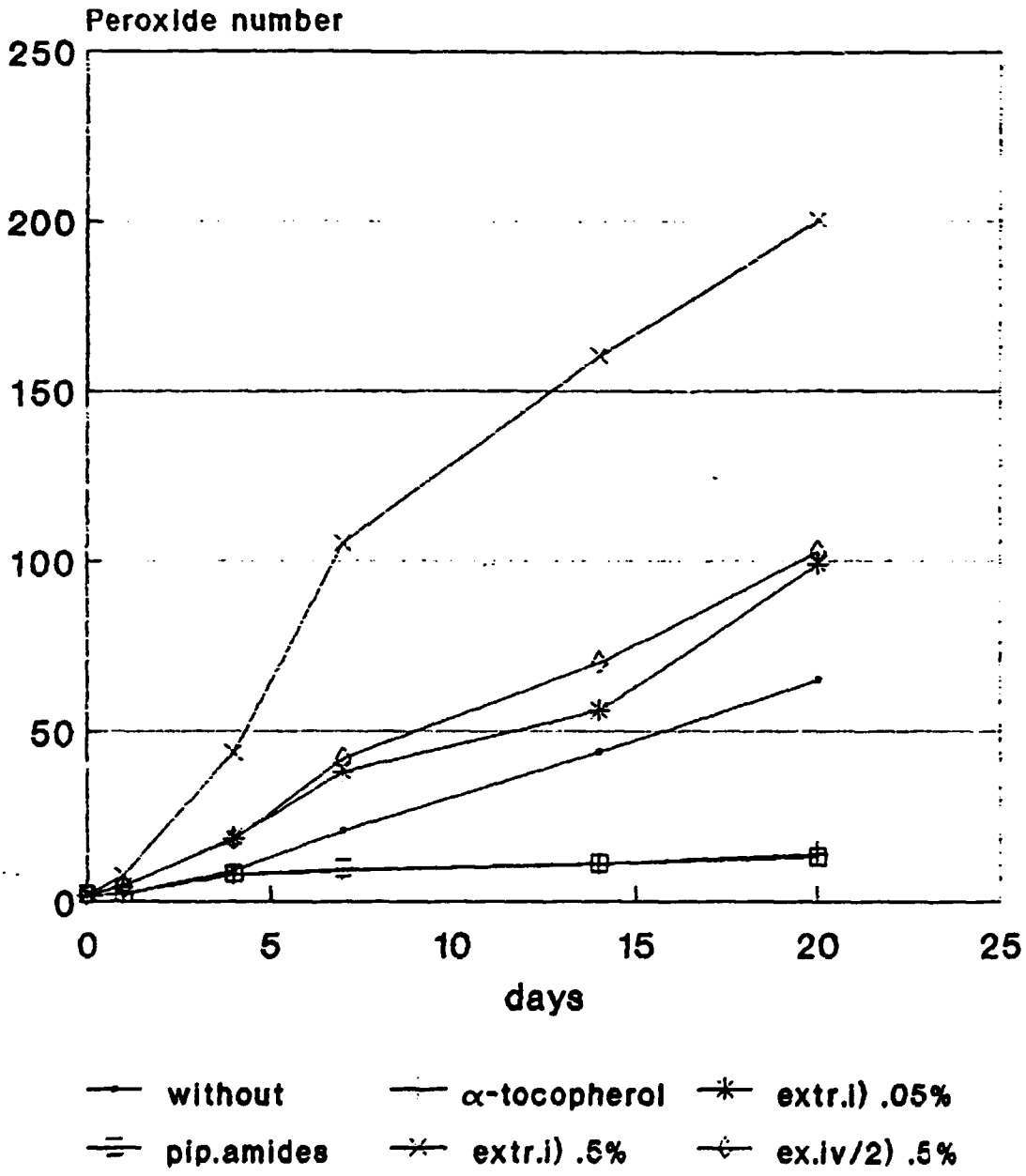
Extracts or components			Peroxide number after n days air treatment n = 0	1	4	7	14	20
without		Soy	1.8	2.2	9.2	20.8	44	65
		Saf	2.9	4.2	14.4	29	38	56
α-tocopherol	0.05 %	Soy	1.8	2.0	8	9	11	14
		Saf	2.9	4.9	6.7	7.9	10	16
piperine amides	0.05 %[1)]	Soy	1.8	2	8	9.5	11	13
		Saf	2.9	5.2	7.9	8.5	11	15
extract i)	0.05 %	Soy	1.8	4.2	18.5	38	56	99
		Saf	2.9	5.8	26.0	40	80.5	112
extract i)	0.1 %	Soy	1.8	4.2	22.3	50.3	76	104
		Saf	2.9	7.5	36.6	83.0	116	148
extract i)	0.5 %	Soy	1.8	7.4	43.6	105	160	>200
		Saf	2.9	11.5	62.6	148.5	195	>200
extract iv)	0.05 %	Soy	1.8	5.6	21	35	54	104
		Saf	2.9	6.0	24	41	76	122
extract iv)	0.5 %	Soy	1.8	10	45	100	166	>200
		Saf	2.9	12.6	56	133	182	>200
fraction 2 of extract iv)	0.1 %[2)]	Soy	1.8	4.6	18	42	70	102.5
		Saf	2.9	6.9	28	59	82	122
fraction 2 of extract iv)	0.5 %[2)]	Soy	1.8	8.9	69	145	169	>200
		Saf	2.9	11	59	132	186	>200

1) This product was prepared as described in chapter 1.5

2) This product was prepared as described in chapter 1.4

Figure 2

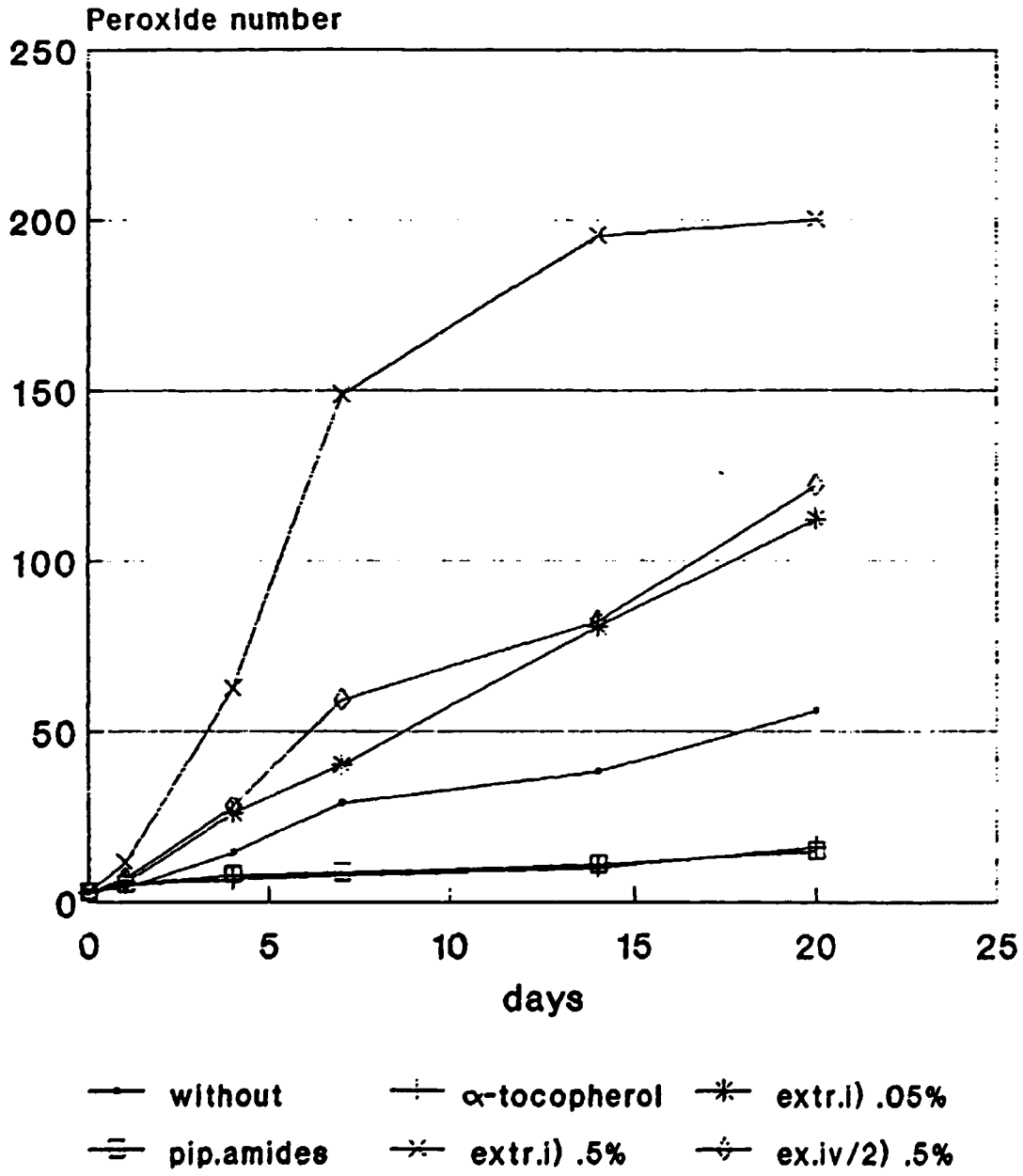
Oxydation of Soybean Oil
after addition of pepper-extract



881220 8

Figure 3

Oxydation of Safflower Oil
after addition of pepper-extract



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3. Bactericidal check-test

The extracts No. iii) and iv) were checked w.r.t. their bactericidal properties. A standard test procedure for testing disinfectants and preservatives was used. Details are summarized in the following description.

3.1. Testing procedure for bactericidal properties

According to the German pharmacopceia DAB 9 the extracts were examined in a minimum inhibition concentration test for the most usual bacterium strains, which cause problems to the human life. The growth of the following strains were observed at a termperature of 37 C for 24 h:

Protcus mirabilis
Pseudomonus aeruginosa
Staphiylococcus aureas
Escherichia coli
Streptococcus faeculis

No inhibition of the growth were observed for all bacterium strains showed a non-reduced growth. The extracts therefore do not possess bactericidal properties under this test conditions.

4. Preserving of green pepper

Because of the high contamination of the green pepper with mould and bacteria, the product can presently only be stored and transported if it is kept in an acid liquid preservative.
Another possibility to preserve green pepper is to remove the total water of the product which may be done by freeze-drying or by a drying procedure using super-critical carbon-dioxide.

As it was difficult to obtain enough fresh green pepper only a small test could be done with the available material*). The green pepper which was transported very quickly in a frozen state to our institute in Hamburg was separated after visual inspection manually in berries which did not have any sign of mould and showed a homogeneous dark green colour. This material was then treated with carbondioxide under the following conditions:

100 g berries were treated for 5 min with 100 g carbondioxide at a pressure of 50 bar at 25 C in two cycles. Then the carbondioxide/water mixture**) was removed and the total material was heated up to 40 C at a vacuum pressure of 500 mbar for 10 min.

The obtained material contained less than 0.5 % water and showed a somewhat brighter green colour. The volume was roughly 80 % of the volume before dewatering. The product had a slight, but less of a normal green pepper smell, it tasted sharp and pungent. The material absorbed water up to 33 % after it was treated for 2 h with drinking water. The visual inspection after regeneration with water showed that the derived material had nearly the same appearance than before dewatering; taste and smell were somewhat less than of the fresh product. The microscopical inspection showed that nearly none of the cells were damaged during the procedure, so that intact berries were obtained.

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*) This material was obtained by a kindly arrangement of Mr. A.G. Nasutiong, President of the International Pepper Community, Djakarta.

**) Under this conditions 3 g carbondioxide will take up 1 g water.

5. Discussion

A lot is known about the composition and the content of components in pepper from the literature. The literature informs us that several components contained in the berries of piper lognum and piper nigrum do have properties which could be made use in the food industry, pharmaceutical industry as well as in the plant protection agents industry. There is no doubt that after separation of such components it will work more or less in the way as it is described in the literature. But the results of the few experiments carried out within this project show that products obtained with a simple separation technolgy do not alyways possess the expected properties in a distinct manner. Antioxidant properties as well as bactericidal and pharmaceutical properties are superposed by others, in some cases contradictory acting properties were revealed as was shown in the case of antioxidant test. Presently and in the near future the technical isolation of a single component with a particular property from the mixtures of components of pepper extracts will no be possible under realistic economic conditions.

From a technical point of view the extraction with supercritical carbondioxide might give a good chance for a better isolation of a particular group of components from pepper extracts. But even in this case a column chromatographical procedure will be necessary to obtain sufficient pure substances for technical purposes.

Many of the volatile components from piper nigrum and piper lognum particularly some sesquiterpene hydrocarbons and some monoterpenes possess a chemical structure which could be

used as a starting material in the chemical syntheses of complex pharmaceutical products. But it was already shown by C.J. Müller and W.G. Jennings most of them are minor components comprising less than 0.1 % of the total volatile fraction of the pepper extracts. To separate these components from the crude extract or the crude oleo resin material it is at present a complicated procedure which from the economical point of view will not come into comparison with the technical production of such components by complete chemical syntheses.

A further complication in the use of such minor components as starting material for chemical syntheses is caused by waste problem. Not all of these components from a pepper extract will be presumably free of value as starting products for chemical reactions. Just those components like ß-carophylilene and others can much easier be prepared from other natural plant material and therefore will cause high waste to reduce the economic result obtained by selling the minor components.

The development of a sophisticated technology which is the separation of chemical components and which is under the way since the last 10 years and will be advanced in the next 10 years, may open the possibility to make use of such components on a commercial base and should therefore be considered carefully during next years. But any research development regarding the use of such components should be defered until advanced technologies have been developed in other technological programmes.

COMMERCIAL ASPECTS

1. General aspects

From all aspects revealed from the existing literature reporting about pepper components to be used for industrial products it appears possible from the technical point of view that pepper components made from white and black pepper may compete with several synthesized chemicals. Piper nigrum and piper longum may be used for different applications in the food, agricultural and pharmaceutical industry. This report deals with the economic aspects which have to be taken into account for a comparison of pepper or oleo-resin components and other materials from pepper with already existing products in the international chemical market.

In part 1 of this project report (literature review) and part 2 (preparation of pepper extracts and experimental checks) besides the possible use and preparation of monoterpenes, sesquiterpenes as well as the main piperine alcaloids to be used in the above mentioned fields of application it is reported also about some tiny components in pepper extracts originated naturally or by oxidation and artificial treatment, which have been described as to possess pharmacological, antioxidation or biocide properties. Therefore the possible use of Minor components in the both groups of chemical components from pepper are included in the consideration of the economical aspects.

2. Terpenes, deterpenes and sesquiterpenes

The most important natural components from pepper which as a mixture can easily be obtained by extraction are the terpenes and sesquiterpenes.

All terpenes, diterpenes and sesquiterpenes occur in roots, leaves and fruits of many plants, particularly those growing in tropical and subtropical climate. The oleoresin extracts from pepper contains dl-limonene alpha- and beta-pinene and caryophyllene as main components (about 80 %) of the extracted volatile material. The terpenes and sesquiterpenes are mainly used by the flavour and perfume industry as well as by the pharmaceutical industry.

For the production of 1 kg of the main components, e.g. dl-limonene, it is necessary to start with the extraction of 80 - 100 kg of dried pepper berries. This calculation is made due to the fact that 0,5 - 4,2 % of the total materials can be extracted from dried pepper berries as volatile material and a content of 25 % of the volatiles is dl-limonene[1)].
According to the data from literature[2)] (see part 1 and part 2 of this report) a somewhat smaller amount of the components with the second highest content alpha- and beta-pinene and caryophyllene will be obtained from the above-mentioned amount of dry pepper berries. All other components of mono-, di- and sesquiterpenes can be prepared from the same amount of raw material in a much smaller weight level of some grams to 100 grams according to the much lower amount of these components available in the volatile components of pepper.

To obtain such individual components in a pure state high efford has to be spend in the separation technology.[3)] The requirements for purity of a single component are becoming higher, particularly because of the increasing legislative requirements of the food- and pharmaceutical industry. But even than, the raw materia' prices for the basic product are of importance in the preparation process and pepper as the raw material has to compete with a lot of other plant materials to start from.

The market prices for small orders of delivery of some terpenes and sesquiterpenes are given in table 1. The selling price levels on a US-Dollar basis for some of the most important terpene components are between 50 and 200 US $/kg terpene at a 97 to 99 % level of purity. According to the above mentioned calculation and due to the fact that market prices for black or white pepper are presently at a level of 2900 to 3800 US $/ mto the raw material price of the pepper for the preparation of 1 kg of limonene would be about 300 US $, which is 10 times as much as the selling for the D-limonene and more than 60 times as much as the market price for the Dl-limonene.

The corresponding figures for some other main components of the terpenes and sesquiterpenes are given in Table 2. The discrepancy for pepper to be used as raw material for the production of the main components of terpenes and sesquiterpenes is evident from the figures given in Table 2.

Of course several different components of the terpenes and sesquiterpenes will be prepared or isolated simultaniously by the particular separation techniques from the same amount of bulk material. But it can clearly be seen from the figures of Table 1 and 2 that this will not have any extraordinary influence on the total price of the final products.

Table 1

Market prices for terpenes and sesquiterpenes for small orders of delivery*)

	Trade name and/or chemical name	purity [%]	price/kg [US $]
1	Myrcene Methyl-3-methylene-1,6-octadiene	97	20- 40
2	1,3,5-Triisopropylbenzene	97	350- 400
3	" "	99	600
4	Adamantane Tricyclo(3,3,1,1,3,7)decane	99	160- 350
5	D-Limonene 4-Isopropylene-1-methylcyclohexane	97	30- 50
6	" " " "	99	40- 80
7	γ-Terpinene 1-Isopropyl-4-methyl-1.4-cyclohexadiene	98	80- 130
8	α -Terpinene 1.Isopropyl-4-methyl-1.3-cyclohexadiene	97	60
9	α-Pheldandrene 5-Isopropyl-2-methyl-1.3-cyclohexadiene	97	90- 120
10	ß-Caryophyllene 8-Methylene-4-11,11-trimethyl- bicyclo(7,2,0)undec-4-ene	97	75- 120
11	ß-Pinene 6,6-Dimethyl-2-methylenebicyclo- 3,1,1-heptane	98	40- 60
12	α-Pinene 2,6,6-Trimethyl-bicyclo(. 1,1)-2-heptane	98	50
13	2-Carene 3,7,7-Trimethylbicyclo 4,1,0)-Hepta-2-ene	97	500-1500
14	" "	99	1500-2000
15	D-Sabinene 4-Methyl-1-1(2-propyl)bicyclo(3,1,0)hexane	99	3000-4000
16	DL-Limonene DL-Mentha-1,8-diene	97	5- 8

*) Prices are taken from chemquest databank

Table 2

Comparison of the raw material prices (pepper) to the market prices of terpenes and sesquiterpenes

	content in dried pepper %	raw material price for pepper to prepare 1 kg of the product based on the present marked price of 3 000 US $/to in US $	market actual prices in US $
D limonene	0,2	1500	30 - 50
Dl limonene	0,8	375	5 - 8
ß Cargophyllene	0,4	750	75 - 120
ß Pinene	0,8	375	40 - 60
D Sabinene	0,15	2000	2000 - 2500
γ Terpinene	0,07	4285	80 - 130

Even if the costs for the isolation of the single components by steam distillation, other distillation and chromatographical techniques[4] are not taken into account, pepper as a raw material for the production of such chemicals can only be of value, if pepper waste is used together with other raw material sources as it is done in the past[5].

The latter is true particularly in comparison to the market prices for larger orders, which could not be obtained officially, but will dependend on the actual demand for a particular component 10 to 30 % less than the prices given in
Table 1.

Minor components of terpenes and sesquiterpenes, which exist in pepper as e.g. 2-carene or d-sabinene[6], might be of interest because of their much higher market prices (see Tab. 1). However, there is only a small demand for these components in the pharmaceutical and flavour industry. But these components as pure materials have to be isolated by a sophisticated technique and may also be produced from a lot of other natural resources, which are available elsewhere. Therefore these components cannot be seen of any particular value to increase the availability of pepper as raw material,
more than it is used presently.

3. Piperine components

Another group of components extractable from pepper are the alkaloids responsible for the pungent taste of the product. Between 3 and 8 % alkaloids, the main component of which is

piperine, are extractable from dried pepper[7]. Besides piperine some minor chemical components naturally occurring in pepper have also alkaloid character and are reported to show insecticidal and antioxidation properties[8]. Unfortunately, not so much the piperine itself but predominantly some of the congener components and also their oxidised products, which are available in the pepper at very low content level between 0.05 and 0.5 %, are said to show these properties.

Piperine itself as well as some minor alkaloids and their derivates prepared from piper nigrum and piper longum are reported to show pharmacological activities[9].

3.1 Antioxidants

The antioxidation properties as shown in part 2 of this project report are due only to the very limited content of the phenolic pipiridine amide and correlated components[10]. It is not yet clear, whether these components occur naturally in pepper or may originated from chemical reactions with oxygen during storage and treatments. Therefore their will be obtained from pepper only in a tedious and costly procedure[11].

As the raw material prices strongly enhences the price of the final product, the price of these components will be high in each case, so that besides the large availability of natural and synthetic antioxidants like Vitamin E or BHT, antioxidants from pepper may not be regarded as an economic alternative to the existing products, particularly to the food industry.

Table 3

Market prices for small orders of deliveries of antioxidants*)

	Trade name and/or chemical name	Purity [%]	Price US $/kg
1	BHT Butylated Hydroxyamide	97	40
2	BHT 2,6-Di-tert.-Butyl-4-methylphenol	98	13.5
3	" " "	99	17- 30
4	3,5-Di-tert.-Butyl-4-hydroxytoluene	97	76- 80
5	Vitamine E DL-alpha-Tocopherol	96	380
6	D-delta-Tocopherol	93	740**)
7	D-gamma-Tocopherol	97	540-570**)
8	Vitamine C L Ascorbic Acid	97	20- 30
9	" " "	99	40- 80
10	Sodium ascorbate	97	25
11	" "	99	30- 40
12	L Ascorbic acid-6-palmitate	97	150-160
13	" " "	99	160-220
14	L Tartaric acid	99	14- 20

*) Prices are taken from chemquest databank

**) Price for 1 g

In Table 3 the international market prices for the most important antioxidants used in the food industry more or less prepared by chemical synthesis, are collected.
Moreover it must also to be taken into consideration that from the toxicological point of view a lot of information has to be revealed, before such a product could be marketed as an antioxidant for food products in most of the western countries. Last not least a pungent taste of the piperine derivates may also limit the application of these components in food products.

Therefore, a similar economical situation occurs, as already mentioned above for the volatile components.

Taking into account that the piperine derivates, which might be of interest for the use as antioxidants, will only be isolated from the other components by solid liquid chromatography techniques, which are tedious and expensive, it seems to be doubtful at present to obtain such products on a economical basis. Costs for the preparation of such products, will therefore in each case be on a high level and it is obvious that presently no preparation technique will be available to match the prices for the products of Tab. 3 in particular those for the synthetic antioxidants but to a certain extent also to thë natural ones.

3.2 Insecticides

Regarding the insecticidal properties of piperine and piperine amides some toxic and repellant effects on particular insects are reported (this report part 1, page 20). If piperine amides or other components prepared from pepper or

pepper extracts would be isolated from pepper or oleo-resins and used in the field of agricultural protection agents, they have to compete with the already introduced chemical components predominantly prepared by chemical synthesis.

Table 4

European market prices of sactine agents for insecticides*)

	Name	US $/kg
1	Lindan	40- 50
2	Parathione	20- 30
3	Thiram	10- 20
4	Carbofuran	120- 140
5	Pyrethrum	550-1200**)

*) Prices are taken from chemquest databank

**) depending on the purity

In Table 4 the market prices for some insecticides in the European market are collected. The prices for the same materials in the United States will be lower because of the larger agricultural market. Such figures could not be made available seriously for trade reval reasons between European and American plant protection industry. The prices for most of the products are very low with the exception of pyrethrum, which is obtained from natural resources and has got newly a broad field of application in agricultural plant protection. Some minor components like piperitine and pelletrene are reported to show synergism effects to

pyrethrum[12]. There are a lot of other chemical components which also show synergism effects to pyrethrum, and components from pepper which are not easyly to separate from pepper extracts, might come in a strong competition from the economical point of view to the presently used chemicals which do show this synergism effects.

However, as there is an increasing market for insecticidal products based on natural resources, the synergism properties of the mentioned components of pyrethrum could be an interesting point for the future developments in the plant protection industry and should therefore seriously be considered from the scientific and economic point of view as a possibility to enlarge the production of pepper.

3.3 Pharmaceutics

A somewhat more promising situation occurs with some exceptions for those components which are said to be of pharmacological value.

Piperine and some congeners are reported to show analeptic[13,14] activity, coronary vasodilatorial activities[15] as well as - with some doubt on the reliability of the published work - antifertility properties[16] and particularly together with other components of natural plant extrakts antihelmintic and antiflammatory behaviour (see Lit. of part I).

The market prices for pharmaceutical chemicals are generally higher due to the stronger requirements, which have to be fulfilled for purity, activity and safety reasons. Therefore, the pharmaceutical industry of the Western coun-

tries has a strong interest in exploring tropical plants with respect to the content of pharmaceutical agents. These activities are already running in more than a dozen studies supported by the UNIDO, the GTZ and the national health research authorities of the United States, Japan and the Federal Republic of Germany. In Table 5 the market prices are collected for small orders of delivery of some pharmaceutical agents which are used for the preparation of drugs for coronary vasodilatorial deseases or as anticonvulsive and antifertility agents.

However, it should be pointed out clearly that the pharmaceutical industry in the Western countries has to fulfill a lot of legal requirements, before a new pharmaceutical product is marketed and any decision to go ahead with the development of a new pharmaceutical agent produced from natural sources, will be carefully checked in each case and should not be considered in general. The amount of money which has to be spent to fulfill all the necessary toxicological and pharmakokinetic requirements for such a product often exceeds 5 to 10 million US $ and the work will run over 3 to 5 years. This means, that if the active components prepared from pepper do not show significant advantages to the already known pharmaceutical components the interests of the pharmaceutical industry to carry out an exhaustive investigation will be comparatively low. A discussion with the management of larger pharmaceutical companies in the Federal Republic of Germany responsable for the development of new products about the properties and already known results of peperine derivates which show pharmaceutical activities as mentioned above, did not result in any serious interest.

Table 5

Market prices for small orders of deliveries of pharmaceutical agents*)

	Trade name and/or chemical name	Purity [%]	Price US $/kg
A)	**Psychotonics**		
1	Caffeine 1,3,7-Trimethylxanthine	99	20- 40
2	Caffeine citrate 1,3,7-Trimethylxanthine citrate	99	110- 120
3	Theobromine 3,7-Dimethylxanthine	97	200
4	" "	99	250- 290
B)	**Neuroleptica / Vasodilatora**		
1	Reserpine 3,4,5-Trimethoxybenzoicester	97	2500-2800
2	" "	99	2500-3400
3	Promethazine 10-(2-Dimethylaminopropyl) Phenothiazine	98	300- 400
4	Chlorpromazine 2-Chloro-10-(1-dimethylaminopropyl)- phenothiazine	98	400- 500
C)	**Anticonvalsiva**		
1	Trimidone 2-Desoxyphenobarbital	97	300- 400
2	ß-Methylphenobarbital	98	600- 800
3	Phenobarbital	98	120- 150
4	5,5-Diphenylhydantoin	99	70- 120
D)	**Antihelminthica**		
1	Piperazine	99	20- 40
2	Quinidine sulfate Chinekonan-9-ol-,6-methoxy-sulfate	99	900-1400
3	Cimetidine	98	1600
E)	**Antifertilizer**		
1	Oestradiol-benzoate	98	3500-4000
2	17-ß-Hydroxy-17-Methyl-Androsta- 1,4 -Dien-3-One	99	4000
3	17-α-Methyl-Δ5-Androsten-3ß-17ß-Diol	97	4000-7000

*) Prices are taken from chemquest databank

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RECOMMENDATIONS

Pepper extracts and components of pepper have already limited applications as industrial products. Severals components of pepper are reported in the literature to show antioxidant properties, insecticide behaviour and some pharmacological activities. Some of the reported properties and the amount of available components in pepper have been checked in this study. It was also checked whether a softer and more effective extraction procedures using modern hypercritical extraction technologies would result in better yield and more cleaner and better useable products.

The main results from this study can be summarized as follows:

1. Pepper does not contain particular components which have extraordinary properties for which a high demand in the chemical or pharmaceutical industry is expected in the near future.

2. Most of the components available from pepper can also be obtained in high amount from other natural material.

3. Many of the components obtainable for pepper which are of possible interest for the pharmaceutical-, chemical- and plant protection industry are available in relatively low concentration levels. This means that the raw material price of the pepper have to be drasticuly reduced to compete with the production costs of the presently existing alternative chemical components.

4. To obtain particular chemical components from pepper sophisticated isolation technologies which are tedious and laboursome have to be applied. This will have a strong

influence on the price of the final product and therefore products from pepper as a alternatives will come to an acceptable price level in comparison with the presently existing materials.

Therefore seems to be unlikely at present from the economical point of view to develop products from pepper which can be sold in the international market on a suitable price level to increase the demand of pepper cultivation.

However looking into the future develepments of the plant protection industry, which because of the environmental problems is searching more and more for the possibilities of using natural products as alternatives and into the recently started developments of the pharmaceutical industry, trying to find new products from natural raw material sauces the following recommendation is given:

1. The developments of the plant protection industry particularly the aspects to use natural or semi artificial components of natural grown products as insecticides and rhodenticides should be carefully watched within the next five years.

   Practically this could be done on a low cost bases by a literature study. The results should be summarised in a yearly report. If as a result of that study more confirmation about the pesticide properties of those components showing a similar structur to the pepper components is reported from the scientific literature, experimental studies with such components and derivates could then be carried out with a good chance of success.

2. A small study should be carried out to obtain the different opinions of the international parmaceutical industry about the anticonvulsive and vaso dilatorial properties of the piperin and some piperin derivates.

   This study could be carried out in sending questionaires to the 40 or 50 largest pharmaceutical companies in the world and into several pharmaceutical scientific institutes. The aim of this study should be to obtain their opinion about the applicability of the piperine derivates, the possible development in this field and the reliability of the reported behaviour of some of the pepper components. In case of positive replies a experimental study on the respective components could be carried out may be together with a pharmaceutical company.

3. The future development of new separation technologies should be watched carefully from the technical and the economical point of view.

   It may be possible that future developments in the more sophisticated technologies could reduce the costs for the separation significantly and this could be the bases for future uses of pepper components on a more realistic price level. Such a study could also be done by a consecutive literature report over the next five years and should also contain informations about the possibilities for the drying and storing of green pepper as a modern food component.

ANNEX I

RETRIEVAL OF LITERATURE

The cited literature is given below on the subject of

P E P P E R

Part 1: PEPPER, PROCESSING OR EXTRACTION
Part 2: PEPPER, USE
Part 3: PEPPER, VARIETIES
Part 4: PEPPER, VOLATILES OR ANALYTICS
Part 5: PEPPER, PROCESSING, USE, ANALYSIS (SYNOPSIS)
Part 6: PEPPER, VEGETABLE
Part 7: PEPPER, ANTIOXIDATIVE EFFECTS
Part 8: PEEPER, PHARMACEUTICAL EFFECTS

Included in this retrieval of literature are the citations listed with these keywords in the data bases

5 BIOSIS PREVIEWS 69-88/FEB BA8504;RRM3404
10 AGRICOLA - 1979-87/DEC
110 AGRICOLA - 70-78/Dec
50 CAB ABSTRACTS - 1984-87/NOV
51 FSTA - 69-87/ DECEMBER
79 FOODS ADLIBRA - 74-88/JAN
399 CA SEARCH 1967-1988 UD=10804
76 LIFE SCIENCES COLLECTION -78-87/OCT

Citations within each data base are chronological. Due to retrieval in different data bases citations may occur repeatedly.

Part 1: PEPPER PROCESSING OR EXTRACTION

1: Production of a black pepper oleoresin by dense carbon dioxide or carbon dioxide-ethanol extraction
2: The use of Calflo E solid support for extraction of benzo(a)pyrene and other polycyclic aromatic hydrocarbons from large quantities of fats and oils
3: Process for extraction of pepper colors from chilli oil
4: Detection of gamma irradiated pepper and papain by chemiluminescence
5: Wet method for obtaining oil-soluble substances from vegetable matter
6: Apparatus for distillative separation of volatile materials from liquids
7: Changes in capsaicin contents in fresh and processed red peppers
8: High-contrast photographic elements exhibiting reduced pepper fog
9: Spice extracts, lauricidin, and propylene glycol as inhibitors of Clostridium botulinum in turkey frankfurter slurries
10: Halftone imaging silver halide emulsions, photographic elements, and processes which employ arylhydrazides
11: Effects of processing treatments on recovery of capsaicin in jalapeno peppers
12: Relationship between pigment content, peroxidase activity and sugar composition of red pepper (Capsicum annuum L.). I. Influence of cultivar, drying method and a ripening accelerator
13: Relationship between pigment content, peroxidase activity and sugar composition of red pepper (Capsicum annuum L.). II. Changes occurring

during the industrial drying process
14: Use of supercritical gas extraction for spices and fragrances
15: Validation of a radioimmunoassay for (+)-abscisic acid in extracts of apple and sweet-pepper tissue using high-pressure liquid chromatography and combined gas chromatography-mass spectrometry
16: Retention of carotene in green peppers and peaches after a home dehydration process
17: Irradiation in the production, processing, and handling of food
18: Thermal poultices containing dl-camphor and ginger extracts
19: Fate of malathion removal from treated chilli Capsicum annum by home processings
20: Spice extracts
21: Effect of pulsation mixing on the extraction of essential oils
22: Determination of the capsaicinoids content in an extract of red pepper
23: Study of the kinetics of initiation of radical processes during heating of lignin in an alkaline medium using a spin trap
24: Injection-extraction procedure for rapid determination of relative pungency in fresh jalapeno peppers
25: Encapsulation of active agents as microdispersions in homogeneous natural polymeric matrices
26: Investigation into some physiological and biochemical processes in hothouse-grown sweet pepper with a view to determining the causes of flower abortion
27: Kinetics of essential oils extraction during production of alcohol extracts
28: Uses of supercritical gas extraction in the food industry
29: High contrast development of photographic elements
30: Separation of biologically active chromium-containing complexes from yeast extracts and other sources of glucose tolerance factor (GTF) activity
31: Hydroxyproline-containing proteins extracted from intact and wounded sweet pepper fruits
32: Plant extracts with sensory properties
33: Effects of blanching and sulfur dioxide on ascorbic acid and pigments of frozen capsicums
34: Influence of cultivar and agricultural as well as processing technologies on color, sugar composition and peroxidase activity of red pepper
35: Chemical composition of vegetable processing byproducts
36: Effect of storage conditions on changes in quality of flavor and aroma extracts obtained from certain spices
37: Toxic hazards from common materials
38: Effects of added calcium on texture and quality of canned Jalapeno peppers
39: Ethyl acetate as a solvent for extraction of spice oleoresins
40: Changes in vitamin U during storage and processing of vegetables
41: Jalapeno pepper pungency as a quality control factor for process cheese
42: Use of a device for measuring the light absorption or dispersion in determining the solubility of extracts from foods or condiments in highly compressed solvents
43: Nitrate content of preserved vegetables
44: Improved methods of the determination of common salt in spices
45: Evaluation of the quality and stability of taste and flavor preparations obtained by extraction
46: New method for quantitative essential oil analysis
47: Formation and metabolism of pungent principle of Capsicum fruits. Part VII. Enzymic formation of capsaicinoid from vanillylamine and iso-type

fatty acids by cell-free extracts of Capsicum annuum var. annuum cv. Karayatsubusa
48: Photosynthetic inhibitors from Capsicum annuum L.: extraction and bioassay
49: Studies on processing and analysis of red pepper seed oil
50: Study of the production of extractum capsici spissum
51: Extraction of plant and animal materials
52: Rapid determination of nonylic acid vanillylamide and other capsaicinoids in Capsicum fruits and extracts by silver(1+)-complexation high-performance liquid chromatography
53: Extraction of bitter principles from black pepper
54: HPLC determination of piperine in pepper and in pepper extracts
55: Inhibition of Clostridium botulinum by spice extracts and aliphatic alcohols
56: The use of lactic acid in vegetable products industries
57: A closed system for measurement of photosynthesis, respiration and carbon dioxide compensation points
58: Comparison of batchwise and continuous steam distillation-solvent extraction recovery of volatiles from oleoresin capsicum, African type (Capsicum frutescens)
59: Processing factors affecting acidification of canned pimiento peppers
60: Effect of indoleacetic acid, kinetin, extract from Capsicum stigmas, and Nitschs' culture medium on pollen germination and growth of pollen tubes in vitro of various species of Capsicum
61: High-performance liquid chromatographic analysis of the pungent principles of pepper and pepper extracts
62: Detection of radioactive contamination in vegetable and fruit products and effects of technological processes (on the contamination), in the canning industry
63: Volatile components and pungency in fresh and processed jalapeno peppers
64: Effect of sulfur dioxide on the main biochemical processes and yield of tomato and paprika
65: Volatile components and pungency in fresh and processed jalapeno peppers (Capsicum annuum)
66: Reduction of photosensitive pepper in silver halide emulsions
67: Characteristic of flavor and aroma of natural extracts from black pepper
68: Analytical control of a capsaicin-free Capsicum extract
69: Study of the organic acid composition in carbon dioxide extracts from some plants with a spicy aroma
70: Spice aroma extract
71: Extraction and gas-liquid chromatographic determination of hexachlorophene from several plant tissues
72: Spice processing
73: A high-yield method for the extraction and purification of capsaicin
74: Environmental pollution of the Port Pirie region. 3. Metal contamination of home gardens in the city and their vegetable produce
75: Hot pepper extract
76: A composition for and a process therewith of treating the hair and/or scalps of animals
77: Studies of quality changes in capsicum cultivars during maturation, ripening and processing
78: Spice extracts
79: Spectrophotometrical determination of yellow and red paprika pigments from the total extract
80: Dyed edible food casing

81: Changes in the pectic composition during the processing, fermentation and preservation of pickled products (pimentos and olives)
82: Effects of spice extracts on hydrolases. No. 1. On trypsin
83: Influence of gibberellic acid and yeast extract on the germination of pollen and the growth of pollen tubes in vitro of different species of Cayenne peppers (Capsicum)
84: Analytical evaluation of seasoning extracts (oleoresins) and essential oils from seasonings. II
85: Constituents of peppers. V. Qualitative and quantitative analysis of the pungent principles of pepper and pepper extracts
86: Extraction of oleoresins from spices
87: Extraction of fat-soluble nutrients from plants
88: Extraction rate equations for paprika and turmeric with certain organic solvents
89: Application of emission spectrometry for studying trace elements in fruit juices and extracts
90: Effect of some spice extracts and antioxidants on the oxidation of edible soybean oil
91: Extracts from the fruits of Piper guineense
92: Carbon dioxide extract from Capsicum annuum fruit
93: Processing of pimento waste to provide a pigment source for poultry feed
94: Effect of natural spices, spice extracts, essential oils, extraction residues, and synthetic antioxidants on the breakdown of pork fat and model lipids. III. Spice extracts, water vapor-volatile and nonvolatile extraction components, and extraction residues
95: Treatment of concentrated pimiento wastes with polymeric flocculating agents
96: Extraction of odorous and taste substances from plant material
97: Use of generalized variables for the correlation of extraction properties of solvents
98: Mineral nutrition of vegetable crops. XIII. Extraction of macronutrients by several vegetable crops
99: Production of red pepper extracts for the pharmaceutical industry
100: Aromatic extracts of natural composition
101: Instrumental analysis of carbon dioxide-extract components of Piper nigrum
102: Carotenoid synthesis in seasoning paprika
103: Processing medicinal plants and herbs
104: Flowable granules with protective coatings
105: Extraction of the antibiotic capsicidin from mature Capsicum annuum seeds by a simple method
106: Determination of kava-kava (piper methysticum) extracts
107: Extraction of plant raw material containing alkaloids with liquid carbon dioxide
108: Inhibition of oxidation processes in meat-product lipids under the effect of ionizing irradiations
109: Distillation processing of medicinal plants or drugs
110: Inhibitor extracted from Capsicum annuum (Capsicum frutescens) (red pepper) leaves. III. Antigenic purity of active substance isolated and identified with ribon ulease
111: Preparation of a carbon dioxide extract of red pepper
112: Galenicals or pure substances. 1. Solubility tests with pure substances and dry extracts
113: Processing of pimiento for stuffing olives. Chemical peeling and storage in low-concentration brines. II. Results for 1969-70

114: Analysis of dyes. XI. Detection of foreign pigments in spice extracts used in the manufacture of meat products
115: Effect of thiol groups on the germination rate and metabolic processes in normal and in difficulty germinable leguminous seeds
116: Control of the adulteration of pepper samples by electrophoretic analysis of protein extracts
117: Effect of natural spices, spice extracts, essential oils, extraction residues, and synthetic antioxidants on the decomposition of pork fat and model lipids. I. Effect of natural spices and spice extracts on pork fat
118: Chemical and qualitative changes in producing frozen roasted Kapia red peppers
119: Development toner bath
120: Spasmolytic activity of aryl substituted .alpha.-pyrones and aqueous extracts of Piper methysticum
121: Extracts of spicy-aromatic substances in mayonnaises
122: Content of ascorbic acid and its derivatives in fresh-frozen and canned peppers
123: Correlation between ribonuclease activity and inhibition of virus infection by foliar extracts from different species
124: Introduction of native extracts of medicinal plants and spices into lotions and shampoos
125: White pepper
126: Indigenous drugs used in uterine disorders. I. Pharmacological actions of the extract of the fruits of Piper aurantiacum and an attempt at the identification of its oxytocic principles
127: Inhibitory effect of extracts from pepper leaves (Capsicum annum). II. Concentration and purification of an inhibitory fraction
128: Inhibiting the oxidizing processes occurring in meat product fats under the effect of ionizing radiations
129: Composition of the carbon dioxide extract of black pepper
130: Changes of free sugar contents in sarcocarp and seed during the ripening process. Free sugar contents in pumpkin, sweet pepper, and trifoliate orange
131: Auto-oxidation of extractable color pigments in chili pepper with special reference to ethoxyquin treatment
132: Structure of pipataline, an extractive from Piper peepuloides
133: Rapid method for the extraction of light filth from paprika
134: Extraction of pepper oil
135: Liquid pepper extract
136: Vitamin C content in fresh and canned vegetables

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107196681	103213681	101071388	95181927	93148399	91009527
107174495	103121791	101069463	95167303	93137921	90164092
107156357	103101451	100173322	95095694	93074863	90021019
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104196919	101235664	96141380	94109072	92074558	88005025
104050040	101212907	96102744	94099839	91173630	87199264
104004799	101089004	95202262	94044255	91033987	87182935

73-136

87182727	84003364	80124357	77066235	72099285	70113936
87156339	83145961	80106995	76070063	72089021	70109094
87083373	83111341	80094383	76044772	72061408	70095556
86177170	83026545	80058898	75132991	72020254	69066258
85141517	82153984	80030731	75116825	72011457	69010151
85122116	82123417	79030678	75031503	72002238	69009767
35003944	82084699	79017198	75025327	72000973	67057240
84149574	82072612	78146479	75004217	71042162	67005649
84149526	82014004	78101980	73129626	71037586	66018121
84149393	81076666	78059893	73011432	71028970	
84013401	81024345	77072319	73002784	71010227	

citation no. 8020/1
79:0250190 87240471
Food Flavouring Ingred Process Pack , 9(10) October 1987, p 65-68
CODEN: FFIPEB
Doc Type: JOURNAL
Fruit juices: D Pepper of Paterson Candy (UK) discusses why he believes ultrafiltration in the clarification of fruit juices is a better method than conventional filtration.
Descriptors: PROCESSING & ENGINEERING; Vegetables & Fruits

citation no. 8020/2
79:0248118 87220440
Sciences des Aliments 7(3) 1987, p 481-498 CODEN: SCALDC
Doc Type: JOURNAL
Spices: "Production of a black pepper oleoresin by dense carbon dioxide or carbon dioxide ethanol extraction." (J P Vidal & H Richard; in French)
Descriptors: PROCESSING & ENGINEERING; Extractions

citation no. 8020/3
79:0240258 87140367
MC. The Manufacturing Confectioner , 67(6) June 1987, p 83-88 CODEN: MCNFAO
Doc Type: JOURNAL
Sweeteners: T Pepper of Finnsugar Xyrofin (UK) Ltd reviews the uses of sugar substitutes in chocolate and boxed chocolate fillings and nougats. Xylitol, sorbitol, mannitol, isomalt, lactitol, maltitol, and hydrogenated glucose syrup are discussed along with intense sweeteners such as aspartame, acesulfame K, saccharin, cyclamate, thaumatin and stevioside.
Descriptors: PROCESSING & ENGINEERING; Confectionery

citation no. 8020/4
79:0236407 87100520
Food Microbiology , 3(4) October 1986, p 321-329 CODEN: FOMIE5
Doc Type: JOURNAL
Sausages: The combined effect of pH, water activity, and certain additives (sodium nitrite and sodium nitrate, polyphosphates, wines and pepper) on growth and survival of two strains of Staphylococcus aureus in model salami at 25 C was investigated.
Descriptors: PROCESSING & ENGINEERING; QUALITY CONTROL; Meats

citation no. 8020/5
79:0236384 87100497
Journal of Food Protection , 50(5) May 1987, p 401-403 CODEN: JFPRDR
Doc Type: JOURNAL
Spices: H Geeta & P R Kulkarni report results of a survey of the microbiological quality of whole, black pepper, and turmeric powder sold in retail shops in Bombay, India.
Descriptors: PROCESSING & ENGINEERING; QUALITY CONTROL

citation no. 8020/6
79:0219680 86160912
Packer , 93(28) July 12, 1986, p 9B CODEN: PCKRAA
Doc Type: JOURNAL
Peppers: Vacuum cooling lends the Superior Brand Produce Inc a hand in pepper harvesting.
Descriptors: PROCESSING & ENGINEERING METHODS; Vegetables & Fruits

citation no. 8020/7
79:0214093 86057905
Journal of Food Protection , 49(3) March 1986, p 216-221 CODEN: JFPRDR
Doc Type: JOURNAL
Spices: "Microanalytical quality of ground and unground marjoram, sage & thyme, ground allspice, black pepper and paprika." (J S Gecan, et al.)
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/8
79:0213924 86056508
Agricultural & Biological Chemistry , 50(2) February 1986, p 347-355
CODEN: ABCHA6
Doc Type: JOURNAL
Spices: The distribution of microorganisms in fifteen samples of selected spices and the effects of irradiation on them was evaluated by M L Juri, et al. The total aerobic bacteria in black pepper, white pepper, turmeric, rosemary and basil were determined.
Descriptors: PROCESSING & ENGINEERING METHODS

citation no. 8020/9
79:0213172 86050804
Federal Register, 51(69) April 10, 1986, p 12394 CODEN: FEREAC
Doc Type: JOURNAL
Spices: FDA announces the availability of defect action levels Compliance Policy Guides for insect and rodent filth in ground and unground processed spices (allspice, cinnamon, nutmeg and pepper).
Descriptors: GOVERNMENT INFORMATION

citation no. 8020/10
79:0212337 86043507
J Food Science & Technology , 22(5) September 1985, p 317-320 CODEN: JFSTAB
Doc Type: JOURNAL
Spices: The microbiological status of black pepper is discussed by T V Mathew, et al. It was observed that export quality samples of black pepper were less contaminated than market samples.
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/11
79:0210706 86029801
Int J of App Radiation & Isotopes , 36(12) December 1986, p 989-991
CODEN: IJARAY
Doc Type: JOURNAL
Spices: R Hewamanna & L W Boteju report microbiological and chemical studies on irradiated black pepper.
Descriptors: PROCESSING & ENGINEERING METHODS

citation no. 8020/12
79:0201647 85090708
CRC Critical Rev in Food Sci & Nutr , 22(2) 1985, p 108-176
CODEN: CRFND6
Doc Type: JOURNAL
Spices: A comprehensive review is offered by V S Govindarajan on capsicum. The production, technology, chemistry and quality is discussed in Part I which focuses on the history, botany, cultivation and primary processing of these pepper spices (from paprika to bell pepper including chilis and cayenne).
Descriptors: RESEARCH & TECHNOLOGY

citation no. 8020/13
79:0196554 85051802
Deutsche Lebensm Rundschau , 80(12) December 1984, p 369-374 CODEN: DLRUAJ
Doc Type: JOURNAL
Spices: "Impact of natural state and degermed pepper on the spoiling velocity of ready-to-eat soups." (H.K.Frank & I.Beyer)
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/14
79:0194531 85040209
Journal of Food Science , 50(2) March 1985, p 376-378 CODEN: JFDSAZ
Doc Type: JOURNAL
Aflatoxin: "Evaluation of substrate potentially and inhibitory effects to identify high risk spices for aflatoxin contamination." Growth and aflatoxin production by Aspergillus parasiticus on autoclaved, whole, ground and also surface sterilized black pepper, cardamom, red pepper, dry ginger and tumeric were studied.
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/15
79:0191584 85010810
Dairy Record, December 1984, p 34 CODEN: DAREAU
Doc Type: JOURNAL
Cheese: Otto Roth (General Foods Corp) began importing a new cheese line, Duo brand layered cheeses. Duo is a combination of pasteurized processed emmenthal with a mousse-like filling of walnuts, herbs and spices; salami & black pepper, or smoked salmon. (full text)
Descriptors: NEW PRODUCTS; DAIRY

citation no. 8020/16
79:0189255 84100604
Advertising Age , November 01, 1984, p 59 CODEN: ADVAAQ
Doc Type: JOUkNAL
Cheese Spreads: Kraft Inc introduces Velveeta Mexican process cheese spread in mild and hot varieties to the national market. Each of the Velveeta branded cheeses contain jalapeno pepper.
Descriptors: NEW PRODUCTS; DAIRY

citation no. 8020/17
84070818
Applied and Environmental Microbiology , August 1984, p 376-379 CODEN: AEMIDF
Doc Type: JOURNAL
Aflatoxins: "Aspergillus parasiticus growth and aflatoxin production on black and white pepper and the inhibitory action of their chemical constituents."
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/18
84057901
Food Chemical News , June 18, 1984, p 20-22 CODEN: FCHNA9
Doc Type: JOURNAL
Irradiation: USDA researcher D.W.Thayer notes that radiation processes are no panacea or a "process free from concern." Some flavor changes are noted in spices (black pepper).
Descriptors: PROCESSING & ENGINEERING METHODS

citation no. 8020/19
81024120
Processed Prepared Foods, June 1981, p 111 CODEN: PPFOD2
Doc Type: JOURNAL
FLAVORS: New water dispersible flavoring system from OM Ingredients Inc eliminates the need for salt or dextrose as a carrier. The line, Liquispice, comes in 5 flavors: black pepper, celery, capsicum, paprika, and mace/nutmeg. Also featured in Food Processing, July 1981, p 30-31.
Descriptors: NEW PRODUCTS; INGREDIENTS

citation no. 8020/20
81011615
Federal Register, March 27, 1981, p 18995-18996 CODEN: FEREAC
Doc Type: JOURNAL
Soft Drinks: FDA further extends the comment period on the standard of identity for soda water to accomplish the following: 1) designate kola nut extract, rather than caffeine; 2) provide for decaffeinated "cola" or "pepper" type soft drinks; 3) continue to permit the use of added caffeine. Comment period now ends on July 29, 1981.
Descriptors: GOVERNMENT INFORMATION

citation no. 8020/21
80029916
Federal Register, October 21, 1980, p 69816-69817 CODEN: FEREAC
Doc Type: JOURNAL
Soda Water: FDA proposed amended rules for soda water, section 165.175 to designate cola or kola nut extract, rather than caffeine from other

extracts that naturally contain caffeine, as the mandatory ingredient in "cola" or "pepper" soft drinks.
Descriptors: GOVERNMENT INFORMATION

citation no. 8020/22
80016020
Advertising Age , May 26, 1980, p 1,62 CODEN: ADVAAQ
Doc Type: JOURNAL
"Procter & Gamble Co made its expected jump into the soft drink business with a bid to acquire Crush International's US and international (excluding Canada) businesses for $46 million. But Dr Pepper Co muddied the situation Friday morning (May 23, 1980) with a bid for Crush that bettered P&G's price by $10 million." Observers were betting Crush would stick with the P&G's deal. Also noted in Wall Street Journal, May 29, 1980, p 6).
Descriptors: PROCESSING & ENGINEERING METHODS; COMPANY & ASSOCIATION NEWS

citation no. 8020/23
80016019
Wall Street Journal , May 27, 1980, p 8 CODEN: WSJOAF
Doc Type: JOURNAL
Dr Pepper offered to buy Crush International's US and international businesses, excluding Canadian interests for $56 million. Crush wouldn't comment.
Descriptors: PROCESSING & ENGINEERING METHODS; COMPANY & ASSOCIATION NEWS

citation no. 8020/24
79018308
Food Engineering, June 1979, p 67-69 CODEN: FOEGAN
Doc Type: JOURNAL
DR. PEPPER'S new plant in Dallas/Ft. Worth, TX has some "clever" automation that makes the production of beverages very efficient.
Descriptors: PROCESSING & ENGINEERING METHODS

citation no. 8020/25
79001026
FOOD PRODUCT DEVELOPMENT, DECEMBER 1978, P 20-21 CODEN: FPRDAI
Doc Type: JOURNAL
J.E. CHARBONNEAU OF NATIONAL FOOD PROCESSORS ASSN. LOOKS AT METHODS TO MONITOR NUTRITIONAL PROFILES AND SAFETY OF FOODS. P 24-25 QUALITY CONTROL PROGRAMS AT DR. PEPPER ARE BRIEFED.
Descriptors: PROCESSING & ENGINEERING METHODS; QUALITY CONTROL

citation no. 8020/26
79:0125316 78005001
FOOD PRODUCT DEVELOPMENT, FEBRUARY 1978, P 15 CODEN: FPRDAI
Doc Type: JOURNAL
DR. PEPPER CO. (DALLAS) EXPANDS ITS MARKET ACTIVITY FOR HUSTLE HIGH-PROTEIN ENERGY DRINK. THE BEVERAGE PROVIDES 40% OF THE US RDA FOR PROTEIN AND COMES IN 2 FLAVORS, CHOCOLATE AND VANILLA. PRIMARY INGREDIENT IS NONFAT DRY MILK. A 10-OZ. CAN RETAILS FOR $.54. (ALSO FOOD PROCESSING, FEBRUARY 1978, P. 114).
Descriptors: NEW PRODUCTS; BEVERAGES

citation no. 8020/27
79:0110316 75022430
INTERNATIONAL FLAVOURS AND FOOD ADDITIVES , JULY 1975, P 206 CODEN: IFFADH
Doc Type: JOURNAL
THE ANALYTICAL EVALUATION OF SEASONING EXTRACTS AND ESSENTIAL OILS FROM SEASONINGS IS REVIEWED. PART 2 COVERS CAPSICUM, GINGER, PEPPER, TUMERIC, AND PAPRIKA.
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8020/28
79:0108971 75015912
FOOD TECHNOLOGY (CHICAGO) , JULY 1975, P 68 CODEN: FOTEAO
Doc Type: JOURNAL
HAMBURGER SEASONING, XTRA-BURG FROM SUCREST CORP., IS A BALANCED BLEND OF SPECIAL SUGARS AND MOLASSES WITH SALT AND HYDROLYZED VEGETABLE PROTEIN AGAINST A BACKGROUND OF NATURAL EXTRACTIVE OF ONION, GARLIC AND PEPPER.
Descriptors: NEW PRODUCTS; INGREDIENTS

citation no. 8020/29
79:0100178 74000917
FLAVOUR INDUSTRY, OCTOBER 1973, P 418 CODEN: FLAIBN
Doc Type: JOURNAL
H. E. DANIEL LTD (UK) ARE MARKETING A NEW PEPPER OLEORESIN EXTRACTIVE.
Descriptors: NEW PRODUCTS; INGREDIENTS

citation no. 8020/1 - 55 (76:)

1161060	82001592686	0719464	82000408054	493895	80091203086
1146372	82001557091	0699264	82000350448	477074	80071277799
1143500	82001553360	0658725	82000242790	436256	80031235512
1142575	82001549955	0657684	82000241144	401074	80010600520
1126342	82001515628	0652225	82000230512	401073	80010600519
1116037	82001490365	0643954	82000210813	279517	79091202757
1099875	82001451911	0617977	82000123651	253616	79061263038
1048831	82001331669	0617670	82000123308	246693	79051256623
1047300	82001326601	607760	81101206125	244402	79051254043
1042275	82001259383	575826		224849	79031235715
1031791	82001235688	571521		210963	79021220865
1031684	82001235557	570561		108662	78121800303
0981922	82001076443	545547		106620	78121207707
0973885	82001049925	545508		93095	78111286754
0957989	82000995667	539283		48097	78071242455
0852647	82000740305	531762		44011	78061239154
0816440	82000646024	525389		7673	78031202835
0761547	82000503703	523940			
0726859	82000419638	512868			

1: Safe and sound.
2: Demonstration of spice-specific IgE in patients with suspected food allergies.
3: Karyotype study on certain species in Capsicum .
In 6th MEETING ON GENETICS AND BREEDING ON CAPSICUM AND EGGPLANT - ZARAGOZA (SPAIN) - 21-24 OCTOBER, 1986..
4: The isolation of natural flavour from byproducts of the food industry by high-pressure CO2 extraction.

Gewinnung von natuerlichen Aromen aus Reststoffen der Lebensmittelproduktion mit Hilfe der CO2-Hochdruckextraktion
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Mise en evidence d'une induction de resistance chez Capsicum annuum par des extraits de tiges de Piment contaminees par le Phytophthora capsici.
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Zur Keimzahlverminderung bei Gewurzen mit Hilfe ionisierender Strahlen. 2. Mitteilung: Beeinflussung der Scharfe von schwarzem Pfeffer.
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36: Influence of heat sterilization on the organoleptic quality of spices.

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38: Studies of the powdery-mildew fungus, Leveillula taurica, on green pepper. II. Light and electron microscopic observation of the infection process.
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40: Peroxide isoenzyme specificity in abscission zone fragments of pepper leaves affected by powdery mildew or stress condition.
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42: Viricidal terpenes.
43: Viricidal terpenes.
44: Chromatomass-spectrometric study of substances reponsible for the aroma of Indian black pepper.
45: Studies on eudesmol deposited on inside walls of food containers made from Narra wood.
46: Mycotoxin production of fungi on commercial foods.
47: Volatile components and pungency in fresh and processed jalapeno peppers.
48: Laboratory study on toxic effect of black pepper varieties to three species of stored-product insects.
49: Two flexuous-rod viruses in Dioscorea floribunda: symptoms, identification, and ultrastructure.
50: Influence of storage and sterilization on the organoleptic quality of spices.
51: Quality and processing attributes of selected jalapeno pepper cultivars.
52: Toxicity of black pepper extract to boll weevils.
53: The effect of pepper and pepper constituents on the microflora of sausage products.
Wirkung von Pfeffer und Pfefferinhaltsstoffen auf die Mikroflora von Wurstwaren.
54: Effect of fertilization on biological self-toleration.
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citation no. 8020/1 (52:)
CAS REGISTRY NUMBER: 72968-48-0*
FORMULA: Unknown
CA INDEX NAME:
Oils, red pepper, paprika, sweet
DEFINITION NOTE:
Extractives and their physically modified derivatives. Capsicum annuum, Solanacea.
CLASS:
*CA General Subject; UVCB
SYNONYMS:
Paprika extract, sweet
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1983 1986

citation no. 8020/2 (52:)
CAS REGISTRY NUMBER: 68991-42-4*
FORMULA: Unknown
CA INDEX NAME:
Oils, red pepper, paprika
DEFINITION NOTE:
Extractives and their phsically modified derivatives. Capsicum annum, Solanaceae.

CLASS:
*CA General Subject; UVCB
SYNONYMS:
Oils, red pepper, paprika (1979)
Paprika oil (1983 1986)
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1979 1983 1986

citation no. 8020/3 (52:)
CAS REGISTRY NUMBER: 68917-78-2*
FORMULA: Unknown
CA INDEX NAME:
Resins, oleo-, paprika (1986)
Resins, oleo-, red-pepper (1979 1983)
DEFINITION NOTE:
Extractives and their physically modified derivatives. Capsicum annum.
CLASS:
*CA General Subject; UVCB
SYNONYMS:
Oleoresin paprika (1979 1983 1986)
Resins, oleo-, red-pepper (1979)
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1979 1983 1986

citation no. 8020/4 (52:)
CAS REGISTRY NUMBER: 8006-82-4*
FORMULA: Unknown
CA INDEX NAME:
Black pepper oil (8CI) (1979)
Oils, black pepper (1983 1986)
DEFINITION NOTE:
Extractives and their physically modified derivatives. Piper nigrum, Labiatae.
CLASS:
*CA General Subject; UVCB
SYNONYMS:
Black pepper oil
Oil pepper black
Oil piper nigrum
Pepper black oil
Pepper oil
Pepper oil black
Pepper oil, black
Pepper oleoresin black
Pepper resin black
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1979 1983 1986

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1 :Gas chromatographic properties of the M series of universal retention index standards and their application to pesticide analysis.
2 :(Ozone treatment - sterilization process for foods, pharmaceutical ingredients and plants, drugs and herbs/spices.):Behandlungs - Entkeimungsverfahren vc Rohstoffen und Pflanzen, Drogen, Gewuerze, mit Ozon.
3 :Efficacy of certain indigenous plant products as grain protectants

against Sitophilus oryzae (L.) and Rhyzopertha dominica (F.).
4 :Application of overpressured layer chromatography in foodstuff examinations. Variation in capsaicin content of red pepper millings as a function of storage.:(In 'Euro food pack. International conference on food packaging. FSTA (1986) 18 7F1).)
5 :Isolation, identification and sensory evaluation of capsaicinoids.
6 :(Preparation and keeping quality of retort pouched fried mackerel meat paste.)
7 :Pepper sauce processing plant designed for corrosion control.
8 :Quantitative determination of zearalenone in red pepper.
9 :(CO 2 high-pressure extraction - a new method for producing spice extracts.):CO 2-Hochdruckextraktion ein neues Verfahren zur Gewuerzextraktgewinnung.
10 :(Storage stability of intermediate moisture deep-fried mackerel.)
11 :(Isomerization of piperine.):Zur Isomerisierung des Piperins.
12 :A new method for sensory evaluation of red pepper heat.
13 :Propolis and some other natural antioxidants for fats of frozen meat.
14 :A review of oleoresin black pepper and its extraction solvents.
15 :Production of plant extracts having improved sensory properties.

16 :Ethyl acetate as a solvent for extraction of spice oleoresins.
17 :Biochemical studies on pepper seeds at different maturity stages and stored for various periods.
18 :(Method of producing 'Kurut' cheese.)
19 :(Antioxidant properties of red pepper peel extract on margarine.)
20 :(Up-to-date methods for red pepper processing.)
21 :Pepper coring and slicing apparatus.
22 :Encapsulated concentrates retain full-flavor-profile balance.
23 :(Studies on vinegar. XI. Utilization of slimy polysaccharide produced by acetic acid bacteria.)
24 :(Comparison of ground red pepper and oleoresin.)
25 :(Pepper and tea and electronics.)
26 :(Whey-based desserts and ketchups.)
27 :A note on the thin layer chromatographic detection of mineral oil in whole black peppercorns (Piper nigrum L.).
28 :(Study of the process of extracting black pepper with ethyl alcohol.)
29 :Gas-liquid chromatographic method for determining oxamyl in peppers, tomatoes, and cucumbers.
30 :Precursors to nitrosopyrrolidine and nitrosopiperidine in black pepper treated with nitrous acid.
31 :Reduction of microorganisms in spices by ionizing radiation. II. Effect on pungency of black pepper.
II. Beeinflussung der Schaerfe von schwarzem Pfeffer.
32 :Piperine and related compounds in pepper. I. Search for minor components.
33 :Bacteriological quality of black pepper in retail stores in a Canadian city.
34 :(Bacterial studies on the subsidiary ingredients of fish sausage.)
35 :Isolation, identification, and insecticidal properties of Piper nigrum amides.
36 :Structures and syntheses of two phenolic amides from Piper nigrum L.
37 :HPLC determination of piperine in pepper and in pepper extracts.
38 :(Antioxidant activity and pungency of synthetic capsaicin homologues.)
39 :(Process for extracting bitter substances from vegetable material.)
40 :SOME PROBLEMS IN PEPPER HARVESTING, PROCESSING AND STORAGE.

41 :EXPORTS OF PEPPER IN PROCESSED FORMS.
42 :INFLUENCE OF HEAT STERILIZATION ON THE ORGANOLEPTIC QUALITY OF SPICES.
43 :POTENTIAL CARCINOGENICITY OF BLACK PEPPER (PIPER NIGRUM).
44 :HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC ANALYSIS OF THE PUNGENT PRINCIPLES OF PEPPER AND PEPPER EXTRACTS.
45 :(ANTIBACTERIAL ACTION OF CO2 EXTRACTS FROM SPICES.)
46 :MYCOTOXIN PRODUCTION OF FUNGI ON COMMERCIAL FOODS.
47 :(FLAVOUR AND AROMA CHARACTERISTICS OF NATURAL EXTRACTS OF BLACK PEPPER.)
48 :CAROTENE OXIDIZING FACTORS IN RED PEPPER FRUITS (CAPSICUM ANNUUM L.): OLEORESIN-CELLULOSE SOLID MODEL.
49 :EFFECTS OF SPICES ON THE GROWTH OF LACTIC ACID BACTERIA.
50 :CAROTENE OXIDIZING FACTORS IN RED PEPPER FRUITS (CAPSICUM ANNUUM L.): EFFECT OF ASCORBIC ACID AND COPPER IN A $$BETA$$ -CAROTENE-LINOLEIC ACID SOLID MODEL.
51 :CAROTENE OXIDIZING FACTORS IN RED PEPPER FRUITS (CAPSICUM ANNUUM L.): PEROXIDASE ACTIVITY.
52 :(EFFECT OF PEPPER AND PEPPER CONSTITUENTS ON THE MICROFLORA OF SAUSAGE PRODUCTS.):WIRKUNG VON PFEFFER UND PFEFFERINHALTSSTOFFEN AUF DIE MIKROFLORA VON WURSTWAREN.
53 :CHEMICAL STUDY OF 'HARISA' (CHILI RED PEPPER SAUCE), MANUFACTURED IN THE LIBYAN ARAB REPUBLIC.
54
55 :(INVESTIGATION OF LIPIDS IN HOT PEPPER. I. NEUTRAL LIPIDS OF HOT PEPPER SEEDS.)
56 :CONSTITUENTS OF PEPPERS. V. QUALITATIVE AND QUANTITATIVE ANALYSIS OF THE PUNGENT PRINCIPLES OF PEPPER AND PEPPER EXTRACTS.
57 :CONSTITUENTS OF PEPPERS. I. QUALITATIVE ANALYSIS OF PIPERINE ISOMERS.
58 :(MICROBIOLOGICAL DETECTION OF ANTIBIOTICS IN FOOD, AND THE SIGNIFICANCE OF NON-SPECIFIC REACTIONS.)
59 :CAROTENE OXIDIZING FACTORS IN RED PEPPER FRUITS (CAPSICUM ANNUUM L.). ASCORBIC ACID.
60 :ANALYTICAL EVALUATION OF SEASONING EXTRACTS (OLEORESINS) AND ESSENTIAL OILS FROM SEASONINGS. II.
61 :(WASTE PRODUCT UTILIZATION IN PAPRIKA PROCESSING.)
62 :(WEISSWURST AS A FULLY-PRESERVED PRODUCT.):WEISSWURST ALS VOLLKONSERVE.
63 :OLEORESIN QUALITY ANALYSIS - FACT OF FANCY.
64 :SYMPOSIUM ON SPICE INDUSTRY IN INDIA, 28 FEBRUARY, 1974.
65 :(PEPPER EXTRACT.)
66 :(IMPROVING THE QUALITY OF CANNED MEAT AT VEGETABLES AND PROLONGING THEIR KEEPING QUALITY DURING STORAGE.)
67 :(METHOD OF SEASONING THE SURFACE OF FRESH MEAT, POULTRY, FISH AND VEGETABLES BY MEANS OF SPICED SLICES OF GELATINE, SEASONING EXTRACTS AND/OR AROMAS SALTS.):VERFAHREN ZUR OBERFLAECHENWUERZUNG VON FRISCHEN FLEISCH, GEFLUEGEL, FISCH UND GEMUESE MITTELS WUERZSCHEIBEN AUS GELATINE, GEWUERZEXTRAKTEN UND/ODER AROMEN UND SALZEN.
68 :ANALYSIS AND SURVEY OF GROUND BLACK, WHITE, AND CAPSICUM PEPPERS FOR AFLATOXINS.
69 :(METHOD OF OBTAINING AN EXTRACT OF HOT RED PEPPER.)
70 :(FOREIGN AND DOMESTIC SPICES AND SPICE OILS. I. PEPPER AND PEPPER EXTRACTS.)
71 :EFFECT OF SOME VEGETABLE EXTRACTS ON THE ACTIVITY OF POLYGALACTURONASE.
72 :(TABLE CONDIMENT.)
73 :(THE USE OF CO $$SUBSCRIPT 2$$ -EXTRACTS OF SPICES.)
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75 :DEVELOPMENT OF PRE-DIGESTED PROTEIN-RICH FOOD BASED ON INDIAN OILSEED MEALS AND PULSES. II.
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78 :ANITOXIDANT EFFECT OF SPICE EXTRACTS AND THEIR CONSTITUENTS IN LARD.

79 :(ASSESSMENT OF QUALITY OF EXPERIMENTAL BATCHES OF SPICE EXTRACT AND THEIR SUITABILITY FOR MEAT PRODUCTS.)
80 :COLLABORATIVE STUDY OF A NEW METHOD FOR THE EXTRACTION OF LIGHT FILTH FROM BLACK AND WHITE GROUND PEPPER.
81 :(EXTRACTION OF VEGETABLE RAW MATERIALS CONTAINING ALKALOIDS WITH LIQUID CO $$SUBSCRIPT 2$$.)
82 :(PHYSIO-CHEMICAL STUDIES ON SEED BROWNING IN MATURE GREEN PEPPERS STORED AT LOW TEMPERATURE. III. THE EFFECT OF VARIOUS CONTROLLED ATMOSPHERE (CA) STORAGE CONDITIONS ON BROWNING.)
83 :(CHANGE IN POLISH IMPORT TARIFFS.):AENDERUNG DER POLNISCHEN EINFUHR-ZOLLSAETZE.
84 :CHEESE COLOURS FROM PLANT SOURCES. I. PREPARATION AND PROPERTIES OF COLOUR FROM PEPPER AND SAFFLOWER.
85 :(CAYENNE PEPPER EXTRACT.)
86 :(SEASONING COMPOSITIONS.)
87 :(METHOD FOR MANUFACTURING A LIQUID PEPPER EXTRACT.
88 :OLEORESIN PEPPER.
89 :LIPASE ACTIVITY IN SPICES AND SEASONINGS.
90 :(CHARACTERISTICS OF SPICES.)
91 :(DEHYDRATED MEAT PRODUCTION.)
92 :LIQUID PEPPER.
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334767	245122	220658	195637	149378	090573
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280973	239746	211846	182716	124714	080616
277783	238649	211663	173795	124081	079135
277774	234847	210146	170772	124079	075352
276017	234219	209933	166410	123887	073044
271481	231284	208719	166235	115697	068053
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AUTHOR(S): Nosti Vega, M.; De Castro Ramos, R.
LOCATION: Inst. Grasa y sus Derivados, Sevilla, Spain, 41012
JOURNAL: Grasas Aceites (Seville) DATE: 1984 VOLUME: 35 NUMBER: 4
PAGES: 221-3 CODEN: GRACAN ISSN: 0017-3495 LANGUAGE: Spanish

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2: Chemical compositions of pepper preparations and their relations to the maturity of berries
3: Studies on antifungal, physico-chemical and phytotoxic properties of the essential oil of Piper betle
4: New prenylated phenolics from Piper auritum
5: Considerations on Pothomorphe umbellata (L.) Miq., official pariparoba
6: Protein and amino acid compositions of Malaysian vegetables
7: Multielement proton-induced x-ray emission analysis of betel leaves, betel nuts, and lime
8: Chemical constituents of Piper hancei Maxim (II)
9: Ascorbic acid content of neotropical plant parts available to wild monkeys and bats
10: A chromene, an isoprenylated methyl hydroxybenzoate and a C-methyl flavanone from the bark of Piper hostmannianum
11: Dehydropipernonaline, an amide possessing coronary vasodilating activity, isolated from Piper longum L
12: Effect of different insecticides on the control of 'pollu' beetle Longitarsus nigripennis Mots., a major pest of black pepper Piper nigrum L
13: Insecticidal properties of some metabolites of Jamaican Piper spp., and the amides synthesized from 5,6-Z and E-butenolides of Piper fadyenii
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18: New C6-C3 and C6-C1 compounds from Piper lenticellosum
19: Chemical constituents of peppers (Piper spp.) and application to food preservation: naturally occurring antioxidative compounds
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23: N-Nitrosamines in the saliva of tobacco chewers or masheri users
24: Analysis of the constituents of Piper methysticum by gas chromatography methane chemical ionization mass spectrometry. New constituents of kava resin
25: Neolignans from Piper hancei Maxim
26: Investigations on medicinal plants by mass spectrometry. Part 1. Analysis of dried plant material directly introduced into a mass spectrometer
27: Chemical constituents of the leaves of Piper lenticellosum C.D.C
28: Phenylpropene, benzoic acid and flavonoid derivatives from fruits of Jamaican Piper species
29: Potentialities of some indigenous plants for antifertility activity
30: Constituents of tropical medicinal plants. IXX. GC/MS-investigations of the constituents of Piper amalago - 30 new amides of the piperine-type
31: Comparative efficacy of some insecticides against betelvine bug
32: Aliphatic and alicyclic alcohols of Piperis methystici rhizoma
33: Lignans from Piper cubeba. Part 2. Dibenzylbutyrolactone lignans from Piper cubeba
34: Efficacy of three systemic fungicides in controlling Phytophthora infections of black pepper

35: Effects of NAA and two phenolic substances on rooting of pepper shoots cultured in vitro
36: A contribution to the phytochemical survey of Peninsular Malaysia
37: Biochemical changes induced in roots and xylem sap of black pepper by Meloidogyne incognita
38: Two amides from Piper amalago
39: Kava pyrones. Composition of Piper methysticum rhizomes in plant-derived sedatives
40: Biosynthesis of piperlongumine
41: Efficacy of extraction of constituents in the preparation of yaqona beverage. Part 2: major active constituents
42: The isolation and characterization of kadsurenone from haifenteng (Piper futokadsura) as an orally active specific receptor antagonist of platelet-activating factor
43: Efficacy of extraction of constituents in the preparation of yaqona beverage. Part 1: general constituents
44: Compositional differences of black, green and white pepper (Piper nigrum L.) oil from three cultivars
45: Neolignans from Piper futokadsura
46: Reactions of black pepper to Meloidogyne incognita infestation in relation to content of total phenols
47: Antibacterial studies with the compounds isolated from Piper methysticum Forst
48: 5-Allyl-2-(3,4-dimethoxyphenyl)-3a.alpha.-methoxy-3-methyl-2,3,3a,6-tetrahydro-6-oxobenzofuran as an antagonist of platelet-activating factor
49: Dimethoate residues in pepper (Piper nigrum)
50: Effect of storage (in small packages) on volatile oil and piperine content of ground black pepper
51: Changes in chemical composition of "yaqona" (Piper methysticum) with time
52: Determination of piperine in pepper (Piper nigrum L)
53: Pharmaceuticals and plant drugs with sedati· effects
54: Structural and synthetic studies on the retrofractamides - amide constituents of Piper retrofractum
55: Determination of phosphorus-32 in wet-digested plant leaves by Cherenkov counting
56: Lignans from Piper cubeba
57: Ishwarol, the main sesquiterpene in Piper amalago
58: Evaluation of chemicals inhibiting the bacterial leaf spot pathogen of betelvine
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60: Chromatographic characterization of the crude drug and fluid extract of Pothomorphe umbellata (L.) Miq
61: Sylvone, a new furanoid lignan of Piper sylvaticum
62: Pharmacological study on piperine
63: Effect of antioxidants on the preservation of citral content of lemongrass oil
64: Minor lignans of Piper clusii
65: Studies on genus Piper - X: amebicidal activity of compounds isolated from Piper methysticum Forst
66: Identification of fungicidal and nematocidal components in the leaves of Piper betle (Piperaceae)
67: Kovats' indexes as a preselection routine in mass spectra library

searches of volatiles
68: Effect of spices on hepatic microsomal enzyme function in mice
69: Inhibitors of certain enzymes (of Botryodiplodia theobromae) in Piper betle leaf extracts
70: Chemical constituents of Piper sarmentosum, Roxb
71: Preparation for increasing mental and physical performance
72: Mineral cycling in a tropical palm forest
73: The mutagenicity of nitrite-treated aqueous extract of Piper betle L
74: Preliminary study on the antioxidative components of some spices grown in Taiwan
75: Modifying influences of betel quid ingredients on B(a)P-induced carcinogenesis in the buccal pouch of hamster
76: Study of some Piperaceae family species
77: Isolation and structure of the lignan cubebin from Piper lacunosum
78: Phytochemical study on Piper aduncum L
79: In vitro responses of black pepper (Piper nigrum)
80: High-performance liquid chromatography of kava lactones from Piper methysticum
81: Determination of piperine in Bi Bo (Piper longum) by TLC and UV spectrometry
82: Studies on the constituents of the crude drug "Piperis Longi Fructus." On the alkaloids of fruits of Piper longum L
83: Effect of maturity on some chemical constituents of Sri Lankan pepper (Piper nigrum L.)
84: Larva-development inhibitors of black pepper
85: On the determination of papaya seed adulteration of black pepper
86: Homogeneous, free-flowing liquid black pepper oleoresin composition
87: Calcium, iron and oxalate content of some condiments and spices
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90: Kava lactones in Piper methysticum from Fiji
91: Scanning electron microscopy of enzyme-digested starch granules
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95: Folate content of various Nigerian foods
96: A TLC-fluorescent method of detecting and evaluating individual antioxidative components
97: Constituents of Piper sylvaticum: structure of sylvatesmin
98: Quality evaluation of yaqona (Piper methysticum) in Fiji
99: Distribution of alkaline inorganic pyrophosphatase in leaves of different families of plants and partial characterization of the enzyme from Amarantus blitum L
100: Nitrogen cycling in the seasonally dry forest zone of Belize, Central America
101: Chemical composition of common fodder tree leaves, shrubs and epiphytes in Northeastern Hill Region, (India)
102: A new alkamide from Piper sylvaticum
103: Food antioxidants from pepper
104: Effect of 6-furfurylaminopurine (kinetin) on detached leaves of betel (Piper betel var. 'Maghai')
105: Studies on the antioxidative activities of spices grown in Taiwan. 1

106: Isolation and identification of amides from Piper callosum. Synthesis of pipercallosine and pipercallosidine
107: Potential carcinogenicity of black pepper (Piper nigrum)
108: A glycolytic piperolide from Piper sanctum
109: Analgesic principles from Maoju (Piper arboricola)
110: A new kawainoil derivative from Piper sanctum
111: The chemistry of Brazilian Piperaceae. Part V.
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112: Evaluation of chemicals for the control of Phytophthora from Piper nigrum
113: Aurantiamides: a new class of modified dipeptides from Piper aurantiacum
114: Essential oils from the Amazon. VII
115: Fluidized oleoresin compositions
116: Scientific evidence on the role of Ayurvedic herbals on bioavailability of drugs
117: Evaluation of commercially important chemical constituents in wild black pepper types
118: Auranamide, a new phenylalanine derivative isolated from Piper aurantiacum Wall
119: Equilibrium moisture and essential oil content of commercial spices. Statistical evaluation of analyses of approximately 750 spice samples
120: Amides of Ottonia corcovadensis
121: Chemical control of betel-vine decline
122: The structure and synthesis of fadyenolide, a new butenolide from Piper fadyfnii
123: Constituents of pepper. Part III. Isobutyl amides from pepper (Piper nigrum L.)
124: A note on standardization of the method of extracting chloroplast pigments from betel (Piper betle) leaves
125: Gas-liquid chromatographic determination of major constituents of Piper methysticum
126: Structure and synthesis of new phenolic amides from Piper nigrum L
127: A naturally occurring trans-2-cis-4-isomer of wisanine from Piper guineense
128: Determination of essential oil in tinctures containing phenylpropanoides. Part 4. Analysis of phenylpropanoid derivatives
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130: Isolation, identification, and insecticidal properties of Pi· nigrum amides
131: Uranium trace analysis of a chewable betel-leaf preparation and tea leaves
132: Structure and stereochemistry of an alkamide from Piper sylvaticum
133: Effect of betel-quid chewing on nitrite levels in saliva
134: Pharmacologically active principle of piper retrofractum
135: The Piperaceae amides. Part III. Insecticidal joint action of pipercide and co-occurring compounds isolated from Piper nigrum L
136: Studies on Piper chaba as a bioavailable agent
137: 4-Hexadecenylphenol and flavonoids from Piper hispidum
138: The nutritive value of some Nigerian leafy green vegetables. Part 2. The distribution of protein, carbohydrates (including ethanol-soluble simple sugars), crude fat, fibre and ash
139: Z,E Isomerism of piperolide
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141: Amides of Piper attenuatum Ham

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143: Evaluation of fruits of Piper longum Linn. and leaves of Adhatoda vasica Nees for anthelmintic activity
144: Pharmacology of kava
145: Electropharmacological and behavioral actions of kava
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147: Chemistry of kava
148: A mutagenic screening of various herbs, spices, and food additives
149: N-Isobutyl-11-(3,4-methylenedioxyphenyl)-2E,4E,10E-undecatrienoic amide from Piper nigrum
150: The nutritive value of some Nigerian leafy green vegetables. Part 1: Vitamin and mineral contents
151: Dimethoate residue in pepper (Piper nigrum)
152: Effects of some herbicides and fungicides on the growth of the Cephaleuros in culture
153: Antithiamin factor in fruits, mushrooms and spices
154: The essential oil of Piper aduncum from Fiji
155: Pipermethystine, a novel pyridone alkaloid from Piper methysticum
156: The Piperaceae amides. I. Structure of pipercide, a new insecticidal amide from Piper nigrum L
157: Control of the burrowing nematode Radopholus similis (Cobb) on black pepper
158: Black pepper (Piper nigrum): evidence of carcinogenicity
159: Pepper
160: Metabolism of some kava pyrones in the rat
161: Antioxidant effect of betel leaf and its extracts on storing of fish oil
162: RNA metabolism in senescing detached betel (Piper betle L.) leaves
163: Activity of essential oils of three medicinal plants against various pathogenic and nonpathogenic fungi
164: Inhibitory effects of condiments and herbal drugs on the growth and toxin production of toxigenic fungi
165: Propiophenones from Piper marginatum
166: Chemical control of two major foliage diseases of betel vine
167: Chemical control of root-knot nematodes in Piper nigrum
168: The efficiency of utilizing the iron in leafy green vegetables for hemoglobin synthesis by anemic rats
169: Cercaricidal activity of some essential oils of plants from Brazil
170: A new piperidine alkaloid from Piper peepuloides
171: Flavonoids from Piper marginatum. Isolation of a new flavonoid, marginatoside
172: Pharmacological studies on the sedative-tranquilizing effect of kava (Piper methysticum Forst)
173: Studies on the effect of 'planofix' application on pepper (Piper nigrum L.)
174: Highlights of the chemistry and pharmacology of yaqona (Piper methysticum)
175: Prolonging storage life of betel leaves
176: Synergistic effect of depetiolation and calcium ion on the retardation of senescence in detached betel leaves
177: Synthesis of wisanine, a new piperine amide from Piper guineense
178: Studies on the genus Piper. V. Chemical investigation of Piper methysticum Forst (Piperaceae). Structure and synthesis of flavokawain C
179: Studies on the genus Piper: studies on the roots of Piper longum Linn
180: A new amide from Piper officinarum
181: A new piperine-type amide from Piper guineense

182: Constituents of Piper sylvaticum Roxb
183: New amides from the extracts of Piper guineense
184: On the control of Liothrips karnyi (Bagnall) pepper leaf gall thrips
185: Variations in the loss of vitamin C in leafy vegetables with various methods of food preparation
186: Constituents of Piper aurantiacum Wall.: isolation of triterpenoids from a Piper species
187: Alkaloids of Ghanaian medicinal plants. Part 6. Novel amide alkaloids from the roots of Piper guineense
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189: Pepper - chemistry, technology, and quality evaluation
190: Chemical constituents of stems of Piper nigrum Linn
191: Role of petiole in protein metabolism of senescing betel (Piper betle L.) leaves
192: Experimental studies on the movement of uranium in the soil to vegetables
193: .DELTA..alpha..beta.-Dihydrowasanine, a new alkaloid from Piper guineense
194: Structure of a new amide, filfiline, isolated from Piper officinarum
195: Four new neolignans from Piper futokadzura
196: Structure of tricholein, a new pyrrolidine alkaloid from Piper trichostachyon
197: Piperaceae from Guiana: Piper marginatum Jacq
198: Gas-chromatographic study of pharmacopeia drugs. Part 6. Gas-chromatographic quantitation of trans,trans-piperine in Piper nigrum and album
199: Phytochemical studies on Bangla variety of betel leaf (Piper betle Linn.)
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201: The structure of piperenone
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107194937	106099439	105075982	104074869	103140502	102012184
107194929	106048946	105075937	104031820	103140401	101226873
107183368	106002876	105054739	104018861	103016266	101226686
107174686	105232293	105039341	104015049	103003653	101207632
107132996	105224774	105020492	104004826	103002925	101207044
107020765	105220951	104230306	104004759	102218307	101189889
107006179	105168922	104183273	104003405	102182409	101187978
107004261	105149773	104181625	103211413	102180709	101167142
106149163	105148017	104165549	103210886	102160196	101137051
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101109152	100005045	98105940	96159311	95096981	93215484
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101051731	99189749	98015897	96117386	95038394	93155786
100188783	99174305	98015706	96082671	95005203	93146334
100188774	99172833	98014297	96003657	95003382	93130900
100135969	99136013	98003750	95167373	94188653	93114205
100126955	99102254	97210394	95156487	94145420	93110609
100117350	99068895	97143289	95148802	94099755	93041605

100099873	99052018	97123900	95147110	94099741	93041604
100065161	99021116	97054049	95131064	94098935	92140486
100048575	98159205	97020669	95129311	93238803	92121862

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92104491	91157947	90200305	88046245	87116600	86155544
92104490	91154269	90067524	87197457	87114640	86152623
92103876	91152698	90001656	87184408	87102489	86086142
92092862	91152523	89213948	87184323	87085154	86078710
92055352	91087249	89210355	87180745	87083219	86068387
92004883	91082889	89163812	87164189	87065351	86043867
92001345	91037624	89020270	87152437	87035991	86029547
91205566	91035876	89000042	87148686	87035152	86021786
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Part 4: PEPPER, VOLATILES OR ANALYTICS

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SEMLER U; SCHMIDTBERG G; GROSS G G
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LAB. MICOLOGIA, PROGRAMA FLORA MEX., INIREB, APDO. POSTAL 63. XALPAPA, VERACRUZ 91000.
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JOSIMOVIC L; CUDINA I
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HALL R D; HOLDEN M A; YEOMAN M M
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CHA Y-J; PARK D-C; LEE E-H
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LEE E-H; AHN C-B; OH K-S; LEE T-H; CHA Y-J; LEE K-W

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PIIRONEN V; SYVAOJA E-L; VARO P; SALMINEN K; KOIVISTOINEN P
DEP. FOOD CHEM. TECHNOL., UNIV. HELSINKI, SF-00710 HELSINKI 71, FINLAND.
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LEE E-H; HA J-H; CHA Y-J; OH K-S; KWON C-S
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CHITWOOD R L; PANGBORN R M; JENNINGS W
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INSTITUTE OF BIOCHEMISTRY, COLLEGE OF MEDICINE, NATIONAL TAIWAN UNIVERSITY AND ENVIRONMENTAL CARCINOGENESIS RESEARCH GROUP, CANCER RESEARCH PROMOTION COMMITTEE, NATIONAL SCIENCE COUNCIL, TAIPEI, TAIWAN.
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339158	273122	207305	173795	115049	052322
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Zitat Nr. 51:5 Some studies on the commercial quality of important varieties of pepper.
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Zitat Nr. 51:10 (Influence of microwaves on spices.) Einfluss von Mikrowellen auf Gewuerze.
Zitat Nr. 51:11 Effect of storage (in small packages) on volatile oil and piperine content of ground black pepper.
Zitat Nr. 51:12 New research underscores benefits of cryomilled spices.
Zitat Nr. 51:13 Recent developments in the methodology of flavour research. (In 'Colloque G international G sur G les G aromes G alimentaires G' (see FSTA (1986) 18 G 2A61).)
Zitat Nr. 51:14 (Preparation of powdered dried sea mussel and anchovy for instant soup.)
Zitat Nr. 51:15 HPLC quantifies heat levels in chili pepper products.
Zitat Nr. 51:16 Quality evaluation of black pepper cultivars.
Zitat Nr. 51:17 Protection of spice quality using clear plastic packaging.
Zitat Nr. 51:18 (Determination of secondary amines in foods by high performance liquid chromatography with fluorescence detection.)
Zitat Nr. 51:19 (Effect of irradiation on the sterilization of black pepper powder.)
Zitat Nr. 51:20 Rapid quality control procedure for the determination of Scoville heat units and the detection of chillies in black pepper, via high-performance liquid chromatography.
Zitat Nr. 51:21 Effect of maturity on some chemical constituents of Sri Lankan pepper (Piper nigrum L.).
Zitat Nr. 51:22 The influence of radapertization upon some sensory properties of black pepper.
Zitat Nr. 51:23 Determination of piperine in pepper (Piper nigrum) using high-performance liquid chromatography.
Zitat Nr. 51:24 Changes in the quality of ground black pepper packaged in different materials during storage.
Zitat Nr. 51:25 (Improvements of the Scoville method for the pungency determination of black pepper. (In 'Flavour '81' G(see FSTA (1983) 15 G3T130).)
Zitat Nr. 51:26 Combined effect of gamma irradiation and heat treatment on microflora of spices. (In 'Combination processes in food irradiation.' (see FSTA (1982) 14 8C331).)
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Zitat Nr. 51:29 Evaluation of polypropylene and other flexible materials for packaging of ground spices.
Zitat Nr. 51:30 (Reduction of microorganisms in spices by ionizing radiation. II. Effect on pungency of black pepper.) Zur Keimzahlverminderung bei Gewuerzen mit Hilfe ionisierender Strahlen.
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Zitat Nr. 51:34 Chemical composition of pepper grades and products.
Zitat Nr. 51:35 New method for quantitative essential oil analysis.
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Zitat Nr. 51:44 HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC ANALYSIS OF THE PUNGENT PRINCIPLES OF PEPPER AND PEPPER EXTRACTS.
Zitat Nr. 51:45 (FLAVOUR AND AROMA CHARACTERISTICS OF NATURAL EXTRACTS OF BLACK PEPPER.)
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Zitat Nr. 51:48 FLAVOR COMPONENTS OF 'AJVAR'.
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Zitat Nr. 51:56 (IMPORTANT INDIAN SPICES. II. CURRY LEAVES (MURRAYA KOENIGII, RUTACEAE). III. GINGER ROOT (ZINGIBERACEAE).) WICHTIGE GEWUERZE INDIENS. II CURRY-BLAETTER (MURRAYA KOENIGII, RUTACEAE). III. INGWERWURZEL (ZINGIBERACEAE).
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Zitat Nr. 51:59 (EFFECT OF NATURAL SPICES, SPICE EXTRACTS, ESSENTIAL OILS, EXTRACTION RESIDUES AND SYNTHETIC ANTIOXIDANTS ON BREAKDOWN OF PORK FAT AND MODEL LIPIDS. III. SPICE EXTRACTS, WATER-VAPOUR-VOLATILE AND NON-VOLATILE EXTRACTION COMPONENTS AND EXTRACTION RESIDUES.) UNTERSUCHUNGEN UEBER DIE WIRKUNG VON NATURGEWUERZEN, GEWUERZEXTRAKTEN, AETHERISCHEN OELEN, EXTRAKTIONSRUECKSTAENDEN UND SYNTHETISCHEN ANTIOXYDANTIEN AUF DEN ABBAU VON SCHWEINEFETT UND MODELL-LIPIDEN. III. GEWUERZEXTRAKTE, BEI DER EXTRAKTION ENFALLENDE WASSERDAMPFFLUECHTIGE UND NICHTFLUECHTIGE EXTRAKTBESTANDTEILE SOWIE EXTRAKTIONSRUECKSTAENDE.
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Zitat Nr. 51:62 (GAS CHROMATOGRAPHIC ANALYSIS OF VOLATILE OILS IN SPICES.)
Zitat Nr. 51:63 (PRESERVATIVE EFFECT OF EGG WHITE LYSOZYME ON SALAMI SAUSAGE.)
Zitat Nr. 51:64 VOLATILE COMPOSITIONAL DIFFERENCES BETWEEN CULTIVARS OF BLACK PEPPER (PIPER NIGRUM).
Zitat Nr. 51:65 THE EFFECT OF IONIZING RADIATION ON THE MICROBIOLOGICAL CONTENT AND VOLATILE CONSTITUENTS OF SPICES.
Zitat Nr. 51:66 (VOLATILE CONSTITUENTS OF BLACK PEPPER.)
Zitat Nr. 51:67 (COMPARATIVE STUDY OF THE VOLATILE CONSTITUENTS OF SOME VARIETIES OF BLACK PEPPER.)
Zitat Nr. 51:68 (ANITOXIDANT EFFECT OF SPICE EXTRACTS AND THEIR CONSTITUENTS IN LARD.) UEBER DIE ANTIOXYDATIVE WIRKUNG VON GEWUERZEXTRAKTEN UND GEWUERZEXTRAKTBESTANDTEILEN IN SCHWEINESCHMALZ.
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Zitat Nr. 51:72 VARIETAL STUDIES ON SOME VOLATILE CONSTITUENTS OF BLACK PEPPER NIGRA.
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Zitat Nr. 51:75 (METHOD FOR MANUFACTURING A LIQUID PEPPER EXTRACT.) VERFAHREN ZUR HERSTELLUNG EINES FLUESSIGEN PFEFFEREXTRAKTES.
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Zitat Nr. 51:78 STUDIES ON SOME VOLATILE CONSTITUENTS OF PIPER NIGRA.
Zitat Nr. 51:79 STUDIES ON OIL OF BLACK PEPPER, PIPER NIGRUM.
Zitat Nr. 51:80 (CHANGES IN THE COMPOSITION OF ESSENTIAL OILS DURING STORAGE OF SPICE.)
Zitat Nr. 51:81 LIQUID PEPPER.
Zitat Nr. 51:82 (RESIDUE PROBLEMS IN COLD STERILIZATION OF SPICES, USING T-GAS (ETHYLENE OXIDE).) RUECKSTANDSPROBLEME BEI DER KALTENTKEIMUNG VON GEWUERZEN MIT T-GAS (AETHYLENOXYD).
Zitat Nr. 51:83 BLACK PEPPER EXTRACTS.
Zitat Nr. 51:84 WHITE PEPPER.
Zitat Nr. 51:85 (DETERMINATION OF VOLATILE OIL AND OTHER CONSTITUENTS OF SPICES. 1: PEPPER, PAPRIKA, MACE AND PIMENTO.) ROUTINEUNTERSUCHUNGEN VON GEWUERZEN AUF AETHERISCHE OELGEHALTE UND ANDERE INHALTSSTOFFE. 1. MITTEILUNG: PFEFFER, PAPRIKA, MUSKATBLUETE, PIMENT.

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Homicidal asphyxia by pepper aspiration
Cohle S.D.
Blodgett Memorial Medical Center, Grand Rapids, MI 49506
U.S.A.
J. FORENSIC SCI. (U.S.A.) ,1986, 31/4 (1475-1478), Coden: JFSCA

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Relaxant effects on tracheal and ileal smooth muscles of the guinea pig
Reiter M.; Brandt W.
Institut fur Pharmakologie und Toxikologie der Technischen Universitat Munchen, D-8000 Munchen 40
GERMANY, WEST
ARZNEIM.-FORSCH./DRUG RES. (GERMANY, WEST) ,1985, 35/1A (408-414), Coden: ARZNA

citation no. 8023/76:1
1053161 82001342483
Microbiological and chemical studies on irradiated black pepper.
Hewamanna, R.; Boteju, L.W.
Radioisot. Cent., Univ. Colombo, P.O. Box 1490, Colombo 3, Sri Lanka
INT. J. APPL. RADIAT. ISOTOPES; 36(12), pp. 989-990 1985
Language: English Summary Language: English

citation no. 8023/76:2
1049393 82001332828
Compositional differences of black, green and white pepper (Piper nigrum L.) oil from three cultivars.
Buckle, K.A.; Rathnawathie, M.; Brophy, J.J.
Sch. Food Sci. and Technol., Univ. New South Wales, P.O. Box 1, Kensington, N.S.W. 2033, Australia
J. FOOD TECHNOL.; 20(5), pp. 599-613 1985
Language: English Summary Language: English

citation no. 8023/76:3
0867087 82000772348
The influence of radapertization upon some sensory properties of black pepper.
Uchman, W.; Fiszer, W.; Mroz, I.; Pawlik, A.
Inst. Anim. Products Technol., Univ. Agric., Poznan, Poland
NAHRUNG; 27(5), pp. 461-468 1983
Language: English Summary Language: English

citation no. 8023/76:4
545547
Reduction of microorganisms in spices by means of ionizing radiation. II. Influence on the biting constituents in black pepper.
Zur Keimzahlverminderung bei Gewurzen mit Hilfe ionisierender Strahlen. 2. Mitteilung: Beeinflussung der Scharfe von schwarzem Pfeffer.
Zehnder,H.J.
(Eidg. Forschungsanst. Obst-, Wein- und Gartenbau, CH-8820 Wadenswil, Switzerland)

Alimenta ; 19(1), 17-20 1980
Language: German Summary Language: French; English; German

citation no. 8023/76:5
523940
HPLC determination of piperine in pepper and in pepper extracts.
Verzele,M. ; Qureshi,S.
(Lab. Org. Chem., State Univ. Gent, Krijgslaan, 271 (S.4), B-9000 Gent, Belgium)
Chromatographia ; 13(4), 241-243 1980
Language: English Summary Language: English

citation no. 8023/76:6
70869 78091264703
(A severe disease of squash in Campania).
Una grave malattia della zucca in Campania.
Noviello, C. ; Cristinzio, G. ; Aloj, B.
(Fac. Sci. Agrar., Univ. Studi Napoli, Portici, Italy)
Annali ; 11, 11-22 1977
Language: Italian Summary Language: Italian; English

citation no. 8023/79:1
0244241 87180637
Flavour and Fragrance Journal , 1(4-5) December 1986, p 165-168
CODEN: FFJOED
Doc Type: JOURNAL
Spices: The essential oil of Znthoxylum rhetsa closely resembles the volatile oil from black pepper. The flavor is commonly known in Asia as mullilam.
Descriptors: RESEARCH & TECHNOLOGY; Flavors

citation no. 8023/79:2
0219028 86160260
J of Agricultural & Food Chemistry , 34(4) July 1986, p 770-772 CODEN: JAFCAU
Doc Type: JOURNAL
Bell Peppers: C M Wu & S E Liou assess the effect of tissue disruption on the volatile constituents of bell pepper and the pepper's flavor.
Descriptors: RESEARCH & TECHNOLOGY; Vegetables & Fruits

citation no. 8023/79:3
0219025 86160257
J of Agricultural & Food Chemistry , 34(4) July 1986, p 616-620 CODEN: JAFCAU
Doc Type: JOURNAL
Acidulants: - Quinic acid, tartaric acid and malic acid esters as well as glucose esters were determined in tomatoes, bell pepper, eggplant, spinach, mangold, beetroot, pea, bush beans, broad bean, lettuce, endive and chicory by HPLC.
Descriptors: RESEARCH & TECHNOLOGY; Vegetables & Fruits

citation no. 8023/79:4
0212076 86041604
Journal of Chromatography , 351(3) January 31, 1986, p 595-598 CODEN: JOCRAM
Doc Type: JOURNAL
Spices: A W Archer reports the separation and determination of piperine in ground pepper by high performance liquid chromatography (HPLC).
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8023/79:5
0204234 85113309
Journal of Food Technology , 20(5) October 1985, p 599-613 CODEN: JFOTAP
Doc Type: JOURNAL
Spices: The composition of volatile oil (oleoresin) from black pepper, green pepper and white pepper products of a local Sri Lakan cultivar was compared to that from Panniyur and Kuching cultivars from India and Sarawak.
Descriptors: RESEARCH & TECHNOLOGY

citation no. 8023/79:6
0188887 84096711
Food Processing (Chicago) , October 1984, p 70 CODEN: FOPRA9
Doc Type: JOURNAL
Spices: HPLC quantifies the heat levels in chili pepper products. The method reduces testing time from 16 to 24 hours to less than one hour and is more reproducible than organoleptic methods.
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8023/79:7
0187948 84087207
Journal of Chromatography , September 28, 1984, p 288-291 CODEN: JOCRAM
Doc Type: JOURNAL
Spices: "Rapid quality control procedure for the determination of Scoville heat units and the detection of chillies in black pepper, via high performance liquid chromatography (HPLC)."
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8023/79:8
0174483 83034705
Journal of Chromatography , July 15, 1983, p 316-320 CODEN: JOCRAM
Doc Type: JOURNAL
Spices: "Determination of piperine in pepper (Piper nigrum) using HPLC."
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8023/399:1
107196681 CA: 107(21)196681t JOURNAL
Production of a black pepper oleoresin by dense carbon dioxide or carbon dioxide-ethanol extraction
AUTHOR(S): Vidal, J. P.; Richard, H.
LOCATION: Lab. Chim. Aliment-Aromes, Ec. Natl. Super. Ind. Agric. Aliment., 91305, Massy, Fr.
JOURNAL: Sci. Aliments DATE: 1987 VOLUME: 7 NUMBER: 3 PAGES: 481-98
CODEN: SCALDC ISSN: 0240-8813 LANGUAGE: French

citation no. 8023/399:2
107174699 CA: 107(19)174699c JOURNAL
Studies on the Zanthoxylum piperitum De Candolle. 1. Pungent principles and essential oil composition
AUTHOR(S): Jung, Hyun Sook
LOCATION: Dep. Home Econ., Suncheon Natl. Coll., S. Korea
JOURNAL: Han'guk Yongyang Siklyong Hakhoechi DATE: 1987 VOLUME: 16
NUMBER: 2 PAGES: 123-7 CODEN: HYSHDL ISSN: 0253-3154 LANGUAGE: Korean

citation no. 8023/399:3
104108022 CA: 104(13)108022p JOURNAL
Separation and determination of piperine in ground pepper by high-performance liquid chromatography
AUTHOR(S): Archer, Alan W.
LOCATION: Div. Anal. Lab., New South Wales Dep. Health, Lidcombe, 2141, Australia
JOURNAL: J. Chromatogr. DATE: 1986 VOLUME: 351 NUMBER: 3 PAGES: 595-8
CODEN: JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8023/399:4
104087212 CA: 104(11)87212h JOURNAL
Capillary gas chromatographic analysis of volatile flavor compounds
AUTHOR(S): Takeoka, G.; Ebeler, S.; Jennings, W.
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, CA, 95616, USA
JOURNAL: ACS Symp. Ser. DATE: 1985 VOLUME: 289 NUMBER: Charact. Meas. Flavor Compd. PAGES: 95-108 CODEN: ACSMC8 ISSN: 0097-6156 LANGUAGE: English

citation no. 8023/399:5
103195036 CA: 103(23)195036s JOURNAL
Splitless capillary GC analysis of herbs and spices using cryofocusing
AUTHOR(S): Wampler, T. P.; Bowe, W. A.; Levy, E. J.
LOCATION: Chem. Data Syst. Div., AE/CDS Autoclave, Inc., USA
JOURNAL: Am. Lab. (Fairfield, Conn.) DATE: 1985 VOLUME: 17 NUMBER: 10
PAGES: 76, 78-81 CODEN: ALBYBL ISSN: 0044-7749 LANGUAGE: English

citation no. 8023/399:6
103177122 CA: 103(21)177122n JOURNAL
Effect of storage (in small packages) on volatile oil and piperine content of ground black pepper
AUTHOR(S): Packiyasothy, E. V.; Balachandran, S.; Jansz, E. R.
LOCATION: Nat. Prod. Sect., Ceylon Inst. Sci. Ind. Res., Colombo, Sri Lanka,
JOURNAL: J. Natl. Sci. Counc. Sri Lanka DATE: 1983 VOLUME: 11 NUMBER: 1 PAGES: 111-22 CODEN: JNSCBH ISSN: 0300-9254 LANGUAGE: English

citation no. 8023/399:7
Analysis of commercial grades of pepper
AUTHOR(S): Sumathikutty, M. A.; Rajaraman, K.; Padmakumari, K. P.; Narayanan, C. S.; Mathew, A. G.

LOCATION: Reg. Res. Lab., CSIR, Travandrum, 695019, India
JOURNAL: Indian Perfum. DATE: 1984 VOLUME: 28 NUMBER: 3-4 PAGES: 119-22 CODEN: IPERAS ISSN: 0019-607X LANGUAGE: English

citation no. 8023/399:8
103052826 CA: 103(7)52826p JOURNAL
Identification and change of the odor components from two types of pepper during cooking
AUTHOR(S): Matsumoto, Mutsuko; Kawamura, Fujiko
LOCATION: Tokyo Kasei Coll., Tokyo, Japan,
JOURNAL: Kenkyu Kiyo - Tokyo Kasei Daigaku DATE: 1984 VOLUME: 24 NUMBER: 2 PAGES: 145-50 CODEN: TKDKBL ISSN: 0371-831X LANGUAGE: Japanese

citation no. 8023/399:9
103005148 CA: 103(1)5148j JOURNAL
Spice quality: effect of cryogenic and ambient grinding on volatiles
AUTHOR(S): Pesek, C. A.; Wilson, L. A.; Hammond, E. G.
LOCATION: Dep. Food Technol., Iowa State Univ., Ames, IA, 50011, USA
JOURNAL: J. Food Sci. DATE: 1985 VOLUME: 50 NUMBER: 3 PAGES: 599-601
CODEN: JFDSAZ ISSN: 0022-1147 LANGUAGE: English

citation no. 8023/399:10
102061051 CA: 102(7)61051p JOURNAL
The effect of gamma radiation and storage time on the volatile constituents, piperine, piperettine and sensory quality of pepper
AUTHOR(S): Bahari, Ismail; Ishak, Soleha; Ayub, Mohd. Khan
LOCATION: Univ. Kebangsaan, Malay.
JOURNAL: J. Sains Nukl. DATE: 1984 VOLUME: 1 NUMBER: 3 PAGES: 1-17
CODEN: JSNUEG LANGUAGE: English

citation no. 8023/399:11
99174305 CA: 99(21)174305n JOURNAL
Neutron activation analysis of sodium in biological samples using americium-beryllium source
AUTHOR(S): Parwate, D. V.; Mukerjee, S. K.; Garg, A. N.
LOCATION: Dep. Chem., Nagpur Univ., Nagpur, 440 010, India
JOURNAL: J. Indian Chem. Soc. DATE: 1983 VOLUME: 60 NUMBER: 5 PAGES: 490-2 CODEN: JICSAH ISSN: 0019-4522 LANGUAGE: English

citation no. 8023/399:12
99069017 CA: 99(9)69017x JOURNAL
The influence of radapertization upon some sensory properties of black pepper
AUTHOR(S): Uchman, W.; Fiszer, W.; Mroz, I.; Pawlik, A.
LOCATION: Inst. Anim. Prod. Technol., Univ. Agric., Poznan, Pol.
JOURNAL: Nahrung DATE: 1983 VOLUME: 27 NUMBER: 5 PAGES: 461-8
CODEN: NAHRAR ISSN: 0027-769X LANGUAGE: English

citation no. 8023/399:13
97161231 CA: 97(19)161231u CONFERENCE PROCEEDING
Influence of heat sterilization on the organoleptic quality of spices
AUTHOR(S): Maarse, H.; Nijssen, L. M.; Nowak, M.
LOCATION: Cent. Inst. Voedingsonderzoek, NL-3700 AJ, Zeist, Neth.
JOURNAL: Aetherische Oele, Ergeb. Int. Arbeitstag. EDITOR: Kubeczka,

Karl-Heinz (Ed), DATE: 1982 PAGES: 225-31 CODEN: 48JTA8 LANGUAGE: English MEETING DATE: 790000800000 PUBLISHER: Thieme,Stuttgart, Fed. Rep. Ger

citation no. 8023/399:14
96018696 CA: 96(3)18696y JOURNAL
Piperine
AUTHOR(S): Sumathikutty, M. A.; Rajaraman, K.; Sankarikutty, B.; Narayanan, C. S.; Mathew, A. G.
LOCATION: Reg. Res. Lab., CSIR, Trivandrum, 695019, India
JOURNAL: Lebensm.-Wiss. Technol. DATE: 1981 VOLUME: 14 NUMBER: 5
PAGES: 225-8 CODEN: LEWTAP ISSN: 0460-1173 LANGUAGE: English

citation no. 8023/399:15
95005203 CA: 95(1)5203q JOURNAL
Gas-liquid chromatographic determination of major constituents of Piper methysticum
AUTHOR(S): Duve, R. N.
LOCATION: Res. Div., Minist. Agric. Fish., Nausori, Fiji,
JOURNAL: Analyst (London) DATE: 1981 VOLUME: 106 NUMBER: 1259 PAGES: 160-5 CODEN: ANALAO ISSN: 0003-2654 LANGUAGE: English

citation no. 8023/399:16
94109072 CA: 94(14)109072s JOURNAL
New method for quantitative essential oil analysis
AUTHOR(S): Godefroot, M.; Sandra, P.; Verzele, M.
LOCATION: Lab. Org. Chem., State Univ. Ghent, B-9000, Ghent, Belg.
JOURNAL: J. Chromatogr. DATE: 1981 VOLUME: 203, PAGES: 325-35 CODEN: JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8023/399:17
93041571 CA: 93(5)41571a JOURNAL
Chemical composition of pepper grades and products
AUTHOR(S): Sumathikutty, M. A.; Rajaraman, K.; Sankarikutty, B.; Mathew, A. G.
LOCATION: Reg. Res. Lab., Trivandrum, India
JOURNAL: J. Food Sci. Technol. DATE: 1979 VOLUME: 16 NUMBER: 6
PAGES: 249-52 CODEN: JFSTAB ISSN: 0022-1155 LANGUAGE: English

citation no. 8023/399:18
93024593 CA: 93(3)24593s JOURNAL
HPLC determination of piperine in pepper and in pepper extracts
AUTHOR(S): Verzele, M.; Qureshi, S.
LOCATION: Lab. Org. Chem., State Univ. Gent, B-9000, Ghent, Belg.
JOURNAL: Chromatographia DATE: 1980 VOLUME: 13 NUMBER: 4 PAGES: 241-3
CODEN: CHRGB7 ISSN: 0009-5893 LANGUAGE: English

citation no. 8023/399:19
89004793 CA: 89(1)4793w JOURNAL
Characteristic of flavor and aroma of natural extracts from black pepper
AUTHOR(S): Kostrzewa, Ewa; Karwowska, Krystyna
LOCATION: Zakl. Technol. Przetworow Owocowych Warzywnych, Inst. Przem. Ferment., Warsaw, Pol.
JOURNAL: Pr. Inst. Lab. Badaw. Przem. Spozyw. DATE: 1977 VOLUME: 27
NUMBER: 2 PAGES: 93-102 CODEN: PILPAH ISSN: 0554-9043 LANGUAGE:

Polish

citation no. 8023/399:20
84163023 CA: 84(23)163023h JOURNAL
Volatile compositional differences between cultivars of black pepper (Piper nigrum)
AUTHOR(S): Russell, Gerald F.; Else, Joanne
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: Indian Spices DATE: 1975 VOLUME: 12 NUMBER: 1 PAGES: 4-11
CODEN: INSPDD LANGUAGE: English

citation no. 8023/399:21
81048616 CA: 81(9)48616e JOURNAL
Volatile compositional differences between cultivars of black pepper (Piper nigrum)
AUTHOR(S): Russell, Gerald F.; Else, Joanne
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: J. Ass. Off. Anal. Chem. DATE: 1973 VOLUME: 56 NUMBER: 2 PAGES: 344-51 CODEN: JANCA2 LANGUAGE: English

citation no. 8023/399:22
77032999 CA: 77(5)32999p JOURNAL
Comparative study on the composition of volatile constituents of different black pepper (Pipernigrum) varieties
AUTHOR(S): Richard, H. M. J.
LOCATION: Davis, Calif.
JOURNAL: Ind. Aliment. Agr. DATE: 1972 VOLUME: 89 NUMBER: 2 PAGES: 109-19 CODEN: IALAA9 LANGUAGE: French

citation no. 8023/399:23
77032990 CA: 77(5)32990d JOURNAL
Volatile constituents of black pepper
AUTHOR(S): Richard, H. M. J.
LOCATION: Lab. Biochim. Ind. Aliment., Ec. Natl. Super. Ind. Agric. Aliment., Massy, Fr.
JOURNAL: Ind. Aliment. Agr. DATE: 1972 VOLUME: 89 NUMBER: 2 PAGES: 147-51 CODEN: IALAA9 LANGUAGE: French

citation no. 8023/399:24
76152293 CA: 76(25)152293e JOURNAL
Quality control of spice oleoresins. I. Oleoresin of pepper
AUTHOR(S): Wijesekera, R. O. B.; Senanayake, U. M.; Jayewardene, A. L.
LOCATION: Ceylon Inst. Sci. Ind. Res., Colombo, Ceylon
JOURNAL: Flavour Ind. DATE: 1972 VOLUME: 3 NUMBER: 3 PAGES: 133-6
CODEN: FLAIBN LANGUAGE: English

citation no. 8023/399:25
75150513 CA: 75(25)150513g DISSERTATION
Varietal studies on some volatile constituents of black pepper nigra
AUTHOR(S): Richard, Hubert M. J.
LOCATION: Univ. California, Davis, Calif.
DATE: 1970 PAGES: 120 pp. CODEN: DABSAQ LANGUAGE: English CITATION: Diss. Abstr. Int. B 1971, 31(12) (Pt. 1), 7360 AVAIL: Univ. Microfilms, Ann Arbor, Mich., Order No. 71-15,551

citation no. 8023/399:26
75139505 CA: 75(23)139505k JOURNAL
Volatile components of black pepper varieties
AUTHOR(S): Richard, H. M.; Russell, G. F.; Jennings, W. G.
LOCATION: Dep. Consum. Sci., Univ. California, Davis, Calif.
JOURNAL: J. Chromatogr. Sci. DATE: 1971 VOLUME: 9 NUMBER: 9 PAGES: 560-6 CODEN: JCHSBZ LANGUAGE: English

citation no. 8023/399:27
75034165 CA: 75(5)34165w JOURNAL
Volatile composition of black pepper
AUTHOR(S): Richard, H. M.; Jennings, W. G.
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: J. Food Sci. DATE: 1971 VOLUME: 36 NUMBER: 4 PAGES: 584-9
CODEN: JFDSAZ LANGUAGE: English

citation no. 8023/399:28
73097402 CA: 73(19)97402a JOURNAL
Microbes in spice and its analysis
AUTHOR(S): Matsukura, Toichi
LOCATION: Takasago Perfum. Co., Tokyo, Japan
JOURNAL: Kagaku To Seibutsu DATE: 1970 VOLUME: 8 NUMBER: 4 PAGES: 217-24 CODEN: KASEAA LANGUAGE: Japanese

citation no. 8023/399:29
73002784 CA: 73(1)2784q JOURNAL
Control of the adulteration of pepper samples by electrophoretic analysis of protein extracts
AUTHOR(S): Micco, Claudia; Grossi, Margherita; Silano, Vittorio
JOURNAL: Ann. Ist. Super. Sanita DATE: 1969 VOLUME: 5 NUMBER: Pt. 3-4
PAGES: 215-17 CODEN: AISSAW LANGUAGE: Italian

citation no. 8023/399:30
72118448 CA: 72(23)118448s DISSERTATION
Volatile constituents of Piper nigra
AUTHOR(S): Russell, Gerald Frederick
LOCATION: Univ. of California, Davis, Calif.
DATE: 1968 PAGES: 120 pp. CODEN: DABSAQ LANGUAGE: English CITATION: Diss. Abstr. Int. B 1969, 30(4), 1559-60 AVAIL: 69-16,372

citation no. 8023/399:31
66018136 CA: 66(5)18136w JOURNAL
Importance of starch in the analysis of black pepper
AUTHOR(S): Mitra, Sachindra N.; Roy, B. R.; Roy, Ajit Kumar
LOCATION: Central Food Lab., Calcutta, India
JOURNAL: J. Proc. Inst. Chem. (India) DATE: 1966 VOLUME: 38 NUMBER: 5
PAGES: 215-16 CODEN: JPICAE LANGUAGE: English

Part 5: PEPPER, PROCESSING, USE, ANALYSIS (SYNOPSIS)

citation no. 8024/1
399:108003404 CA: 108(1)3404u JOURNAL
Chemical constituents of Piper hancei maxim (III)
AUTHOR(S): Li, Shuming; Han, Guiqiu
LOCATION: Coll. Pharm., Beijing Med. Univ., Beijing, Peop. Rep. China,
JOURNAL: Zhiwu Xuebao DATE: 1987 VOLUME: 29 NUMBER: 3 PAGES: 293-6
CODEN: CHWHAY ISSN: 0577-7496 LANGUAGE: Chinese

citation no. 8024/2
399:107234918 CA: 107(25)234918k JOURNAL
Chemical compositions of pepper preparations and their relations to the maturity of berries
AUTHOR(S): Zhan, Peixin
LOCATION: Sichuan Coll. Light Ind., Zigong, Peop. Rep. China,
JOURNAL: Zhongguo Tiaoweipin DATE: 1987 NUMBER: 6 PAGES: 3-6 CODEN: ZHTIE7 LANGUAGE: Chinese

citation no. 8024/3
399:107196681 CA: 107(21)196681t JOURNAL
Production of a black pepper oleoresin by dense carbon dioxide or carbon dioxide-ethanol extraction
AUTHOR(S): Vidal, J. P.; Richard, H.
LOCATION: Lab. Chim. Aliment-Aromes, Ec. Natl. Super. Ind. Agric. Aliment., 91305, Massy, Fr.
JOURNAL: Sci. Aliments DATE: 1987 VOLUME: 7 NUMBER: 3 PAGES: 481-98
CODEN: SCALDC ISSN: 0240-8813 LANGUAGE: French

citation no. 8024/4
399:107194937 CA: 107(21)194937g JOURNAL
Studies on antifungal, physico-chemical and phytotoxic properties of the essential oil of Piper betle
AUTHOR(S): Dubey, P.; Tripathi, S. C.
LOCATION: Dep. Bot., Gorakhpur Univ., Gorakhpur, 273009, India
JOURNAL: Z. Pflanzenkrankh. Pflanzenschutz DATE: 1987 VOLUME: 94
NUMBER: 3 PAGES: 235-41 CODEN: ZPFPAA ISSN: 0340-8159 LANGUAGE: English

citation no. 8024/5
399:107174686 CA: 107(19)174686w JOURNAL
Protein and amino acid compositions of Malaysian vegetables
AUTHOR(S): Zanariah, J.; Rehan, A. Noor; Rosnah, O.
LOCATION: Food Technol. Div., MARDI, Serdang, Malay.
JOURNAL: MARDI Res. Bull. DATE: 1986 VOLUME: 14 NUMBER: 2 PAGES: 140-7 CODEN: MRBUDP ISSN: 0126-5709 LANGUAGE: English

citation no. 8024/6
399:107009306 CA: 107(2)9306q PATENT
Wet method for obtaining oil-soluble substances from vegetable matter
INVENTOR(AUTHOR): Valero Portillo, Diego
LOCATION: Spain,
ASSIGNEE: Compania Hispano America de Construcciones Conserveras S. A. (CHACONSA)
PATENT: Spain ; ES 526871 A1 DATE: 850416

APPLICATION: ES 526871 (831028)
PAGES: 8 pp. CODEN: SPXXAD LANGUAGE: Spanish CLASS: C11B-001/10A

citation no. 8024/7
399:107004261 CA: 107(1)4261m JOURNAL
A chromene, an isoprenylated methyl hydroxybenzoate and a C-methyl flavanone from the bark of Piper hostmannianum
AUTHOR(S): Diaz D., Pedro P.; Arias C., Tiberio; Joseph-Nathan, Pedro
LOCATION: Fac. Cienc., Univ. Nac. Colombia, Bogota, Colombia,
JOURNAL: Phytochemistry DATE: 1987 VOLUME: 26 NUMBER: 3 PAGES: 809-11
CODEN: PYTCAS ISSN: 0031-9422 LANGUAGE: English

citation no. 8024/8
399:106149163 CA: 106(19)149163v JOURNAL
Dehydropipernonaline, an amide possessing coronary vasodilating activity, isolated from Piper longum L
AUTHOR(S): Shoji, Noboru; Umeyama, Akemi; Saito, Nobuaki; Takemoto, Tsunematsu; Kajiwara, Akiko; Ohizumi, Yasushi
LOCATION: Dep. Pharm., Tokushima-Bunri Univ., Tokushima, Japan, 770
JOURNAL: J. Pharm. Sci. DATE: 1986 VOLUME: 75 NUMBER: 12 PAGES: 1188-9 CODEN: JPMSAE ISSN: 0022-3549 LANGUAGE: English

citation no. 8024/9
399:106137208 CA: 106(17)137208a JOURNAL
Changes in capsaicin contents in fresh and processed red peppers
AUTHOR(S): Chung, Byung Sun; Kang, Kun Og
LOCATION: Dep. Food Sci., King Sejong Univ., S. Korea
JOURNAL: Han'guk Yongyang Siklyong Hakhoechi DATE: 1985 VOLUME: 14 NUMBER: 4 PAGES: 409-18 CODEN: HYSHDL ISSN: 0253-3154 LANGUAGE: Korean

citation no. 8024/10
399:106133765 CA: 106(17)133765g JOURNAL
Effect of different insecticides on the control of 'pollu' beetle Longitarsus nigripennis Mots., a major pest of black pepper Piper nigrum L
AUTHOR(S): Kumar, T. Prem; Banerjee, S. K.; Devasahayam, S.; Koya, K. M. Abdulla
LOCATION: Cent. Plant Crops Res. Inst., Reg. Stn., Calicut, 673 012, India
JOURNAL: Entomon DATE: 1985 VOLUME: 11 NUMBER: 4 PAGES: 219-21
CODEN: ENTOD5 ISSN: 0377-9335 LANGUAGE: English

citation no. 8024/11
399:106133735 CA: 106(17)133735x JOURNAL
Insecticidal properties of some metabolites of Jamaican Piper spp., and the amides synthesized from 5,6-Z and E-butenolides of Piper fadyenii
AUTHOR(S): Nair, Muraleedharan G.; Mansingh, Ajay P.; Burke, Basil A.
LOCATION: Dep. Chem., Univ. West Indies, Kingston, Jamaica,
JOURNAL: Agric. Biol. Chem. DATE: 1986 VOLUME: 50 NUMBER: 12 PAGES: 3053-8 CODEN: ABCHA6 ISSN: 0002-1369 LANGUAGE: English

citation no. 8024/12
399:106099439 CA: 106(13)99439s JOURNAL
Determination of piperine in Piper longum L. by HPLC
AUTHOR(S): Li, Haisheng; Jia, Zongcai; Zhang, Minhe; Zhou, Jingyuan
LOCATION: Tianjin Inst. Drug Control, Tianjin, Peop. Rep. China,
JOURNAL: Yaowu Fenxi Zazhi DATE: 1986 VOLUME: 6 NUMBER: 6 PAGES: 346-8 CODEN: YFZADL ISSN: 0254-1793 LANGUAGE: Chinese

citation no. 8024/13
399:106002876 CA: 106(1)2876w JOURNAL
A cinnamoyl pyrrolidine amide from Piper peepuloides
AUTHOR(S): Shah, Sharda; Kalla, Ashok K.; Dhar, K. L.
LOCATION: P. G. Dep. Chem., Kashmir Univ., Srinagar, India
JOURNAL: Phytochemistry DATE: 1986 VOLUME: 25 NUMBER: 8 PAGES: 1997-8
CODEN: PYTCAS ISSN: 0031-9422 LANGUAGE: English

citation no. 8024/14
399:105224774 CA: 105(25)224774e JOURNAL
Chemical constituents of peppers (Piper spp.) and application to food preservation: naturally occurring antioxidative compounds
AUTHOR(S): Nakatani, Nobuji; Inatani, Reiko; Ohta, Haruko; Nishioka, Atsuko
LOCATION: Fac. Sci. Living, Osaka City Univ., Osaka, Japan, 558
JOURNAL: EHP, Environ. Health Perspect. DATE: 1986 VOLUME: 67, PAGES: 135-42 CODEN: EVHPAZ ISSN: 0091-6765 LANGUAGE: English

citation no. 8024/15
399:105168922 CA: 105(19)168922n JOURNAL
A study on the main antioxidative components of betel vines
AUTHOR(S): Huang, S. L.; Chang, W. H.
LOCATION: Grad. Inst. Food Sci. Technol., Natl. Taiwan Univ., Taipei, Taiwan,
JOURNAL: Chung-kuo Nung Yeh Hua Hsueh Hui Chih DATE: 1986 VOLUME: 24 NUMBER: 2 PAGES: 199-210 CODEN: CKNHAA ISSN: 0578-1736 LANGUAGE: Chinese

citation no. 8024/16
399:105149773 CA: 105(17)149773y JOURNAL
Studies on minor seed oils. VII
AUTHOR(S): Mannan, A.; Farooqi, Javed A.; Ahmad, I.; Asif, M.
LOCATION: Dep. Chem., Aligarh Muslim Univ., Aligarh, 202001, India
JOURNAL: Fette, Seifen, Anstrichm. DATE: 1986 VOLUME: 88 NUMBER: 8 PAGES: 301-2 CODEN: FSASAX ISSN: 0015-038X LANGUAGE: English

citation no. 8024/17
399:105112020 CA: 105(13)112020z JOURNAL
Analysis of the constituents of Piper methysticum by gas chromatography methane chemical ionization mass spectrometry. New constituents of kava resin
AUTHOR(S): Duffield, A. M.; Lidgard, R. O.; Low, G. K. C.
LOCATION: Biomed. Mass Spectrom. Unit, Univ. New South Wales, Kensington, 2033, Australia
JOURNAL: Biomed. Environ. Mass Spectrom. DATE: 1986 VOLUME: 13 NUMBER: 6 PAGES: 305-13 CODEN: BEMSEN ISSN: 0887-6134 LANGUAGE: English

citation no. 8024/18
399:105075982 CA: 105(9)75982s JOURNAL
Chemical constituents of the leaves of Piper lenticellosum C.D.C
AUTHOR(S): Diaz D., Pedro P.; Dorado V., Jorge
LOCATION: Fac. Cienc., Univ. Nac. Colombia, Bogota, Colombia,
JOURNAL: Rev. Latinoam. Quim. DATE: 1986 VOLUME: 17 NUMBER: 1-2
PAGES: 58-60 CODEN: RLAQA8 ISSN: 0370-5943 LANGUAGE: Spanish

citation no. 8024/19
399:105054739 CA: 105(7)54739c JOURNAL
Potentialities of some indigenous plants for antifertility activity
AUTHOR(S): Prakash, Anand O.
LOCATION: Sch. Stud. Zool., Jiwaji Univ., Gwalior, 474011, India
JOURNAL: Int. J. Crude Drug Res. DATE: 1986 VOLUME: 24 NUMBER: 1
PAGES: 19-24 CODEN: IJCREE ISSN: 0167-7314 LANGUAGE: English

citation no. 8024/20
399:105039341 CA: 105(5)39341y JOURNAL
Constituents of tropical medicinal plants. IXX. GC/MS-investigations of the constituents of Piper amalago - 30 new amides of the piperine-type
AUTHOR(S): Achenbach, Hans; Fietz, Wolfgang; Woerth, Juergen; Waibel, Reiner; Portecop, Jacques
LOCATION: Inst. Pharm. Food Chem., Univ. Erlangen, D-8520, Erlangen, Fed. Rep. Ger.
JOURNAL: Planta Med. DATE: 1986 NUMBER: 1 PAGES: 12-18 CODEN: PLMEAA
ISSN: 0032-0943 LANGUAGE: English

citation no. 8024/21
399:104108022 CA: 104(13)108022p JOURNAL
Separation and determination of piperine in ground pepper by high-performance liquid chromatography
AUTHOR(S): Archer, Alan W.
LOCATION: Div. Anal. Lab., New South Wales Dep. Health, Lidcombe, 2141, Australia
JOURNAL: J. Chromatogr. DATE: 1986 VOLUME: 351 NUMBER: 3 PAGES: 595-8
CODEN: JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8024/22
399:104087212 CA: 104(11)87212h JOURNAL
Capillary gas chromatographic analysis of volatile flavor compounds
AUTHOR(S): Takeoka, G.; Ebeler, S.; Jennings, W.
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, CA, 95616, USA
JOURNAL: ACS Symp. Ser. DATE: 1985 VOLUME: 289 NUMBER: Charact. Meas. Flavor Compd. PAGES: 95-108 CODEN: ACSMC8 ISSN: 0097-6156 LANGUAGE: English

citation no. 8024/23
399:104050040 CA: 104(7)50040z JOURNAL
Effects of processing treatments on recovery of capsaicin in jalapeno peppers
AUTHOR(S): Harrison, Mary Kate; Harris, Natholyn D.
LOCATION: Dep. Nutr. Food Sci., Florida State Univ., Tallahassee, FL, 32306, USA

JOURNAL: J. Food Sci. DATE: 1985 VOLUME: 50 NUMBER: 6 PAGES: 1764-5
CODEN: JFDSAZ ISSN: 0022-1147 LANGUAGE: English

citation no. 8024/24
399:104015049 CA: 104(3)15049n JOURNAL
The isolation and characterization of kadsurenone from haifenteng (Piper futokadsura) as an orally active specific receptor antagonist of platelet-activating factor
AUTHOR(S): Shen, T. Y.; Hwang, S. B.; Chang, M. N.; Doebber, T. W.; Lam, M. H.; Wu, M. S.; Wang, X.
LOCATION: Merck, Sharp Dohme Res. Lab., Rahway, NJ, 07065, USA
JOURNAL: Int. J. Tissue React. DATE: 1985 VOLUME: 7 NUMBER: 5 PAGES: 339-43 CODEN: IJTEDP ISSN: 0250-0868 LANGUAGE: English

citation no. 8024/25
399:104004826 CA: 104(1)4826n JOURNAL
Efficacy of extraction of constituents in the preparation of yaqona beverage. Part 1: general constituents
AUTHOR(S): Duve, R. N.; Prasad, J.
LOCATION: Res. Div., Min. Primary Ind., Fiji,
JOURNAL: Fiji Agric. J. DATE: 1984 VOLUME: 46 NUMBER: 1 PAGES: 5-9
CODEN: FJAJAB ISSN: 0015-0886 LANGUAGE: English

citation no. 8024/26
399:104004799 CA: 104(1)4799f JOURNAL
Relationship between pigment content, peroxidase activity and sugar composition of red pepper (Capsicum annuum L.). I. Influence of cultivar, drying method and a ripening accelerator
AUTHOR(S): Vamos-Vigyazo, Lilly; Polacsek-Racz, Maria; Schmidt, Katalin; Joo-Farkas, Ildiko; Pauli, Magda P.; Horvath, G.; Kiss, K.; Horvath, L.
LOCATION: Cent. Food Res. Inst., H-1022, Budapest, Hung.
JOURNAL: Acta Aliment. DATE: 1985 VOLUME: 14 NUMBER: 2 PAGES: 173-89
CODEN: ACALDI ISSN: 0139-3006 LANGUAGE: English

citation no. 8024/27
399:104004759 CA: 104(1)4759t JOURNAL
Compositional differences of black, green and white pepper (Piper nigrum L.) oil from three cultivars
AUTHOR(S): Buckle, K. A.; Rathnawathie, M.; Brophy, J. J.
LOCATION: Sch. Food Sci. Technol., Univ. New South Wales, Kensington, NSW 2033, Australia
JOURNAL: J. Food Technol. DATE: 1985 VOLUME: 20 NUMBER: 5 PAGES: 599-613 CODEN: JFOTAP ISSN: 0022-1163 LANGUAGE: English

citation no. 8024/28
399:103210886 CA: 103(25)210886q JOURNAL
Antibacterial studies with the compounds isolated from Piper methysticum Forst
AUTHOR(S): Som, Uday K.; Dutta, C. P.; Sarkar, G. M.; Banerjee, R. D.
LOCATION: Dep. Chem., Univ. Kalyani, Kalyani, 741 235, India
JOURNAL: Natl. Acad. Sci. Lett. (India) DATE: 1985 VOLUME: 8 NUMBER: 4 PAGES: 109-10 CODEN: NASLDX ISSN: 0250-541X LANGUAGE: English

citation no. 8024/29
399:103140401 CA: 103(17)140401b JOURNAL
Determination of piperine in pepper (Piper nigrum L)
AUTHOR(S): Jansz, E. R.; Pathirana, I. C.; Packiyasothy, E. V.
LOCATION: Nat. Prod. Sect., Ceylon Inst. Sci. Ind. Res., Colombo, Sri Lanka,
JOURNAL: J. Natl. Sci. Counc. Sri Lanka DATE: 1983 VOLUME: 11 NUMBER: 1 PAGES: 129-38 CODEN: JNSCBH ISSN: 0300-9254 LANGUAGE: English

citation no. 8024/30
399:103121791 CA: 103(15)121791n JOURNAL
Use of supercritical gas extraction for spices and fragrances
AUTHOR(S): Okumura, Joji
LOCATION: Kawasaki Res. Lab., Hasegawa Koryo K. K., Kawasaki, Japan,
JOURNAL: Kemikaru Enjiniyaringu DATE: 1985 VOLUME: 30 NUMBER: 7 PAGES: 460-6 CODEN: KEENAT ISSN: 0387-1037 LANGUAGE: Japanese

citation no. 8024/31
399:102182409 CA: 102(21)182409v JOURNAL
Ishwarol, the main sesquiterpene in Piper amalago
AUTHOR(S): Achenbach, Hans; Gross, Johann; Portecop, Jacques
LOCATION: Inst. Pharm. Food Chem., Univ. Erlangen, D-8520, Erlangen, Fed. Rep. Ger.
JOURNAL: Planta Med. DATE: 1984 VOLUME: 50 NUMBER: 6 PAGES: 528-9
CODEN: PLMEAA ISSN: 0032-0943 LANGUAGE: English

citation no. 8024/32
399:102180709 CA: 102(21)180709u JOURNAL
Evaluation of chemicals inhibiting the bacterial leaf spot pathogen of betelvine
AUTHOR(S): Tripathi, R. D.; Johri, J. K.; Balasubrahmanyam, V. R.
LOCATION: Betelvine Sect., Natl. Bot. Res. Inst., Lucknow, 226 001, India
JOURNAL: Trop. Pest Manage. DATE: 1984 VOLUME: 30 NUMBER: 4 PAGES: 440-3 CODEN: TPMAD5 ISSN: 0143-6147 LANGUAGE: English

citation no. 8024/33
399:102160196 CA: 102(19)160196w JOURNAL
Characterization of a platelet-activating factor receptor antagonist isolated from haifenteng (Piper futokadsura): specific inhibition of in vitro and in vivo platelet-activating factor-induced effects
AUTHOR(S): Shen, T. Y.; Hwang, San Bao; Chang, Michael N.; Doebber, Thomas W.; Lam, My Hanh T.; Wu, Margaret S.; Wang, Xui; Han, Guiqiu; Li, Kunzhi
LOCATION: Merck Sharp and Dohme Res. Lab., Rahway, NJ, 07065, USA
JOURNAL: Proc. Natl. Acad. Sci. U. S. A. DATE: 1985 VOLUME: 82
NUMBER: 3 PAGES: 672-6 CODEN: PNASA6 ISSN: 0027-8424 LANGUAGE: English

citation no. 8024/34
399:102154854 CA: 102(18)154854t JOURNAL
Chromatographic characterization of the crude drug and fluid extract of Pothomorphe umbellata (L.) Miq
AUTHOR(S): Silva de Moraes, Marlene; Akisue, Maria Kubota; De Oliveira, Fernando; Akisue, Gokithi
LOCATION: Fac. Cienc. Farm., USP, Sao Paulo, Brazil

JOURNAL: An. Farm. Quim. Sao Paulo DATE: 1984 VOLUME: 24 NUMBER: 1-2
PAGES: 1-9 CODEN: AFQSAZ ISSN: 0003-2441 LANGUAGE: Portuguese

citation no. 8024/35
399:102125111 CA: 102(15)125111t JOURNAL
Pharmacological study on piperine
AUTHOR(S): Lee, Eun Bang; Shin, Kuk Hyun; Woo, Won Sick
LOCATION: Nat. Prod. Res. Inst., Seoul Natl. Univ., Seoul, 110, S. Korea
JOURNAL: Arch. Pharmacal Res. DATE: 1984 VOLUME: 7 NUMBER: 2 PAGES: 127-32 CODEN: APHRDQ LANGUAGE: English

citation no. 8024/36
399:101187978 CA: 101(21)187978u JOURNAL
Inhibitors of certain enzymes (of Botryodiplodia theobromae) in Piper betle leaf extracts
AUTHOR(S): Chile, S. K.; Vyas, K. M.
LOCATION: Dep. Bot., Dr. Harisingh Gaur Vishwavidhyalaya, Sagar, 470 003, India
JOURNAL: Hind. Antibiot. Bull. DATE: 1984 VOLUME: 26 NUMBER: 1-2
PAGES: 27-32 CODEN: HINAAU ISSN: 0018-1935 LANGUAGE: English

citation no. 8024/37
399:101167142 CA: 101(19)167142p JOURNAL
Chemical constituents of Piper sarmentosum, Roxb
AUTHOR(S): Niamsa, Noi; Chantrapromma, Kan
LOCATION: Nam Phong Suksa Sch., Khon Kaen, Thailand,
JOURNAL: Warasan Songkhla Nakkharin DATE: 1983 VOLUME: 5 NUMBER: 2
PAGES: 151-2 CODEN: WSNAEV LANGUAGE: English

citation no. 8024/38
399:101124566 CA: 101(15)124566n JOURNAL
The mutagenicity of nitrite-treated aqueous extract of Piper betle L
AUTHOR(S): Chen, Hsing Chen; Chang, Yung Sing; Lee, Tung Ching
LOCATION: Dep. Mar. Food Sci., Natl. Taiwan Coll. Mar. Sci. Technol., Keelung, Taiwan,
JOURNAL: Proc. Natl. Sci. Counc., Repub. China, Part B DATE: 1984
VOLUME: 8 NUMBER: 1 PAGES: 4-10 CODEN: PCRCD3 ISSN: 0253-6870
LANGUAGE: English

citation no. 8024/39
399:100035969 CA: 100(17)135969b JOURNAL
In vitro responses of black pepper (Piper nigrum)
AUTHOR(S): Mathews, V. Helena; Rao, P. S.
LOCATION: Bio-Org. Div., Bhabha At. Res. Cent., Bombay, 400 085, India
JOURNAL: Curr. Sci. DATE: 1984 VOLUME: 53 NUMBER: 4 PAGES: 183-6
CODEN: CUSCAM ISSN: 0011-3891 LANGUAGE: English

citation no. 8024/40
399:100126955 CA: 100(16)126955s JOURNAL
High-performance liquid chromatography of kava lactones from Piper methysticum
AUTHOR(S): Smith, Roger M.; Thakrar, H.; Arowolo, T. A.; Shafi, A. A.
LOCATION: Dep. Chem., Loughborough Univ. Technol., Loughborough/Leics., UK, LE11 3TU
JOURNAL: J. Chromatogr. DATE: 1984 VOLUME: 283, PAGES: 303-8 CODEN:

JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8024/41
399:100117350 CA: 100(15)117350p JOURNAL
Determination of piperine in Bi Bo (Piper longum) by TLC and UV spectrometry
AUTHOR(S): Zhang, Minhe
LOCATION: Tianjin Munic. Inst. Drug Control, Tianjin, Peop. Rep. China,
JOURNAL: Zhongcaoyao DATE: 1983 VOLUME: 14 NUMBER: 11 PAGES: 489-91
CODEN: CTYAD8 ISSN: 0253-2670 LANGUAGE: Chinese

citation no. 8024/42
399:100065161 CA: 100(9)65161f JOURNAL
Effect of maturity on some chemical constituents of Sri Lankan pepper (Piper nigrum L.)
AUTHOR(S): Jansz, Errol R.; Balachandran, Subramaniam; Packiyasothy, E. Velupillai; Ratnayake, Sunil
LOCATION: Ceylon Inst. Sci. Ind. Res., Colombo, Sri Lanka,
JOURNAL: J. Sci. Food Agric. DATE: 1984 VOLUME: 35 NUMBER: 1 PAGES: 41-6 CODEN: JSFAAE ISSN: 0022-5142 LANGUAGE: English

citation no. 8024/43
399:100048575 CA: 100(7)48575b JOURNAL
Larva-development inhibitors of black pepper
AUTHOR(S): Ohigashi, Hajime; Nishimuro, Satoshi; Koshimizu, Koichi
LOCATION: Dep. Food Sci. Technol., Kyoto Univ., Kyoto, Japan, 606
JOURNAL: Bull. Inst. Chem. Res., Kyoto Univ. DATE: 1983 VOLUME: 61 NUMBER: 2 PAGES: 104-8 CODEN: BICRAS ISSN: 0023-6071 LANGUAGE: English

citation no. 8024/44
399:99102254 CA: 99(13)102254x JOURNAL
Lignans of Piper clusii
AUTHOR(S): Koul, S. K.; Taneja, S. C.; Dhar, K. L.; Atal, C. K.
LOCATION: Reg. Res. Lab., Jammu, 180001, India
JOURNAL: Phytochemistry DATE: 1983 VOLUME: 22 NUMBER: 4 PAGES: 999-1000 CODEN: PYTCAS ISSN: 0031-9422 LANGUAGE: English

citation no. 8024/45
399:99068895 CA: 99(9)68895v JOURNAL
Determination of piperine in pepper (Piper nigrum) using high-performance liquid chromatography
AUTHOR(S): Rathnawathie, Malinie; Buckle, K. A.
LOCATION: Sch. Food Technol., Univ. New South Wales, Kensington, 2033, Australia
JOURNAL: J. Chromatogr. DATE: 1983 VOLUME: 264 NUMBER: 2 PAGES: 316-20 CODEN: JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8024/46
399:99003121 CA: 99(1)3121v JOURNAL
Hydroxyproline-containing proteins extracted from intact and wounded sweet pepper fruits
AUTHOR(S): Fukuda, Mitsuru; Kagimoto, Toshiko
LOCATION: Mukogawa Women's Univ., Nishinomiya, Japan,
JOURNAL: Mukogawa Joshi Daigaku Kiyo, Hifuku-hen DATE: 1982 VOLUME: 30,

PAGES: S7-S12 CODEN: MDHFDZ ISSN: 0387-2092 LANGUAGE: Japanese
JOURNAL: Mukogawa Joshi Daigaku Kiyo, Shokumotsu-hen, 30

citation no. 8024/47
399:98159205 CA: 98(19)159205r JOURNAL
A TLC-fluorescent method of detecting and evaluating individual antioxidative components
AUTHOR(S): Chang, W. H.; Luu, H. X.; Cheng, A. C.
LOCATION: Grad. Inst. Food Sci. Technol., Natl. Taiwan Univ., Taipei, Taiwan,
JOURNAL: J. Food Sci. DATE: 1983 VOLUME: 48 NUMBER: 2 PAGES: 658-9
CODEN: JFDSAZ ISSN: 0022-1147 LANGUAGE: English

citation no. 8024/48
399:98140524 CA: 98(17)140524x JOURNAL
Constituents of Piper sylvaticum: structure of sylvatesmin
AUTHOR(S): Banerji, Avijit; Pal, Sudhir
LOCATION: Coll. Sci., Univ. Calcutta, Calcutta, 700 009, India
JOURNAL: J. Nat. Prod. DATE: 1982 VOLUME: 45 NUMBER: 6 PAGES: 672-5
CODEN: JNPRDF ISSN: 0163-3864 LANGUAGE: English

citation no. 8024/49
399:98105940 CA: 98(13)105940h JOURNAL
Quality evaluation of yaqona (Piper methysticum) in Fiji
AUTHOR(S): Duve, Ram N.; Prasad, Jagendra
LOCATION: Res. Div., Dep. Agric., Fiji, Fiji,
JOURNAL: Fiji Agric. J. DATE: 1981 VOLUME: 43 NUMBER: 1 PAGES: 1-8
CODEN: FJAJAB ISSN: 0015-0886 LANGUAGE: English

citation no. 8024/50
399:98015706 CA: 98(3)15706g JOURNAL
Chemical composition of common fodder tree leaves, shrubs and epiphytes in Northeastern Hill Region, (India)
AUTHOR(S): Varma, Arun; Yadav, B. P. S.; Sampath, K. T.; Roy, D. J.
LOCATION: Anim. Nutr. Div., ICAR Res. Complex, Meghalaya, 793 013, India
JOURNAL: Indian J. Anim. Sci. DATE: 1982 VOLUME: 52 NUMBER: 10
PAGES: 859-65 CODEN: IJLAA4 ISSN: 0367-8318 LANGUAGE: English

citation no. 8024/51
399:98003750 CA: 98(1)3750d PATENT
Food antioxidants from pepper
LOCATION: Japan,
ASSIGNEE: Hasegawa, T., Co., Ltd.
PATENT: Japan Kokai Tokkyo Koho ; JP 82146563 A2 ; JP 57146563 DATE: 820910
APPLICATION: JP 8131232 (810306)
PAGES: 12 pp. CODEN: JKXXAF LANGUAGE: Japanese CLASS: A23L-003/34

citation no. 8024/52
399:97143289 CA: 97(17)143289q JOURNAL
Studies on the antioxidative activities of spices grown in Taiwan. I
AUTHOR(S): Huang, Jeng Kun; Wang, Guo Shiang; Chang, Wei Hsien
LOCATION: Grad. Inst. Food Sci. Technol., Natl. Taiwan Univ., Taipei, Taiwan,
JOURNAL: Chung-kuo Nung Yeh Hua Hsueh Hui Chih DATE: 1981 VOLUME: 19

NUMBER: 3-4 PAGES: 200-7 CODEN: CKNHAA ISSN: 0578-1736 LANGUAGE: Chinese

citation no. 8024/53
399:97123900 CA: 97(15)123900d JOURNAL
Isolation and identification of amides from Piper callosum. Synthesis of pipercallosine and pipercallosidine
AUTHOR(S): Pring, Brian G.
LOCATION: Res. Dev. Lab., Astra Laekemedel AB, S-151 85, Soederjaelje, Swed.
JOURNAL: J. Chem. Soc., Perkin Trans. 1 DATE: 1982 NUMBER: 7 PAGES: 1493-8 CODEN: JCPRB4 ISSN: 0300-922X LANGUAGE: English

citation no. 8024/54
399:97054049 CA: 97(7)54049u CONFERENCE PROCEEDING
Potential carcinogenicity of black pepper (Piper nigrum)
AUTHOR(S): Concon, Jose Madrid; Swerczek, T. W.; Newburg, David S.
LOCATION: Dep. Nutr. Food Sci., Univ. Kentucky, Lexington, KY, 40506, USA
JOURNAL: Antinutr. Nat. Toxicants Foods, (Pap. Symp.) EDITOR: Ory, Robert L (Ed), DATE: 1981 PAGES: 359-74 CODEN: 47ZOAW LANGUAGE: English
MEETING DATE: 790000 PUBLISHER: Food & Nutr. Press,Westport, Conn

citation no. 8024/55
399:95147110 CA: 95(17)147110f JOURNAL
Auranamide, a new phenylalanine derivative isolated from Piper aurantiacum Wall
AUTHOR(S): Banerji, Avijit; Ray, Rita
LOCATION: Pure Chem. Dep., Univ. Coll. Sci., Calcutta, 700 009, India
JOURNAL: Indian J. Chem., Sect. B DATE: 1981 VOLUME: 20B NUMBER: 7
PAGES: 597-8 CODEN: IJSBDB ISSN: 0376-4699 LANGUAGE: English

citation no. 8024/56
399:95095694 CA: 95(11)95694c JOURNAL
Ethyl acetate as a solvent for extraction of spice oleoresins
AUTHOR(S): Rajaraman, K.; Narayanan, C. S.; Sumathy Kutty, M. A.; Sankarikutty, B.; Mathew, A. G.
LOCATION: Div. Food, Reg. Res. Lab., Trivandrum, 695 019, India
JOURNAL: J. Food Sci. Technol. DATE: 1981 VOLUME: 18 NUMBER: 3
PAGES: 101-3 CODEN: JFSTAB ISSN: 0022-1155 LANGUAGE: English

citation no. 8024/57
399:95093812 CA: 95(11)93812r JOURNAL
Constituents of pepper. Part III. Isobutyl amides from pepper (Piper nigrum L.)
AUTHOR(S): Nakatani, Nobuji; Inatani, Reiko
LOCATION: Fac. Sci. Liv., Osaka City Univ., Osaka, Japan, 558
JOURNAL: Agric. Biol. Chem. DATE: 1981 VOLUME: 45 NUMBER: 6 PAGES: 1473-6 CODEN: ABCHA6 ISSN: 0002-1369 LANGUAGE: English

citation no. 8024/58
399:95038394 CA: 95(5)38394f JOURNAL
A note on standardization of the method of extracting chloroplast pigments from betel (Piper betle) leaves
AUTHOR(S): Das, S.; Basuchaudhuri, P.; Misra, A. K.; Chattopadhay, N. C.; Das Gupta, D. K.

LOCATION: Coll. Agric., Calcutta Univ., Calcutta, 700 019, India
JOURNAL: Indian Agric. DATE: 1979 VOLUME: 23 NUMBER: 2 PAGES: 115-18
CODEN: INAGAT ISSN: 0019-4336 LANGUAGE: English

citation no. 8024/59
399:95005203 CA: 95(1)5203q JOURNAL
Gas-liquid chromatographic determination of major constituents of Piper methysticum
AUTHOR(S): Duve, R. N.
LOCATION: Res. Div., Minist. Agric. Fish., Nausori, Fiji,
JOURNAL: Analyst (London) DATE: 1981 VOLUME: 106 NUMBER: 1259 PAGES: 160-5 CODEN: ANALAO ISSN: 0003-2654 LANGUAGE: English

citation no. 8024/60
399:94099755 CA: 94(13)99755a JOURNAL
Constituents of pepper. Part I. Structures and syntheses of two phenolic amides from Piper nigrum L
AUTHOR(S): Nakatani, Nobuji; Inatani, Reiko; Fuwa, Hidetsugu
LOCATION: Fac. Sci. Living, Osaka City Univ., Osaka, Japan, 558
JOURNAL: Agric. Biol. Chem. DATE: 1980 VOLUME: 44 NUMBER: 12 PAGES: 2831-6 CODEN: ABCHA6 ISSN: 0002-1369 LANGUAGE: English

citation no. 8024/61
399:94099741 CA: 94(13)99741t JOURNAL
Isolation, identification, and insecticidal properties of Piper nigrum amides
AUTHOR(S): Su, Helen C. F.; Horvat, Robert
LOCATION: Stored-Prod. Insects Res. Dev. Lab., Sci. Educ. Adm., Savannah, GA, 31403, USA
JOURNAL: J. Agric. Food Chem. DATE: 1981 VOLUME: 29 NUMBER: 1 PAGES: 115-18 CODEN: JAFCAU ISSN: 0021-8561 LANGUAGE: English

citation no. 8024/62
399:93215484 CA: 93(23)215484s JOURNAL
Pharmacologically active principle of piper retrofractum
AUTHOR(S): Shin, Kuk Hyun; Yun, Hye Sook; Woo, Won Sick; Lee, Chung Kyu
LOCATION: Seoul Univ., Seoul, S. Korea
JOURNAL: Soul Taehakkyo Saengyak Yonguso Opjukjip DATE: 1979 VOLUME: 18, PAGES: 87-9 CODEN: STSODQ ISSN: 0379-1157 LANGUAGE: English

citation no. 8024/63
399:93130900 CA: 93(13)130900z JOURNAL
The nutritive value of some Nigerian leafy green vegetables. Part 2. The distribution of protein, carbohydrates (including ethanol-soluble simple sugars), crude fat, fibre and ash
AUTHOR(S): Ifon, E. T.; Bassir, O.
LOCATION: Biochem. Dep., Univ. Ibadan, Ibadan, Nigeria,
JOURNAL: Food Chem. DATE: 1980 VOLUME: 5 NUMBER: 3 PAGES: 231-5
CODEN: FOCHDJ ISSN: 0308-8146 LANGUAGE: English

citation no. 8024/64
399:93044366 CA: 93(5)44366y PATENT
Extraction of bitter principles from black pepper
INVENTOR(AUTHOR): Pekhov, A. V.; Katyuzhanskaya, A. N.; Dyuban'kova, N. F.; Epatko, V. N.; Fedorov, N. A.

LOCATION: USSR
ASSIGNEE: Krasnodar Scientific-Research Institute of the Food Industry
PATENT: USSR SU 724116 DATE: 800330
APPLICATION: USSR SU 2486586 DATE: 770510
CODEN: URXXAF LANGUAGE: Russian CITATION: Otkrytiya, Izobret., Prom. Obraztsy, Tovarnye Znaki 1980, (12), 6 CLASS: A23L-001/221;

citation no. 8024/65
399:93041605 CA: 93(5)41605q JOURNAL
Amides of Piper attenuatum Ham
AUTHOR(S): Dasgupta, S.; Ray, A. B.
LOCATION: Inst. Med. Sci., Banaras Hindu Univ., Varanasi, 221005, India
JOURNAL: Indian J. Chem., Sect. B DATE: 1979 VOLUME: 17B NUMBER: 5
PAGES: 538-40 CODEN: IJSBDB ISSN: 0376-4699 LANGUAGE: English

citation no. 8024/66
399:93041604 CA: 93(5)41604p JOURNAL
Constituents of Piper sylvaticum and Piper aurantiacum
AUTHOR(S): Banerji, Avijit; Ray, Rita; Siddhanta, Arup; Pal, Sudhir
LOCATION: Pure Chem. Dep., Univ. Coll. Sci., Calcutta, 700009, India
JOURNAL: Indian J. Chem., Sect. B DATE: 1979 VOLUME: 17B NUMBER: 5
PAGES: 538 CODEN: IJSBDB ISSN: 0376-4699 LANGUAGE: English

citation no. 8024/67
399:93041571 CA: 93(5)41571a JOURNAL
Chemical composition of pepper grades and products
AUTHOR(S): Sumathikutty, M. A.; Rajaraman, K.; Sankarikutty, B.; Mathew, A. G.
LOCATION: Reg. Res. Lab., Trivandrum, India
JOURNAL: J. Food Sci. Technol. DATE: 1979 VOLUME: 16 NUMBER: 6
PAGES: 249-52 CODEN: JFSTAB ISSN: 0022-1155 LANGUAGE: English

citation no. 8024/68
399:93024593 CA: 93(3)24593s JOURNAL
HPLC determination of piperine in pepper and in pepper extracts
AUTHOR(S): Verzele, M.; Qureshi, S.
LOCATION: Lab. Org. Chem., State Univ. Gent, B-9000, Ghent, Belg.
JOURNAL: Chromatographia DATE: 1980 VOLUME: 13 NUMBER: 4 PAGES: 241-3
CODEN: CHRGB7 ISSN: 0009-5893 LANGUAGE: English

citation no. 8024/69
399:92140486 CA: 92(17)140486n JOURNAL
Evaluation of fruits of Piper longum Linn. and leaves of Adhatoda vasica Nees for anthelmintic activity
AUTHOR(S): D'Cruz, J. L.; Nimbkar, A. Y.; Kokate, C. K.
LOCATION: Bombay Coll. Pharm., Bombay, 400 098, India
JOURNAL: Indian Drugs DATE: 1980 VOLUME: 17 NUMBER: 4 PAGES: 99-101
CODEN: INDRBA ISSN: 0019-462X LANGUAGE: English

citation no. 8024/70
399:92121862 CA: 92(15)121862r CONFERENCE PROCEEDING
Pharmacology of kava
AUTHOR(S): Meyer, Hans J.
LOCATION: Dep. Pharmacol., Univ. Freiburg, Freiburg, Fed. Rep. Ger.
JOURNAL: Ethnopharmacol. Search Psychoact. Drugs, (Proc. Symp.) EDITOR:

Efron, Daniel H (Ed), DATE: 1979 PAGES: 133-40 CODEN: 42MMAS LANGUAGE: English MEETING DATE: 67 PUBLISHER: Raven,New York, N. Y

citation no. 8024/71
399:92074558 CA: 92(9)74558j JOURNAL
Comparison of batchwise and continuous steam distillation-solvent extraction recovery of volatiles from oleoresin capsicum, African type (Capsicum frutescens)
AUTHOR(S): Teranishi, Roy; Keller, Urs; Flath, Robert A.; Mon, Thomas R.
LOCATION: West. Reg. Res. Cent., Sci. Educ. Adm., Berkeley, CA, 94710, USA
JOURNAL: J. Agric. Food Chem. DATE: 1980 VOLUME: 28 NUMBER: 1 PAGES: 156-7 CODEN: JAFCAU ISSN: 0021-8561 LANGUAGE: English

citation no. 8024/72
399:91191647 CA: 91(23)191647c JOURNAL
Antithiamin factor in fruits, mushrooms and spices
AUTHOR(S): Rattanapanone, Viboon
LOCATION: Fac. Med., Chiang Mai Univ., Chiang Mai, Thailand,
JOURNAL: Chiang Mai Med. Bull. DATE: 1979 VOLUME: 18 NUMBER: 1
PAGES: 9-16 CODEN: CMMBB2 ISSN: 0009-3440 LANGUAGE: Thai

citation no. 8024/73
399:91154269 CA: 91(19)154269k JOURNAL
The Piperaceae amides. I. Structure of pipercide, a new insecticidal amide from Piper nigrum L
AUTHOR(S): Miyakado, Masakazu; Nakayama, Isamu; Yoshioka, Hirosuke; Nakatani, Nobuji
LOCATION: Inst. Biol. Sci., Sumitomo Chem. Co. Ltd., Hyogo, Japan, 665
JOURNAL: Agric. Biol. Chem. DATE: 1979 VOLUME: 43 NUMBER: 7 PAGES: 1609-11 CODEN: ABCHA6 ISSN: 0002-1369 LANGUAGE: English

citation no. 8024/74
399:91152523 CA: 91(19)152523q JOURNAL
Black pepper (Piper nigrum): evidence of carcinogenicity
AUTHOR(S): Concon, Jose M.; Newburg, David S.; Swerczek, Thomas W.
LOCATION: Dep. Nutr. Food Sci., Univ. Kentucky, Lexington, KY, 40506, USA
JOURNAL: Nutr. Cancer DATE: 1979 VOLUME: 1 NUMBER: 3 PAGES: 22-6
CODEN: NUCADQ ISSN: 0163-5581 LANGUAGE: English

citation no. 8024/75
399:91037624 CA: 91(5)37624m JOURNAL
Antioxidant effect of betel leaf and its extracts on storing of fish oil
AUTHOR(S): Revenkar, G. D.; Sen, D. P.
LOCATION: Cent. Food Technol. Res. Inst., Mysore, India
JOURNAL: J. Oil Technol. Assoc. India DATE: 1978 VOLUME: 10 NUMBER: 4
PAGES: 156-7 CODEN: JOTIAC ISSN: 0030-1485 LANGUAGE: English

citation no. 8024/76
399:91009527 CA: 91(2)9527p JOURNAL
High-performance liquid chromatographic analysis of the pungent principles of pepper and pepper extracts
AUTHOR(S): Verzele, M.; Mussche, P.; Qureshi, S. A.
LOCATION: Lab. Org. Chem., State Univ. Ghent, B-9000, Ghent, Belg.
JOURNAL: J. Chromatogr. DATE: 1979 VOLUME: 172, PAGES: 493-7 CODEN:

JOCRAM ISSN: 0021-9673 LANGUAGE: English

citation no. 8024/77
399:90200305 CA: 90(25)200305y JOURNAL
Propiophenones from Piper marginatum
AUTHOR(S): De Diaz, Aura M. P.; Gottlieb, Otto R.
LOCATION: Inst. Nac. Pesqui. Amazonia, Cons. Nac. Desenvolvimento Cient. Tecnol., Manaus, Brazil
JOURNAL: Planta Med. DATE: 1979 VOLUME: 35 NUMBER: 2 PAGES: 190-1
CODEN: PLMEAA ISSN: 0032-0943 LANGUAGE: English

citation no. 8024/78
399:89163812 CA: 89(19)163812t JOURNAL
A new piperidine alkaloid from Piper peepuloides
AUTHOR(S): Gupta, O. P.; Gupta, S. C.; Dhar, K. L.; Atal, C. K.
LOCATION: Cent. Counc. Res. Indian Med. Homeopathy Unit, Jammu, India
JOURNAL: Phytochemistry DATE: 1978 VOLUME: 17 NUMBER: 3 PAGES: 601-2
CODEN: PYTCAS ISSN: 0031-9422 LANGUAGE: English

citation no. 8024/79
399:89022504 CA: 89(3)22504 DISSERTATION
Volatile components and pungency in fresh and processed jalapeno peppers (Capsicum annuum)
AUTHOR(S): Huffman, Velma Lynn
LOCATION: Texas A and M Univ., College Station, Tex.
DATE: 1977 PAGES: 63 pp. CODEN: DABBBA LANGUAGE: English CITATION: Diss. Abstr. Int. B 1978, 38(11), 5260 AVAIL: Univ. Microfilms Int., Order No. 7806804

citation no. 8024/80
399:89020270 CA: 89(3)20270d JOURNAL
Flavonoids from Piper marginatum. Isolation of a new flavonoid, marginatoside
AUTHOR(S): Tillequin, F.; Paris, M.; Jacquemin, H.; Paris, R. R.
LOCATION: Fac. Pharm., Univ. Paris, Paris, Fr.
JOURNAL: Planta Med. DATE: 1978 VOLUME: 33 NUMBER: 1 PAGES: 46-52
CODEN: PLMEAA ISSN: 0032-0943 LANGUAGE: French

citation no. 8024/81
399:89004793 CA: 89(1)4793w JOURNAL
Characteristic of flavor and aroma of natural extracts from black pepper
AUTHOR(S): Kostrzewa, Ewa; Karwowska, Krystyna
LOCATION: Zakl. Technol. Przetworow Owocowych Warzywnych, Inst. Przem. Ferment., Warsaw, Pol.
JOURNAL: Pr. Inst. Lab. Badaw. Przem. Spozyw. DATE: 1977 VOLUME: 27 NUMBER: 2 PAGES: 93-102 CODEN: PILPAH ISSN: 0554-9043 LANGUAGE: Polish

citation no. 8024/82
399:88078998 CA: 88(12)78998t JOURNAL
Highlights of the chemistry and pharmacology of yaqona (Piper methysticum)
AUTHOR(S): Duve, R. N.
LOCATION: Res. Div., Dep. Agric., Fiji
JOURNAL: Fiji Agric. J. DATE: 1976 VOLUME: 38 NUMBER: 2 PAGES: 81-4

CODEN: FJAJAB LANGUAGE: English

citation no. 8024/83
399:87182727 CA: 87(23)182727u JOURNAL
A high-yield method for the extraction and purification of capsaicin
AUTHOR(S): Sass, Neil L.; Rounsavill, Mark; Combs, Harold
LOCATION: Clin. Invest. Serv., William Beaumont Army Med. Cent., El Paso, Tex.
JOURNAL: J. Agric. Food Chem. DATE: 1977 VOLUME: 25 NUMBER: 6 PAGES: 1419-20 CODEN: JAFCAU LANGUAGE: English

citation no. 8024/84
399:87180745 CA: 87(23)180745z JOURNAL
Studies on the genus Piper: studies on the roots of Piper longum Linn
AUTHOR(S): Dutta, C. P.; Banerjee, [illegible]s. Noton; Sil, Ajoy K.; Roy, D. N.
LOCATION: Dep. Chem., Univ. Kalyani, Kalyani, India
JOURNAL: Indian J. Chem., Sect. B DATE: 1977 VOLUME: 15B NUMBER: 6 PAGES: 583-4 CODEN: IJSBDB LANGUAGE: English

citation no. 8024/85
399:87164189 CA: 87(21)164189r JOURNAL
A new amide from Piper officinarum
AUTHOR(S): Gupta, O. P.; Gupta, S. C.; Dhar, K. L.; Atal, C. K.
LOCATION: Cent. Counc. Res. Indian Med. Homeopathy Unit, Jammu-Tawi, India
JOURNAL: Phytochemistry DATE: 1977 VOLUME: 16 NUMBER: 9 PAGES: 1436-7
CODEN: PYTCAS LANGUAGE: English

citation no. 8024/86
399:87152437 CA: 87(19)152437g JOURNAL
A new piperine-type amide from Piper guineense
AUTHOR(S): Sondengam, B. L.; Kimbu, S. F.; Connolly, Joseph D.
LOCATION: Dep. Org. Chem., Univ. Yaounde, Yaounde, Cameroon
JOURNAL: Phytochemistry DATE: 1977 VOLUME: 16 NUMBER: 7 PAGES: 1121-2
CODEN: PYTCAS LANGUAGE: English

citation no. 8024/87
399:87083373 CA: 87(11)83373u PATENT
Hot pepper extract
INVENTOR(AUTHOR): Adachi, Michiaki
LOCATION: Japan
PATENT: Japan Kokai Tokkyo Koho JP 7761270 DATE: 770520
APPLICATION: Japan JP 75135324 DATE: 751110
PAGES: 1 p. CODEN: JKXXAF CLASS: A23L-C01/221;

citation no. 8024/88
399:87065351 CA: 87(9)65351f JOURNAL
Chemical constituents of stems of Piper nigrum Linn
AUTHOR(S): Singh, Jagdev; Vasudevan, K.; Rai, R. S.
LOCATION: Dep. Pharm., Birla Inst. Technol. Sci., Pilani, India
JOURNAL: J. Indian Chem. Soc. DATE: 1976 VOLUME: 53 NUMBER: 11 PAGES: 1162-3 CODEN: JICSAH LANGUAGE: English

citation no. 8024/89
399:86167931 CA: 86(23)167931s JOURNAL
Structure of a new amide, filfiline, isolated from Piper officinarum
AUTHOR(S): Gupta, O. P.; Gupta, S. C.; Dhar, K. L.; Atal, C. K.
LOCATION: Cent. Counc. Res. Indian Med. Homeopathy, Reg. Res. Lab., Jammu India
JOURNAL: Indian J. Chem., Sect. B DATE: 1976 VOLUME: 14B NUMBER: 12
PAGES: 912-13 CODEN: IJSBDB LANGUAGE: English

citation no. 8024/90
399:86078710 CA: 86(12)78710b JOURNAL
Gas-chromatographic study of pharmacopeia drugs. Part 6.
Gas-chromatographic quantitation of trans,trans-piperine in Piper nigrum and album
AUTHOR(S): Glasl, H.; Borup-Grochtmann, I.; Wagner, H.
LOCATION: Inst. Pharm. Arzneimittellehre, Univ. Muenchen, Munich, Ger.
JOURNAL: Dtsch. Apoth.-Ztg. DATE: 1976 VOLUME: 116 NUMBER: 43 PAGES: 1638-41 CODEN: DAZEA2 LANGUAGE: German

citation no. 8024/91
399:86021786 CA: 86(4)21786b PATENT
Oral contraceptive (long-acting)
INVENTOR(AUTHOR): Das, Phatic Chandra
LOCATION: India
PATENT: Britain GB 1445599 DATE: 760811
APPLICATION: Britain GB 7357221 DATE: 731210
PAGES: 11 pp. CODEN: BRXXAA CLASS: A61K-035/78;

citation no. 8024/92
399:84163023 CA: 84(23)163023h JOURNAL
Volatile compositional differences between cultivars of black pepper (Piper nigrum)
AUTHOR(S): Russell, Gerald F.; Else, Joanne
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: Indian Spices DATE: 1975 VOLUME: 12 NUMBER: 1 PAGES: 4-11
CODEN: INSPDD LANGUAGE: English

citation no. 8024/93
399:82153984 CA: 82(23)153984s JOURNAL
Extraction rate equations for paprika and turmeric with certain organic solvents
AUTHOR(S): Houser, Thomas J.; Biftu, Tesfaye; Hsieh, Po-Fang
LOCATION: Dep. Chem., West. Michigan Univ., Kalamazoo, Mich.
JOURNAL: J. Agric. Food Chem. DATE: 1975 VOLUME: 23 NUMBER: 2 PAGES: 353-5 CODEN: JAFCAU LANGUAGE: English

citation no. 8024/94
399:82072612 CA: 82(11)72612s JOURNAL
Extracts from the fruits of Piper guineense
AUTHOR(S): Okogun, Joseph I.; Ekong, Donald E. U.
LOCATION: Dep. Chem., Univ. Ibadan, Ibadan, Nigeria
JOURNAL: J. Chem. Soc., Perkin Trans. 1 DATE: 1974 NUMBER: 19 PAGES: 2195-8 CODEN: JCPRB4 LANGUAGE: English

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399:82014004 CA: 82(3)14004j JOURNAL
Carbon dioxide extract from Capsicum annuum fruit
AUTHOR(S): Meerov, Ya. S.; Katyuzhanskayz, A. N.; Dyuban'kova, N. F.
LOCATION: Krasnodar. Nauchno-Issled. Inst. Pishch. Prom., Krasnodar, USSR
JOURNAL: Khim. Prir. Soedin. DATE: 1974 NUMBER: 4 PAGES: 481-5
CODEN: KPSUAR LANGUAGE: Russian

citation no. 8024/96
399:81048616 CA: 81(9)48616e JOURNAL
Volatile compositional differences between cultivars of black pepper (Piper nigrum)
AUTHOR(S): Russell, Gerald F.; Else, Joanne
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: J. Ass. Off. Anal. Chem. DATE: 1973 VOLUME: 56 NUMBER: 2
PAGES: 344-51 CODEN: JANCA2 LANGUAGE: English

citation no. 8024/97
399:81024345 CA: 81(5)24345q JOURNAL
Effect of natural spices, spice extracts, essential oils, extraction residues, and synthetic antioxidants on the breakdown of pork fat and model lipids. III. Spice extracts, water vapor-volatile and nonvolatile extraction components, and extraction residues
AUTHOR(S): Palitzsch, A.; Schulze, H.; Lotter, Gisela; Steichele, Andrea
LOCATION: Tieraerztl. Fak., Univ. Muenchen, Munich, Ger.
JOURNAL: Fleischwirtschaft DATE: 1974 VOLUME: 54 NUMBER: 1 PAGES: 63-8 CODEN: FLEIA8 LANGUAGE: German

citation no. 8024/98
399:79030678 CA: 79(5)30678a PATENT
Aromatic extracts of natural composition
ASSIGNEE: Hag A.-G.
PATENT: France Demande FR 2140096 DATE: 730216
APPLICATION: Germany DE P21276119 DATE: 710603
PAGES: 11 pp. CODEN: FRXXBL CLASS: A 231

citation no. 8024/99
399:79017198 CA: 79(3)17198z JOURNAL
Instrumental analysis of carbon dioxide-extract components of Piper nigrum
AUTHOR(S): Meerov, Ya. S.; Katyuzhanskaya, A. N.
LOCATION: Krasnodar. Nauchno-Issled. Inst. Pishch. Prom., Krasnodar, USSR
JOURNAL: Khim. Prir. Soedin. DATE: 1973 NUMBER: 2 PAGES: 184-8
CODEN: KPSUAR LANGUAGE: Russian

citation no. 8024/100
399:78101980 CA: 78(16)101980k PATENT
Processing medicinal plants and herbs
INVENTOR(AUTHOR): Sakamoto, Yoshizo; Sakamoto, Kazuyasu
PATENT: Britain GB 1300966 DATE: 721229
APPLICATION: Britain GB 1129970 DATE: 700310
PAGES: 4 pp. Addn. to Brit. 1,157,717 (CA 71;94748r). CODEN: BRXXAA
CLASS: A 61k

citation no. 8024/101
399:77032999 CA: 77(5)32999p JOURNAL
Comparative study on the composition of volatile constituents of different black pepper (Pipernigrum) varieties
AUTHOR(S): Richard, H. M. J.
LOCATION: Davis, Calif.
JOURNAL: Ind. Aliment. Agr. DATE: 1972 VOLUME: 89 NUMBER: 2 PAGES: 109-19 CODEN: IALAA9 LANGUAGE: French

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399:77032990 CA: 77(5)32990d JOURNAL
Volatile constituents of black pepper
AUTHOR(S): Richard, H. M. J.
LOCATION: Lab. Biochim. Ind. Aliment., Ec. Natl. Super. Ind. Agric. Aliment., Massy, Fr.
JOURNAL: Ind. Aliment. Agr. DATE: 1972 VOLUME: 89 NUMBER: 2 PAGES: 147-51 CODEN: IALAA9 LANGUAGE: French

citation no. 8024/103
399:75139505 CA: 75(23)139505k JOURNAL
Volatile components of black pepper varieties
AUTHOR(S): Richard, H. M.; Russell, G. F.; Jennings, W. G.
LOCATION: Dep. Consum. Sci., Univ. California, Davis, Calif.
JOURNAL: J. Chromatogr. Sci. DATE: 1971 VOLUME: 9 NUMBER: 9 PAGES: 560-6 CODEN: JCHSBZ LANGUAGE: English

citation no. 8024/104
399:75034165 CA: 75(5)34165w JOURNAL
Volatile composition of black pepper
AUTHOR(S): Richard, H. M.; Jennings, W. G.
LOCATION: Dep. Food Sci. Technol., Univ. California, Davis, Calif.
JOURNAL: J. Food Sci. DATE: 1971 VOLUME: 36 NUMBER: 4 PAGES: 584-9
CODEN: JFDSAZ LANGUAGE: English

citation no. 8024/105
399:75025327 CA: 75(4)25327y JOURNAL
Galenicals or pure substances. 1. Solubility tests with pure substances and dry extracts
AUTHOR(S): Csupor, Laszlo; Spaich, W.
LOCATION: Forschungslab., Firma Mueller/Goeppingen, Goeppingen, Ger.
JOURNAL: Pharm. Ind. DATE: 1971 VOLUME: 33 NUMBER: 1 PAGES: 15-17
CODEN: PHINAN LANGUAGE: German

citation no. 8024/106
399:72118448 CA: 72(23)118448s DISSERTATION
Volatile constituents of Piper nigra
AUTHOR(S): Russell, Gerald Frederick
LOCATION: Univ. of California, Davis, Calif.
DATE: 1968 PAGES: 120 pp. CODEN: DABSAQ LANGUAGE: English CITATION: Diss. Abstr. Int. B 1969, 30(4), 1559-60 AVAIL: 69-16,372

citation no. 8024/107
399:72020254 CA: 72(5)20254a JOURNAL
Spasmolytic activity of aryl substituted .alpha.-pyrones and aqueous extracts of Piper methysticum
AUTHOR(S): Kretzschmar, R.; Meyer, Hans Joachim; Teschendorf, H. J.; Zoellner, B.
LOCATION: Pharmakol. Inst., Univ. Freiburg/Br., Freiburg/Br., Ger.
JOURNAL: Arch. Int. Pharmacodyn. Ther. DATE: 1969 VOLUME: 180 NUMBER: 2 PAGES: 475-91 CODEN: AIPTAK LANGUAGE: German

citation no. 8024/108
399:72002238 CA: 72(1)2238u JOURNAL
Content of ascorbic acid and its derivatives in fresh-frozen and canned peppers
AUTHOR(S): Stepanyan, E. K.
LOCATION: USSR
JOURNAL: Izv. Sel'skokhoz. Nauk DATE: 1969 VOLUME: 12 NUMBER: 2
PAGES: 93-8 CODEN: ISKSAE LANGUAGE: Armenian

citation no. 8024/109
399:71042162 CA: 71(10)42162a JOURNAL
Introduction of native extracts of medicinal plants and spices into lotions and shampoos
AUTHOR(S): Getmanskii, I. K.; Kudryashov, A. I.; Ereshchenko, L. A.; Prokopchuk, A. F.
LOCATION: USSR
JOURNAL: Maslo-Zhir. Prom. DATE: 1969 VOLUME: 35 NUMBER: 5 PAGES: 25-8 CODEN: MZPYAE LANGUAGE: Russian

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399:71028970 CA: 71(7)28970f JOURNAL
Indigenous drugs used in uterine disorders. I. Pharmacological actions of the extract of the fruits of Piper aurantiacum and an attempt at the identification of its oxytocic principles
AUTHOR(S): Banerjee, S. P.; Dandiya, P. C.
LOCATION: Dep. Pharmacol., S.M.S. Med. Coll., Jaipur, India
JOURNAL: Indian J. Physiol. Pharmacol. DATE: 1967 VOLUME: 11 NUMBER: 4
PAGES: 130-46 CODEN: IJPPAZ LANGUAGE: English

citation no. 8024/111
399:71010227 CA: 71(3)10227j JOURNAL
Inhibitory effect of extracts from pepper leaves (Capsicum annum). II. Concentration and purification of an inhibitory fraction
AUTHOR(S): Marchoux, G.; Rougier, J.
LOCATION: Centre Rech. Agron. Sud-Est, Inst. Nat. Rech. Agron., Montfavet, Fr.
JOURNAL: Ann. Epiphyt. DATE: 1968 VOLUME: 19 NUMBER: Hors-Serie
PAGES: 21-30 CODEN: AEPIAR LANGUAGE: French

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399:70109094 CA: 70(24)109094e JOURNAL
Composition of the carbon dioxide extract of black pepper
AUTHOR(S): Katyuzhenskaya, A. N.
LOCATION: USSR
JOURNAL: Tr. Krasnodar. Nauch.-Issled. Inst. Pishch. Prom. DATE: 1967

VOLUME: 4, PAGES: 177-80 CODEN: TKDPAZ LANGUAGE: Russian CITATION: Ref. Zh., Khim. 1968, Abstr. No. 16R232

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399:69010151 CA: 69(3)10151p JOURNAL
Structure of pipataline, an extractive from Piper peepuloides
AUTHOR(S): Atal, Chand K.; Dhar, K. L.; Pelter, A.
LOCATION: Univ. Manchester, Manchester, Engl.
JOURNAL: Chem. Ind. (London) DATE: 1967 NUMBER: 52 PAGES: 2173-4
CODEN: CHINAG LANGUAGE: English

citation no. 8024/114
399:67057240 CA: 67(12)57240r PATENT
Extraction of pepper oil
INVENTOR(AUTHOR): Vento Portales, Jose; Garcia Honrubia, Pedro
PATENT: Spain ES 321890 DATE: 670301
APPLICATION: Spain DATE: 660118
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citation no. 8024/115
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AUTHOR(S): Mitra, Sachindra N.; Roy, B. R.; Roy, Ajit Kumar
LOCATION: Central Food Lab., Calcutta, India
JOURNAL: J. Proc. Inst. Chem. (India) DATE: 1966 VOLUME: 38 NUMBER: 5
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Bundschuh, E.; Tylla, M.; Baumann, G.; Gierschner, K.
Univ. Hohenheim, Inst. Lebensmitteltechnol., Garbenstr. 25, D-7000 Stuttgart 70, FRG
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(Sensory Evaluation Discipline, Cent. Food Technol. Res. Inst., Mysore-570 013, India)
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Verzele,M. ; Mussche,P. ; Quneshi,S.A.
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Univ. of Georgia, Athens, Georgia 30601, USA
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citation no. 8024/174
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Doc Type: JOURNAL
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Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8024/175
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Journal of Food Technology , 20(5) October 1985, p 599-613 CODEN: JFOTAP
Doc Type: JOURNAL
Spices: The composition of volatile oil (oleoresin) from black pepper, green pepper and white pepper products of a local Sri Lakan cultivar was compared to that from Panniyur and Kuching cultivars from India and Sarawak.
Descriptors: RESEARCH & TECHNOLOGY

citation no. 8024/176
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Journal of Chromatography September 28, 1984, p 288-291 CODEN: JOCRAM
Doc Type: JOURNAL
Spices: "Rapid quality control procedure for the determination of Scoville heat units and the detection of chillies in black pepper, via high performance liquid chromatography (HPLC)."
Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8024/177
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Journal of Chromatography , July 15, 1983, p 316-320 CODEN: JOCRAM
Doc Type: JOURNAL
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Descriptors: RESEARCH & TECHNOLOGY; ANALYTICAL

citation no. 8024/178
(52:) CAS REGISTRY NUMBER: 72968-48-0*
FORMULA: Unknown
CA INDEX NAME: Oils, red pepper, paprika, sweet
DEFINITION NOTE: Extractives and their physically modified derivatives. Capsicum annuum, Solanacea.
CLASS: *CA General Subject; UVCB
SYNONYMS: Paprika extract, sweet
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1983 1986

citation no. 8024/179
(52:) CAS REGISTRY NUMBER: 68991-42-4*
FORMULA: Unknown
CA INDEX NAME: Oils, red pepper, paprika
DEFINITION NOTE: Extractives and their physically modified derivatives. Capsicum annum, Solanaceae.
CLASS: *CA General Subject; UVCB
SYNONYMS: Oils, red pepper, paprika (1979), Paprika oil (1983 1986)
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1979 1983 1986

citation no. 8024/180
(52:) CAS REGISTRY NUMBER: 8006-82-4*
FORMULA: Unknown
CA INDEX NAME: Black pepper oil (8CI) (1979), Oils, black pepper (1983 1986)
DEFINITION NOTE: Extractives and their physically modified derivatives. Piper nigrum, Labiatae.
CLASS: *CA General Subject; UVCB
SYNONYMS: Black pepper oil, Oil pepper black, Oil piper nigrum, Pepper black oil, Pepper oil, Pepper oil black, Pepper oil, black, Pepper oleoresin black, Pepper resin black
SOURCE: TSCA
TSCA PUBLICATION YEAR(S): 1979 1983 1986

citation no. 8024/181
50: 0568675 0E075-02543; 7G010-01503; 0Q040-03776; 7L001-00667; 0C057-05865
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Ivbijaro, M. F.; Agbaje, M.
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Div. Food Chem. Technol., Food Drug Adm., Washington, DC, 20204
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AUTHOR(S): United States Food and Drug Administration
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VARGAS R I; NISHIDA T
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FERRAZ E C D A; ORCHARD J E; LOPEZ A S
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STUDIES ON SOME VOLATILE CONSTITUENTS OF PIPER NIGRA.
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UNIV., DAVIS, CALIFORNIA, USA
DISSERTATION ABSTRACTS INTERNATIONAL. SECTION B. THE SCIENCES AND ENGINEERING, 1969, 30 (4) 1559-60
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JENNINGS, W. G.
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Part 7: PEPPER, ANTIOXIDATIVE EFFECTS

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Nakatani, Nobuji; Inatani, Reiko; Ohta, Haruko; Nishioka, Atsuko
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Patent
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Hasegawa, T., Co., Ltd.
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Language: Ch Summary Language: en

citation no. 8039/155:1
06030439 87004439
Chemical constituents of peppers (Piper spp.) and application to food preservation: naturally occurring antioxidative compounds.
Nakatani N; Inatani R; Ohta H; Nishioka A
Environ Health Perspect Aug 1986, 67 p135-42, ISSN 0091-6765
Journal Code: EIO

Part 8: PEEPER, PHARMACEUTICAL EFFECTS

citation no. 8040/1
312:108011231
108(2)11231a
Patent
Isolation of a piperidine-type alkaloid from Piper longum
Oizumi, Yasushi; Kajiwara, Akiko; Shoji, Noboru; Takemoto, Tsunematsu
Japan,
Mitsubishi Chemical Industries Co., Ltd.
Japan Kokai Tokkyo Koho ; JP 87178582 A2 ; JP 62178582
870805
JP 8621477 (860203)
3 pp.
JKXXAF
Japanese
C07D-317/60A; A61K-031/445

citation no. 8040/2
312:106149163
106(19)149163v
Zeitschrift
Dehydropipernonaline, an amide possessing coronary vasodilating activity, isolated from Piper longum L
Shoji, Noboru; Umeyama, Akemi; Saito, Nobuaki; Takemoto, Tsunematsu; Kajiwara, Akiko; Ohizumi, Yasushi
Dep. Pharm., Tokushima-Bunri Univ., Tokushima, Japan, 770
J. Pharm. Sci.
1986 , 75 (12),1188-9
JPMSAE
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English

citation no. 8040/3
311:104193040
104(22)193040k
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Studies on Nalu injections.
Gu, Weizhang; Deng, Lijia
Inn. Mongolia Inst. Tradit. Chin.-Mongolia Med., Huhehate, Peop. Rep. China,
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1986 , 17 (1), 10-11
CTYAD8
0253-2670
Chinese

citation no. 8040/4
311:104085415
104(11)85415c
Zeitschrift
Carotenoids of the fruit of Capsicum annuum
Popova, N. V.; Litvinenko, V. I.; Kulinich, V. N.; Obolentseva, G. V.; Kozlova, E. O.
All-Union Res. Inst. Chem. Technol. Drugs, USSR

Farm. Zh. (Kiev)
1985 (6), 50-4

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0367-3057
Ukrainian

citation no. 8040/5
311:103016266
103(3)16266x
Zeitschrift
Pharmaceuticals and plant drugs with sedative effects
Nahrstedt, Adolf
Inst. Pharm. Biol., TU Braunschweig, 3300, Braunschweig, Fed. Rep. Ger.
Schriftenr. Bundesapothekerkammer Wiss. Fortbild., Gelbe Reihe
1984 , 12,), 77-101
SBWRDV
0341-860X
German

citation no. 8040/6
311:102125111
102(15)125111t
Zeitschrift
Pharmacological study on piperine
Lee, Eun Bang; Shin, Kuk Hyun; Woo, Won Sick
Nat. Prod. Res. Inst., Seoul Natl. Univ., Seoul, 110, S. Korea
Arch. Pharmacal Res.
1984 , 7 (2), 127-32
APHRDQ
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citation no. 8040/7
311:101189889
101(21)189889q
Zeitschrift
Effect of spices on hepatic microsomal enzyme function in mice
Han, Yong Bong; Shin, Kuk Hyun; Woo, Won Sick
Coll. Educ., Korea Univ., Seoul, 132, S. Korea
Arch. Pharmacal Res.
1984 , 7 (1), 53-6
APHRDQ
English

citation no. 8040/8
310:93000598
93(1)598w
Zeitschrift
Chemical and some pharmacological studies on leaves of Piper longum Linn
Manavalan, R.; Singh, Jagdev
Dep. Pharm., Birla Inst. Technol. Sci., Pilani, India
Indian J. Pharm. Sci.

1979 , 41 (5
190-1
IJSIDW
English

citation no. 8040/9
309:85137733
85(19)137733r
Zeitschrift
Alkaline phosphatase activity in the uteri of rats and guinea-pigs fed an Ayurvedic antifertility agent
Raman, Geeta; Munshi, Safia R.; Rao, Shanta S.
Inst. Res. Reprod., Bombay, India
Indian J. Med. Res.
1976 , 64 (7),
959-62
IJMRAQ
English

citation no. 8040/5:1
0010049021 BIOSIS Number: 18049021
CHEMICAL AND SOME PHARMACOLOGICAL STUDIES ON LEAVES OF PIPER-LONGUM
MANAVALAN R; SINGH J
DEP. PHARM., B.I.T.S., PILANI, RAJASTHAN, INDIA.
INDIAN J PHARM SCI 41 (5). 1979 (RECD. 1980). 190-191. CODEN: IJSID
Language: ENGLISH

citation no. 8040/10:1
82129229 82022511 Holding Library: AGL
Chemical and some pharmacological studies on leaves of Piper longum Linn. (Effect on pentobarbitone sleeping time, conditioned avoidance response, anticonvulsant activity and on blood pressure, medicinal plants)
Manavalan, R.; Singh, J.
Indian journal of pharmaceutical sciences. v. 41 (5) , Sept/Oct 1979. p. 190-191.
Bombay, , Indian Pharmaceutical Association. ISSN: 0019-5472
NAL: 396.8 IN23
Language: English

citation no. 8040/152:1
00437863 67262863
Alkaloids of Piper longum Linn. I. Structure and synthesis of piperlongumine and piperlonguminine.
Chatterjee A; Dutta CP
Tetrahedron (England) Apr 1967, 23 (4) p1769-81, ISSN 0040-4020
Journal Code: VMP

citation no. 8040/155:1
06195187 87169187
Dehydropipernonaline, an amide possessing coronary vasodilating activity, isolated from Piper longum L.
Shoji N; Umeyama A; Saito N; Takemoto T; Kajiwara A; Ohizumi Y
J Pharm Sci Dec 1986, 75 (12) p1188-9, ISSN 0022-3549
Journal Code: JO7

citation no. 8040/155:2
04536316 82079316
Scientific evidence on the role of Ayurvedic herbals on bioavailability of drugs.
Atal CK; Zutshi U; Rao PG
J Ethnopharmacol Sep 1981, 4 (2) p229-32, ISSN 0378-8741
Journal Code: K8T

citation no. 8040/155:3
00437863 67262863
Alkaloids of Piper longum Linn. I. Structure and synthesis of piperlongumine and piperlonguminine.
Chatterjee A; Dutta CP
Tetrahedron (England) Apr 1967, 23 (4) p1769-81, ISSN 0040-4020
Journal Code: VMP

A N N E X II

The cited literature is given below on the subject of

PRICES
TERPENES, SESQUITERPENES (Part 1)
ANTIOXIDANTS (Part 2)
PHARMACEUTICALS (Part 3)
INSECTICIDES (Part 4)
BARBITURATES (Part 5)

Included in this retrieval of literature are the citations listed with these keywords in the data bases

CHEMQUEST

Part 1:

-1-
CD - (-)-ALPHA-COPAENE 96%
SO - FLUKA (Catalog No.: 27814)
PR - 5 ml 250.00 Swiss Francs
1 ml 60.00 Swiss Francs

-2-
CD - (-)-ISOSATIVENE 97%
SO - FLUKA (Catalog No.: 59800)
PR - 5 ml 275.00 Swiss Francs
1 ml 70.00 Swiss Francs

-3-
CD - (+)-CYCLOSATIVENE 99%
SO - FLUKA (Catalog No.: 30017)
PR - 5 ml 250.00 Swiss Francs
1 ml 60.00 Swiss Francs

-4-
CD - (+)-BETA-CEDRENE 97%/8-METHYLENE-2,6,6-TRIMETHYLTRICYCLO[5.3.1.0-1.5]UNDECANE
SO - FLUKA (Catalog No.: 22134)
PR - 25 ml 255.00 Swiss Francs
1 ml 20.00 Swiss Francs
5 ml 75.00 Swiss Francs

-5-
CD - (+)-SATIVEN 98%
SO - FLUKA (Catalog No.: 84590)
PR - 1 ml 90.00 Swiss Francs

-6-
CD - (-)-ALPHA-CUBEBENE,STABILISED 98%
SO - FLUKA (Catalog No.: 28128)
PR - 1 ml 90.00 Swiss Francs

-7-
CD - (-)-ALPHA-GURJUNENE
97%/3,3,7,11-TETRAMETHYLTRICYCLO[6.3.0.0(2.4)]UNDEC-1(11)ENE
SO - FLUKA (Catalog No.: 51204)
PR - 5 ml 210.00 Swiss Francs
1 ml 50.00 Swiss Francs

-8-
CD - (-)-ISOLEDENE 97%
SO - FLUKA (Catalog No.: 58870)
PR - 1 ml 25.00 Swiss Francs
5 ml 90.00 Swiss Francs

-9-
CD - 2,7-DIMETHYL-1-OCTEN-3-YNE
SO - FARCHAN (Catalog No.: 134250)
PR - 25 g 20.00 US Dollars
100 g 60.00 US Dollars

-10-
CD - VALENCENE 85
SO - BDOUKIAN (Catalog No.: 806)
PR - Price Available from Supplier

-11-
CD - FARNESENE
SO - BDOUKIAN (Catalog No.: 808)
PR - Price Available from Supplier

-12-
CD - 1,5,10-TRIMETHYL-1,5,9-CYCLODODECATRIENE 70%
SO - SHELL (Catalog No.: T-22)
PR - Price Available from Supplier

-13-
CD - 1,2,3,4,5,6,7,8-OCTAHYDRONAPHTHALENE
SO - BADER (Catalog No.: S70610-8)
PR - Price Available from Supplier

-14-
CD - 1,2,4,5-TETRAMETHYL-1,4-CYCLOHEXADIENE 98%
SO - ALDRICH (Catalog No.: 28334-7)
PR - 1 g 5.00 US Dollars
5 g 16.00 US Dollars

-15-
CD - (+)-SABINENE
99%/4-METHYLENE-1-(2-PROPYL)BICYCLO[3.1.0]HEXANE/4(10)-THUJENE
SO - ALDRICH (Catalog No.: 27516-6)
PR - 1 g 40.00 US Dollars

-16-
CD - SABINENE
SO - APIN (Catalog No.: N0002S)
PR - Price Available from Supplier

-17-
CD - (+)-ALPHA-LONGIPINENE
99%/2,6,6,9-TETRAMETHYLTRICYCLO[5.4.0.0,2,8]UNDEC-9-ONE
SO - FLUKA (Catalog No.: 62638)
PR - 1 ml 50.00 Swiss Francs

-18-
CD - GAMMA-GURJUNENE
98%/6,10-DIMETHYL-3-ISOPROPENYLBICYCLO[5.3.0]DEC-1-ENE
SO - FLUKA (Catalog No.: 51205)
PR - 5 ml 120.00 Swiss Francs
1 ml 30.00 Swiss Francs

-19-
CD - 1,7,7-TRIMETHYLTRICYCLO[2.2.1.0,2,6]HEPTANE 99%/TRICYCLENE
SO - ALDRICH (Catalog No.: 28105-0)
PR - 1 g 8.75 US Dollars
5 g 37.25 US Dollars

-20-
CD - TRICYCLENE 98%/1,7,7-TRIMETHYLTRICYCLO[2.2.1.0,2.6]HEPTANE
SO - FLUKA (Catalog No.: 91485)
PR - 1 g 15.00 Swiss Francs
5 g 50.00 Swiss Francs

-21-
CD - (-)-THUJOPSENE
97%/2,2,6,9-TETRAMETHYLTRICYCLO[8.1.0.0,1.6]UNDEC-8-ENE
SO - FLUKA (Catalog No.: 89235)
PR - 1 ml 30.00 Swiss Francs
5 ml 105.00 Swiss Francs

-22-
CD - (-)-DEHYDROAROMADENDRANE 97%
SO - FLUKA (Catalog No.: 30780)
PR - 5 ml 67.00 Swiss Francs
1 ml 18.00 Swiss Francs

-23-
CD - (+)-CALARENE 99%/(+)-BETA-GURJUNENE
SO - FLUKA (Catalog No.: 21025)
PR - 1 ml 50.00 Swiss Francs

-24-
CD - (-)-ARISTOLENE 99%
SO - FLUKA (Catalog No.: 11062)
PR - 1 ml 75.00 Swiss Francs

-25-
CD - 1,5-DIMETHYL-1,5-CYCLOOCTADIENE
SO - ALDRICH (Catalog No.: 29144-7)
PR - Price Available from Supplier

-26-
CD - 1,5-DIMETHYL-1,5-CYCLO-OCTADIENE
SO - K & K (Catalog No.: 18948)
PR - 10 g 103.50 US Dollars

-27-
CD - 1,5-DIMETHYL CYCLOOCTADIENE 98%
SO - SHELL (Catalog No.: D-22)
PR - Price Available from Supplier

-28-
CD - 1,5-DIMETHYL-1-CYCLO-OCTADIENE 98%
SO - WILEY (Catalog No.: 1293.00)
PR - Price Available from Supplier

-29-
CD - ALPHA-TERPINOLENE
SO - K & K (Catalog No.: 22668)
PR - 10 g 46.00 US Dollars

-30-
CD - TERPINOLENE
SO - PROLABO (Catalog No.: 28 503)
PR - 1 l 167.00 French Francs

-31-
CD - ALPHA-TERPINOLENE/1-METHYL-4-ISO-PROPYLIDENECYCLOHEXENE
SO - WILEY (Catalog No.: 8411.00)
PR - Price Available from Supplier

-32-
CD - 2-ISO-PROPYLIDENEBICYCLO[2.2.1]HEPTANE
SO - WILEY (Catalog No.: 8335.00-1)
PR - .5 ml 62.00 US Dollars

-33-
CD - 1,2,4-TRI-ISO-PROPYLBENZENE
SO - WILEY (Catalog No.: 9455.20-1)
PR - .5 ml 42.00 US Dollars

-34-
CD - 1-PHENYLNONANE 99%
SO - ALDRICH (Catalog No.: 11320-4)
PR - 25 g 18.75 US Dollars
100 g 54.60 US Dollars

-35-
CD - N-NONYLBENZENE 97%
SO - ALFA (Catalog No.: 12667)
PR - 100 g 35.00 US Dollars
500 g 119.00 US Dollars

-36-
CD - 1-PHENYLNONANE 97%/NONYLBENZENE
SO - CHEMALOG (Catalog No.: 72-5520-00)
PR - 100 g 54.00 US Dollars
25 g 18.00 US Dollars

-37-
CD - N-NONYL BENZENE 97%
SO - COLUMBIA (Catalog No.: N-2620)
PR - 25 g 14.00 US Dollars
100 g 39.00 US Dollars

-38-
CD - NONYLBENZENE 97%
SO - FLUKA (Catalog No.: 74410)
PR - 25 ml 50.00 Swiss Francs
100 ml 160.00 Swiss Francs

-39-
CD - 1-NONYLBENZENE/1-PHENYLNONANE
SO - FRINTON (Catalog No.: 1357)
PR - 100 g 72.00 US Dollars
500 g 270.00 US Dollars
25 g 23.00 US Dollars

-40-
CD - N-NONYL BENZENE
SO - K & K (Catalog No.: 20557)
PR - 10 g 28.00 US Dollars

-41-
CD - 1-PHENYLNONANE
SO - LANCSTER (Catalog No.: 8394)
PR - Price Available from Supplier

-42-
CD - N-NONYLBENZENE
SO - P & B (Catalog No.: N13910)
PR - 10 g 23.00 US Dollars

-43-
CD - 1-PHENYLNONANE
SO - P & B (Catalog No.: P14020)
PR - 25 g 14.00 US Dollars

-44-
CD - 1-PHENYLNONANE
SO - RIEDEL (Catalog No.: 62977)
PR - Price Available from Supplier

-45-
CD - N-NONYLBENZENE 97%/1-PHENYLNONANE
SO - TCI (Catalog No.: N0298)
PR - 10 ml 8250 Japanese Yen

-46-
CD - NONYLBENZENE 97%
SO - WILEY (Catalog No.: 6890.00)
PR - Price Available from Supplier

-47-
CD - NONYLBENZENE 99%
SO - WILEY (Catalog No.: 6890.05-1)
PR - 1 ml 12.00 US Dollars

-48-
CD - 1-PHENYLNONANE 97%
SO - WYCHEM (Catalog No.: P024)
PR - Price Available from Supplier

-49-
CD - OCTYL TOLUENE
SO - P & B (Catalog No.: 002275)
PR - 50 g 38.00 US Dollars

-50-
CD - 2-METHYL-1-NONENE-3-YNE
SO - K & K (Catalog No.: 26042)
PR - 10 g 44.00 US Dollars

-51-
CD - 2-METHYL-1-NONEN-3 YNE
SO - WILEY (Catalog No.: 6011.00)
PR - Price Available from Supplier

-52-
CD - P-TERT-HEXYLCUMENE TECH
SO - K & K (Catalog No.: 14526)
PR - 10 g 28.00 US Dollars

-53-
CD - TRANS,TRANS-2,6-DIMETHYL-2,4,6-OCTATRIENE 80%/ALLOCIMENE
SO - FLUKA (Catalog No.: 05700)
PR - 250 ml 12.00 Swiss Francs
1 l 30.00 Swiss Francs

-54-
CD - ALLO-OCIMENE
SO - K & K (Catalog No.: 11420)
PR - 100 g 28.00 US Dollars

-55-
CD - ALLO-OCIMENE/2,6-DIMETHYL-2,4,6-OCTATRIENE
SO - P & B (Catalog No.: A13490)
PR - 100 g 25.50 US Dollars

-56-
CD - ALLOCYMENE 80%
SO - RIEDEL (Catalog No.: 63441)
PR - Price Available from Supplier

-57-
CD - 2,6-DIMETHYL-2,4,6-OCTATRIENE
SO - TCI (Catalog No.: D1277)
PR - 25 ml 1500 Japanese Yen
500 ml 10100 Japanese Yen

-58-
CD - NEO-ALLOOCIMEN
SO - FLUKA (Catalog No.: 05708)
PR - 5 ml 29.00 Swiss Francs
25 ml 110.00 Swiss Francs

-59-
CD - 2,6-DIMETHYL-2,4,6-OCTATRIENE,M.I./ALLO-OCIMENE
SO - WILEY (Catalog No.: 1930.00)
PR - Price Available from Supplier

-60-
CD - TRANS,TRANS-2,6-DIMETHYL-2,4,6-OCTATRIENE 80%/ALLOCIMENE
SO - ALDRICH (Catalog No.: 28969-8)
PR - 250 ml 7.00 US Dollars
1 l 19.25 US Dollars

-61-
CD - MYRCENE TECH
SO - ALDRICH (Catalog No.: M10000-5)
PR - 100 g 6.75 US Dollars
500 g 9.65 US Dollars

-62-
CD - MYRCENE 90%
SO - ALFA (Catalog No.: 15888)
PR - 500 g 9.50 US Dollars

-63-
CD - MYRCENE TECH
SO - K & K (Catalog No.: 2517)
PR - 100 g 18.50 US Dollars

-64-
CD - 7-METHYL-3-METHYLENE-1,6-OCTADIENE
SO - K & K (Catalog No.: 25226)
PR - 10 g 16.50 US Dollars

-65-
CD - MYRCENE/7-METHYL-3-METHYLENE-1,6-OCTADIENE
SO - P & B (Catalog No.: M32860)
PR - 1 kg 17.50 US Dollars

-66-
CD - MYRCENE 97%
SO - PCR INC (Catalog No.: 17041-5)
PR - 500 g 25.00 US Dollars

-67-
CD - 7-METHYL-3-METHYLENEOCTADIENE-(1,6)
SO - RIEDEL (Catalog No.: 64109)
PR - Price Available from Supplier

-68-
CD - BETA-MYRCENE 90%/7-METHYL-3-METHYLENE-1,6-OCTADIENE
SO - SIGMA (Catalog No.: M0382)
PR - 250 ml 3.60 Pounds Sterling
500 ml 6.00 Pounds Sterling

-69-
CD - MYRCENE/7-METHYL-3-METHYLENE-1,6-OCTADIENE
SO - TCI (Catalog No.: M023)
PR - 25 ml 600 Japanese Yen
500 ml 7450 Japanese Yen

-70-
CD - 3 No.: S52843-9)
PR - Price Available from Supplier

-71-
CD - 1,3,5-TRIISOPROPYLBENZENE 97%
SO - ALDRICH (Catalog No.: 16100-4)
PR - 25 g 17.10 US Dollars
100 g 40.95 US Dollars

-72-
CD - 1,3,5-TRIISOPROPYLBENZENE
SO - BAYER (Catalog No.: 11.02)
PR - Price Available from Supplier

-73-
CD - 1,3,5-TRISOPROPYLBENZENE 97%
SO - CHEMALOG (Catalog No.: 89-3870-00)
PR - 25 g 10.00 US Dollars
100 g 35.00 US Dollars

-74-
CD - 1,3,5-TRIISOPROPYLBENZENE 97%
SO - FLUKA (Catalog No.: 92075)
PR - 50 ml 20.00 Swiss Francs
250 ml 75.00 Swiss Francs

-75-
CD - 1,3,5-TRIISOPROPYLBENZENE
SO - K & K (Catalog No.: 19463)
PR - 100 g 63.50 US Dollars

-76-
CD - 1,3,5-TRIISOPROPYLBENZENE 98%
SO - LANCSTER (Catalog No.: 4369)
PR - 50 g 7.20 Pounds Sterling
250 g 30.00 Pounds Sterling

-77-
CD - 1,3,5-TRIISOPROPYLBENZENE 95%
SO - TCI (Catalog No.: T0458)
PR - 25 ml 4500 Japanese Yen
500 ml 38000 Japanese Yen

-78-
CD - 1,3,5-TRI-ISO-PROPYLBENZENE 65%
SO - TCI (Catalog No.: T0789)
PR - 25 ml 900 Japanese Yen
500 ml 6050 Japanese Yen

-79-
CD - 1,3,5-TRI-ISO-PROPYLBENZENE 99%
SO - WILEY (Catalog No.: 9455.40)
PR - Price Available from Supplier

-80-
CD - 1,3,5-TRI-ISO-PROPYLBENZENE 99%
SO - WILEY (Catalog No.: 9455.45-1)
PR - 1 ml 6.00 US Dollars

-81-
CD - P-TERT-OCTYL TOLUENE/P-3-(O-METHYLHEPTYL)TOLUENE
SO - K & K (Catalog No.: 23913)
PR - 10 g 28.00 US Dollars

-82-
CD - 3,5-DI-TERT-BUTYLTOLUENE
SO - BADER (Catalog No.: S51624-4)
PR - Price Available from Supplier

-83-
CD - 1-TRANS-4,9-DECATRIENE
SO - BADER (Catalog No.: S43469-8)
PR - Price Available from Supplier

-84-
CD - 2,4,6-TRIMETHYL-1,3,6-HEPTATRIENE
SO - K & K (Catalog No.: 25782)
PR - 10 g 75.00 US Dollars

-85-
CD - 2,4,6-TRIMETHYL-1,3,6-HEPTATRIENE 96%
SO - WILEY (Catalog No.: 9040.20)
PR - Price Available from Supplier

-86-
CD - ADAMANTANE 99%
SO - ALDRICH (Catalog No.: 10027-7)
PR - 100 g 38.70 US Dollars
25 g 12.35 US Dollars

-87-
CD - ADAMANTANE 99%
SO - ALFA (Catalog No.: 14259)
PR - 50 g 19.80 US Dollars

-88-
CD - ADAMANTANE 99%
SO - CHEMALOG (Catalog No.: 01-7160-00)
PR - 100 g 20.00 US Dollars
500 g 80.00 US Dollars

-89-
CD - ADAMANTANE 99%
SO - COLUMBIA (Catalog No.: A-1512)
PR - 25 g 9.00 US Dollars
100 g 33.00 US Dollars

-90-
CD - ADAMANTANE
SO - FLUKA (Catalog No.: 01822)
PR - 100 g 35.00 Swiss Francs
25 g 10.00 Swiss Francs

-91-
CD - ADAMANTANE
SO - K & K (Catalog No.: 21037)
PR - 10 g 18.50 US Dollars

-92-
CD - ADAMANTANE
SO - KODAK (Catalog No.: 136 0098)
PR - 100 g 54.10 US Dollars
25 g 23.35 US Dollars

-93-
CD - ADAMANTANE 99%
SO - LANCSTER (Catalog No.: 2397)
PR - 50 g 6.60 Pounds Sterling
250 g 28.80 Pounds Sterling

-94-
CD - ADAMANTANE/TRICYCLO(3.3.1.137)DECANE
SO - P & B (Catalog No.: A11290)
PR - 25 g 13.00 US Dollars

-95-
CD - ADAMANTANE
SO - RIEDEL (Catalog No.: 62027)
PR - Price Available from Supplier

-96-
CD - ADAMANTANE/TRICYCLODECANE
SO - SIGMA (Catalog No.: A8501)
PR - 250 g 66.90 Pounds Sterling
100 g 29.80 Pounds Sterling
5 g 3.90 Pounds Sterling
25 g 9.50 Pounds Sterling

-97-
CD - ADAMANTANE 99%/TRICYCLO(3.3.1.1-3,7)DECANE
SO - TCI (Catalog No.: A0696)
PR - 10 g 5000 Japanese Yen
25 g 8700 Japanese Yen

-98-
CD - ADAMANTANE
SO - D-SCHUCH (Catalog No.: 820013)
PR - 25 g 12.00 Deutsche Marks

-99-
CD - (-)-ALPHA-CEDRENE 99%
SO - FLUKA (Catalog No.: 22133)
PR - 25 ml 255.00 Swiss Francs
5 ml 75.00 Swiss Francs
1 ml 20.00 Swiss Francs

-100-
CD - CEDRENE
SO - P & B (Catalog No.: C05920)
PR - 100 g 16.50 US Dollars

-101-
CD - 3-METHYLENE 1,5,5-TRIMETHYL CYCLOHEXENE-1
SO - K & K (Catalog No.: 25191)
PR - 10 g 99.00 US Dollars

-102-
CD - 3-METHYLENE-1,5.5-TRIMETHYLCYCLOHEXENE 95%
SO - WILEY (Catalog No.: 4380.00)
PR - Price Available from Supplier

-103-
CD - (+)-3R-TRANS-ISOLIMONENE 99%
SO - FLUKA (Catalog No.: 58923)
PR - 5 ml 32.00 Swiss Francs
25 ml 120.00 Swiss Francs

-104-
CD - (R)-(+)-LIMONENE 97%
SO - ALDRICH (Catalog No.: 18316-4)
PR - 100 g 6.10 US Dollars
500 g 20.70 US Dollars

-105-
CD - (S)-(-)-LIMONENE 97%
SO - ALDRICH (Catalog No.: 21836-7)
PR - 50 g 9.35 US Dollars
250 g 31.20 US Dollars

-106-
CD - DIPENTENE TECH
SO - ALDRICH (Catalog No.: D20330-0)
PR - 3 kg 17.15 US Dollars
100 g 9.95 US Dollars
1 kg 12.85 US Dollars

-107-
CD - (+)-LIMONENE 99%
SO - ALFA (Catalog No.: 13338)
PR - 1 kg 30.40 US Dollars
250 g 10.00 US Dollars

-108-
CD - DIPENTENE
SO - BDH (Catalog No.: 26085)
PR - 2.5 l 12.50 Pounds Sterling

-109-
CD - DIPENTENE 75%
SO - CHEMALOG (Catalog No.: 37-6360-00)
PR - 1 kg 11.00 US Dollars
100 g 8.00 US Dollars

-110-
CD - DIPENTENE TECH
SO - FLUKA (Catalog No.: 42560)
PR - 1 l 10.00 Swiss Francs

-111-
CD - DIPENTENE
SO - K & K (Catalog No.: 3318)
PR - 100 g 13.50 US Dollars

-112-
CD - L-LIMONENE
SO - K & K (Catalog No.: 4300)
PR - 100 g 20.00 US Dollars

-113-
CD - (+)-LIMONENE
SO - KODAK (Catalog No.: 113 6191)
PR - 100 g 48.60 US Dollars

-114-
CD - (+)-LIMONENE TECH
SO - KODAK (Catalog No.: 113 6225)
PR - 3 kg 34.55 US Dollars
1 kg 29.90 US Dollars

-115-
CD - DIPENTENE
SO - P & B (Catalog No.: D49180)
PR - 3 kg 19.00 US Dollars

-116-
CD - LIMONENE/L-P-MENTHA-1,8-DIENE
SO - P & B (Catalog No.: L03200)
PR - 100 g 24.00 US Dollars

-117-
CD - LIMONENE
SO - PROLABO (Catalog No.: 24 982)
PR - 1 l 61.90 French Francs

-118-
CD - DIPENTENE
SO - VICKERS (Catalog No.: 1922)
PR - 500 ml 4.50 Pounds Sterling
2.5 l 11.55 Pounds Sterling

-119-
CD - (+)-LIMONENE 97%
SO - CHEMALOG (Catalog No.: 55-6300-00)
PR - 100 g 4.00 US Dollars
500 g 16.00 US Dollars

-120-
CD - (+)-LIMONENE 98%
SO - FISHER (Catalog No.: 1136191)
PR - 100 g 38.75 US Dollars

-121-
CD - (+)-LIMONENE TECH
SO - FISHER (Catalog No.: 1136225)
PR - 1 kg 33.75 US Dollars
3 kg 39.50 US Dollars

-122-
CD - R(+)-LIMONENE 98%
SO - FLUKA (Catalog No.: 62120)
PR - 100 ml 10.00 Swiss Francs
500 ml 32.00 Swiss Francs

-123-
CD - S(-)-LIMONENE 97%
SO - FLUKA (Catalog No.: 62130)
PR - 100 ml 12.00 Swiss Francs
500 ml 46.00 Swiss Francs

-124-
CD - D-LIMONENE
SO - RIEDEL (Catalog No.: 63595)
PR - Price Available from Supplier

-125-
CD - CARVENE
SO - K & K (Catalog No.: 9995)
PR - 100 g 16.50 US Dollars

-126-
CD - D-LIMONENE
SO - KOCH LT (Catalog No.: 13459)
PR 250 ml 7.00 Pounds Sterling

-127-
CD - D-LIMONENE/D-CINENE/D-P-MENTHA-1,8-DIENE/D-1-METHYL-4-ISOPROPENYL-
-6-CYCLOHEXENE
SO - P & B (Catalog No.: L03190)
PR - 50> g 18.000 US Dollars

-128-
CD - D-LIMONENE 97%
SO - PCR INC (Catalog No.: 73860-9)
PR - 500 g 25.00 US Dollars

-129-
CD - D-LIMONENE/4-ISOPROPENYL-1-METHYL-1-CYCLOHEXENE
SO - SIGMA (Catalog No.: L2129)
PR - 100 ml 5.70 Pounds Sterling
500 ml 18.50 Pounds Sterling

-130-
CD - D-LIMONENE 95%
SO - TCI (Catalog No.: L0047)
PR - 25 ml 600 Japanese Yen
500 ml 2250 Japanese Yen

-131-
CD - D-LIMONENE 99%/D-P-MENTHA-1,8-DIENE
SO - TCI (Catalog No.: L0105)
PR - 5 ml 16300 Japanese Yen

-132-
CD - DEXTRO-LIMONENE 97%/DEXTRO-1-METHYL-4-ISO-PROPENYLCYCLOHEXENE
SO - WILEY (Catalog No.: 3695.95)
PR - 250 ml 7.50 Pounds Sterling
2.5 l Price Available from Supplier

-133-
CD - LIMONENE
SO - BDH (Catalog No.: 29056)
PR - 2.5 l Price Available from Supplier
250 ml 8.60 Pounds Sterling

-134-
CD - D(+)LIMONENE
97%/4-ISOPROPENYL-1-METHYLCYCLOHEXENE/P-MENTHA-1,8-DIENE
SO - LANCSTER (Catalog No.: 4733)
PR - Price Available from Supplier

-135-
CD - D(+)LIMONENE
SO - FISONS (Catalog No.: L/1860)
PR - 250 ml 10.14 Pounds Sterling

-136-
CD - DL-P-MENTHA-1,8-DIENE
SO - D-SCHUCH (Catalog No.: 822044)
PR - 1 l 12.25 Deutsche Marks

-137-
CD - DL-LIMONENE/DIPENTENE/DL-P-MENTHA-1,8-DIENE
SO - TCI (Catalog No.: L0046)
PR - 25 ml 500 Japanese Yen
500 ml 4100 Japanese Yen

-138-
CD - L-(-)-LIMONENE
SO - TCI (Catalog No.: L0132)
PR - Price Available from Supplier

-139-
CD - LAEVO-LIMONENE 92%/LAEVO-1-METHYL-4-ISO-PROPENYLCYCLOHEXENE
SO - WILEY (Catalog No.: 3695.96)
PR - Price Available from Supplier

-140-
CD - (R)-(+)-LIMONENE 97%/(+)-P-MENTHA-1,8-DIENE
SO - D-SCHUCH (Catalog No.: 818407)
PR - 500 ml 28.00 Deutsche Marks

-141-
CD - R-(+)-LIMONENE 99%/CARVENE/R-4-ISOPROPENYL-1-METHYL CYCLOHEXANE
SO - FLUKA (Catalog No.: 62118)
PR - 5 ml 26.00 Swiss Francs
25 ml 100.00 Swiss Francs

-142-
CD - S-(-)-LIMONENE 99%/CARVENE/S-4-ISOPROPENYL-1-METHYL CYCLOHEXANE
SO - FLUKA (Catalog No.: 62128)
PR - 5 ml 26.00 Swiss Francs
25 ml 100.00 Swiss Francs

-143-
CD - (S)-(-)-LIMONENE 97%/(-)-P-MENTHAL-1,8-DIENE
SO - D-SCHUCH (Catalog No.: 818408)
PR - 250 ml 33.00 Deutsche Marks

-144-
CD - GAMMA-TERPINENE 95%/1-ISOPROPYL-4-METHYL-1,4-CYCLOHEXADIENE
SO - ALDRICH (Catalog No.: 22319-0)
PR - 100 g 12.60 US Dollars

-145-
CD - GAMMA-TERPINENE 98%
SO - ALFA (Catalog No.: 16195)
PR - 50 g 7.00 US Dollars
250 g 19.40 US Dollars

-146-
CD - GAMMA-TERPINENE 97%
SO - CHEMALOG (Catalog No.: 83-4010-00)
PR - 250 g 32.00 US Dollars
1 kg 112.00 US Dollars

-147-
CD - GAMMA-TERPINENE 97%
SO - PCR INC (Catalog No.: 17055-5)
PR - 500 g 25.00 US Dollars

-148-
CD - GAMMA-TERPINENE/1-ISOPROPYL-4-METHYL-1,4-CYCLOHEXADIENE
SO - SIGMA (Catalog No.: T2134)
PR - 25 ml 3.90 Pounds Sterling
100 ml 9.70 Pounds Sterling
500 ml 38.40 Pounds Sterling

-149-
CD - GAMMA-TERPINENE 95%/P-MENTHA-1,4-DIENE
SO - TCI (Catalog No.: M0318)
PR - 25 ml 2100 Japanese Yen
500 ml 21200 Japanese Yen

-150-
CD - GAMMA-TERPINENE 99%/P-MENTHA-2,4-(8)DIENE
SO - WILEY (Catalog No.: 8408.20)
PR - Price Available from Supplier

-151-
CD - GAMMA-TERPINENE
95%/1-ISOPROPYL-4-METHYL-1,4-CYCLOHEXADIENE/P-MENTHA-1,4-DIENE
SO - FLUKA (Catalog No.: 86478)
PR - 100 ml 20.00 Swiss Francs
500 ml 67.00 Swiss Francs

-152-
CD - R-(-)-ALPHA-PHELLANDRENE
99%/(R)-5-ISOPROPYL-2-METHYL-1,3-CYCLOHEXADIENE
SO - FLUKA (Catalog No.: 77430)
PR - 1 l 75.00 Swiss Francs
250 ml 24.00 Swiss Francs

-153-
CD - ALPHA-PHELLANDRENE
SO - K & K (Catalog No.: 16607)
PR - 100 mg 9.50 US Dollars

-154-
CD - P-MENTHA-1,5-DIENE/1-ISOPROPYL-4-METHYL-2,4-CYCLOHEXADIENE
SO - P & B (Catalog No.: M02820)
PR - 1 kg 60.00 US Dollars

-155-
CD - ALPHA-PHELLANDRENE/2-METHYL-5-ISO-PROPYL-1,3-CYCLOHEXADIENE
SO - WILEY (Catalog No.: 7585.00)
PR - Price Available from Supplier

-156-
CD - L-P-MENTHA-1,5-DIENE/ALPHA-PHELLANDRENE/5-ISOPROPYL-2-METHYL-1,3--
CYCLOHEXADIENE
SO - TCI (Catalog No.: M0051)
PR - 25 ml 1900 Japanese Yen
500 ml 25100 Japanese Yen

-157-
CD - R(-)-ALPHA-PHELLANDRENE 99%
SO - FLUKA (Catalog No.: 77429)
PR - 5 ml 50.00 Swiss Francs

-158-
CD - (R)-(-)-5-ISOPROPYL-2-METHYL-1,3-CYCLOHEXADIENE/(R)-(-)-ALPHA-PHELLANDRENE
SO - D-SCHUCH (Catalog No.: 818569)
PR - 100 ml 28.00 Deutsche Marks

-159-
CD - 1,3,5,5-TETRAMETHYL-1,3-CYCLOHEXADIENE
SO - K & K (Catalog No.: 25645)
PR - 10 g 69.00 US Dollars

-160-
CD - 1,3,5,5-TETRAMETHYL-1,3-CYCLOHEXADIENE 95%
SO - WILEY (Catalog No.: 8540.01)
PR - Price Available from Supplier

-161-
CD - 1,3,5,5-TETRAMETHYL-1,3-CYCLOHEXADIENE 98%
SO - WILEY (Catalog No.: 8540.02)
PR - Price Available from Supplier

-162-
CD - ALPHA-TERPINENE 85%/1-ISOPROPYL-4-METHYL-1,3-CYCLOHEXADIENE
SO - ALDRICH (Catalog No.: 22318-2)
PR - 100 ml 6.75 US Dollars

-163-
CD - ALPHA-TERPINENE 93%
SO - ALFA (Catalog No.: 16323)
PR - 250 g 12.75 US Dollars
1 kg 26.00 US Dollars

-164-
CD - ALPHA-TERPINENE 97%
SO - CHEMALOG (Catalog No.: 83-4000-00)
PR - 250 g 20.00 US Dollars
1 kg 60.00 US Dollars

-165-
CD - ALPHA-TERPINENE 97%
SO - PCR INC (Catalog No.: 17054-8)
PR - 500 g 25.00 US Dollars

-166-
CD - ALPHA-TERPINENE 90%/1-ISOPROPYL-4-METHYL-1,3-CYCLOHEXADIENE
SO - SIGMA (Catalog No.: T2259)
PR - 500 ml 21.00 Pounds Sterling
25 ml 3.10 Pounds Sterling
100 ml 6.10 Pounds Sterling

-167-
CD - ALPHA-TERPINENE/P-MENTHA-1,3-DIENE
SO - TCI (Catalog No.: M0317)
PR - 25 ml 1800 Japanese Yen
500 ml 21200 Japanese Yen

-168-
CD - ALPHA-TERPINENE/P-MENTHA-1,3-DIENE/1-METHYL-4-ISOPROPYL-1,3-CYCLOHEXADIENE
SO - WILEY (Catalog No.: 8408.00)
PR - Price Available from Supplier

-169-
CD - ALPHA-TERPINENE
SO - FLUKA (Catalog No.: 86475)
PR - 250 ml 25.00 Swiss Francs
1 l 70.00 Swiss Francs

-170-
CD - CIS-1,2-DIVINYLCYCLOHEXANE 98%
SO - ALFA (Catalog No.: 20742)
PR - 2 g 23.10 US Dollars

-171-
CD - CIS-1,2-DIVINYLCYCLOHEXANE
SO - FLUKA (Catalog No.: 43911)
PR - 10 ml 35.00 Swiss Francs

-172-
CD - 1-CYCLOHEXYL-1-BUTYNE
SO - FARCHAN (Catalog No.: 123308)
PR - 25 g 116.00 US Dollars
5 g 29.00 US Dollars

-173-
CD - 1-CYCLOHEXYL-1-BUTYNE
SO - K & K (Catalog No.: 1242)
PR - 10 g 147.50 US Dollars

-174-
CD - GUAIENE
SO - P & B (Catalog No.: G05220)
PR - 100 g 29.50 US Dollars

-175-
CD - (+)-LONGOFOLENE 98%
SO - ALDRICH (Catalog No.: 23517-2)
PR - 5 g 24.55 US Dollars

-176-
CD - (+)-LONGIFOLEN
SO - FLUKA (Catalog No.: 62635)
PR - 5 ml 29.00 Swiss Francs
25 ml 120.00 Swiss Francs

-177-
CD - (+)-LONGIFOLENE
SO - SIGMA (Catalog No.: L8510)
PR - 1 ml 5.20 Pounds Sterling
5 ml 17.50 Pounds Sterling

-178-
CD - (+)-CAMPHENE 80%
SO - ALDRICH (Catalog No.: C00030-1)
PR - 100 g 14.30 US Dollars
1 kg 16.95 US Dollars
3 kg 30.10 US Dollars

-17LFA (Catalog No.: 13723)
PR - 500 g 9.90 US Dollars

-180-
CD - CAMPHENE 95%
SO - CHEMALOG (Catalog No.: 17-3380-00)
PR - 100 g 7.00 US Dollars
500 g 21.00 US Dollars

-181-
CD - CAMPHENE PRACT
SO - COLUMBIA (Catalog No.: C-0190)
PR - 1 kg 14.00 US Dollars

-182-
CD - CAMPHENE PRACT
SO - FISHER (Catalog No.: 1148238)
PR - 500 g 21.35 US Dollars
3 kg 38.40 US Dollars

-183-
CD - CAMPHENE
SO - FISONS (Catalog No.: C/2540)
PR - 500 ml 9.77 Pounds Sterling

-184-
CD - CAMPHENE TECH/2,2-DIMETHYL-3-METHYLENE-NORBORNANE
SO - HOECHST (Catalog No.: 51172.1)
PR - Price Available from Supplier

-185-
CD - CAMPHENE PRACT
SO - KODAK (Catalog No.: 114 8238)
PR - 3 kg 41.60 US Dollars
500 g 20.50 US Dollars

-186-
CD - CAMPHENE/2,2-DIMETHYL-3-METHYLENEBICYCLO[2.2.1]HEPTANE/2,2DIMETHY-
L3-METHYLENENORBORNANE/3,3DIMETHYL-2-METHYLENENORCAMPHANE
SO - P & B (Catalog No.: C02070)
PR - 3 kg 31.50 US Dollars

-187-
CD - CAMPHENE 97%
SO - PCR INC (Catalog No.: 17002-7)
PR - 250 g 25.00 US Dollars

-188-
CD - CAMPHENE
SO - RIEDEL (Catalog No.: 62257)
PR - Price Available from Supplier

-189-
CD - CAMPHENE
SO - D-SCHUCH (Catalog No.: 820254)
PR - 1 kg 23.50 Deutsche Marks

-190-
CD - CAMPHENE 97%/2,2-DIMETHYL-3-METHYLENEBICYCLO[2.2.1]HEPTANE
SO - WILEY (Catalog No.: 0469.15)
PR - Price Available from Supplier

-191-
CD - CAMPHENE 99.5%/2,2-DIMETHYL-3-METHYLENEBICYCLO[2.2.1]HEPTANE
SO - WILEY (Catalog No.: 0469.17-1)
PR - 1 g 8.00 US Dollars

-192-
CD - (-)-CAMPHENE 85%
SO - ALDRICH (Catalog No.: 31042-5)
PR - Price Available from Supplier

-193-
CD - CAMPHENE 90%/(1R)-2,2-DIMETHYL-3-METHYLENEBICYCLO[2.2.1]HEPTANE
SO - FLUKA (Catalog No.: 21290)
PR - 1 kg 18.00 Swiss Francs
250 g 7.00 Swiss Francs

-194-
CD - D-CAMPHENE TECH
SO - K & K (Catalog No.: 2791)
PR - 100 g 9.50 US Dollars

-195-
CD - DL-CAMPHENE TECH
SO - K & K (Catalog No.: 8794)
PR - 100 g 7.50 US Dollars

-196-
CD - DL-CAMPHENE 80%
SO - TCI (Catalog No.: C0009)
PR - 500 g 6550 Japanese Yen
25 g 600 Japanese Yen

-197-
CD - LONGICYCLENE 98%
SO - FLUKA (Catalog No.: 62633)
PR - 5 ml 29.00 Swiss Francs
25 ml 120.00 Swiss Francs

-198-
CD - 3-CYCLOPENTYL CYCLOPENTENE-1
SO - K & K (Catalog No.: 26252)
PR - 10 g 113.50 US Dollars

-199-
CD - 3-CYCLOPENTYLCYCLOPENTENE 99%
SO - WILEY (Catalog No.: 0763.10)
PR - Price Available from Supplier

-200-
CD - 3-CYCLOPENTYLCYCLOPENTENE 99%
SO - WILEY (Catalog No.: 0763.10-1)
PR - .5 ml 15.00 US Dollars

-201-
CD - CYCLOPENTYL CYCLOPENTENE
SO - K & K (Catalog No.: 26244)
PR - 10 g 108.50 US Dollars

-202-
CD - 1-CYCLOPENTYLCYCLOPENTENE 98%
SO - WILEY (Catalog No.: 0763.00-1)
PR - .5 ml 42.00 US Dollars

-203-
CD - 1,2,3,4,5-PENTAMETHYLCYCLOPENTADIENE
SO - ALDRICH (Catalog No.: 21402-7)
PR - 1 g 12.30 US Dollars
5 g 49.70 US Dollars
25 g 165.80 US Dollars

-204-
CD - PENTAMETHYLCYCLOPENTADIENE
SO - ALFA (Catalog No.: 12787)
PR - 1 g 17.00 US Dollars
5 g 60.50 US Dollars
25 g 218.00 US Dollars

-205-
CD - 1,2,3,4,5-PENTAMETHYLCYCLOPENTADIENE 90%
SO - FLUKA (Catalog No.: 76826)
PR - 5 ml 75.00 Swiss Francs
1 ml 18.00 Swiss Francs

-206-
CD - 1,2,3,4,5-PENTAMETHYLCYCLOPENTADIENE 90%
SO - D-SCHUCH (Catalog No.: 818534)
PR - 1 ml 22.50 Deutsche Marks

-207-
CD - PENTAMETHYLCYCLOPENTADIENE
SO - STREM (Catalog No.: 06-1290)
PR - 1 g 12.50 US Dollars
5 g 50.00 US Dollars
25 g 175.00 US Dollars

-208-
CD - SODIUM PENTAMETHYLCYCLOPENTADIENIDE,1M SOLN IN THF
SO - ALFA (Catalog No.: 18607)
PR - 0.02 mole 54.50 US Dollars
0.10 mole 207.00 US Dollars

-209-
CD - BETA-CARYOPHYLLENE
SO - BADER (Catalog No.: S36731-1)
PR - Price Available from Supplier

-210-
CD - BETA-CARYOPHYLLENE TECH
SO - K & K (Catalog No.: 12731)
PR - 100 g 15.00 US Dollars

-211-
CD - BETA-CARYOPHYLLENE/8-METHYLENE-4,11,11-TRIMETHYLBICYCLO[7.2.0]UNDEC-4-ENE
SO - P & B (Catalog No.: C05720)
PR - 200 g 20.50 US Dollars

-212-
CD - BETA-CARYOPHYLLENE 97%
SO - PCR INC (Catalog No.: 17007-6)
PR - 1 kg 75 00 US Dollars
250 g 25.00 US Dollars

-213-
CD - (-)-ISOCARYOPHYLLENE
98%/8-METHYLENE-4,11,11-TRIMETHYLBICYCLO[7.2.0]UNDEC-4-ENE
SO - FLUKA (Catalog No.: 58735)
PR - 1 ml 25.00 Swiss Francs
5 ml 90.00 Swiss Francs

-214-
CD - (-)-TRANS-CARYOPHYLLENE 99%
SO - FLUKA (Catalog No.: 22075)
PR - 5 ml 32.00 Swiss Francs
25 ml 120.00 Swiss Francs

-215-
CD - (-)-TRANS-CARYOPHYLLENE/BETA-CARYPHYLLENE
SO - SIGMA (Catalog No.: C9653)
PR - 5 ml 16.40 Pounds Sterling
10 ml 30.90 Pounds Sterling
25 ml 67.90 Pounds Sterling

-216-
CD - BETA-CARYOPHYLLENE 80%
SO - TCI (Catalog No.: C0796)
PR - 25 ml 700 Japanese Yen
500 ml 6750 Japanese Yen

-217-
CD - (1S)-(-)-BETA-PINENE 99%
SO - ALDRICH (Catalog No.: 11208-9)
PR - 250 g 13.10 US Dollars
1 kg 40.95 US Dollars
3 kg 81.70 US Dollars

-218-
CD - BETA-PINENE 98%
SO - ALFA (Catalog No.: 15695)
PR - 500 g 19.40 US Dollars

-219-
CD - BETA-PINENE
SO - FLUKA (Catalog No.: 80609)
PR - 1 ml 14.00 Swiss Francs
5 ml 60.00 Swiss Francs

-220-
CD - (1S)-(-)-BETA-PINENE
80%/(1S,5S)-6,6-DIMETHYL-2-METHYLENEBICYCLO[3.1.1]HEPTANE
SO - FLUKA (Catalog No.: 80610)
PR - 250 ml 8.00 Swiss Francs
1 l 25.00 Swiss Francs

-221-
CD - BETA-PINENE 76%
SO - K & K (Catalog No.: 2196)
PR - 100 g 16.50 US Dollars

-222-
CD - BETA-PINENE 90%
SO - K & K (Catalog No.: 23399)
PR - 100 g 28.00 US Dollars

-223-
CD - BETA-PINENE 97%
SO - PCR INC (Catalog No.: 17050-6)
PR - 500 g 50.00 US Dollars

-224-
CD - BETA-PINENE 95%
SO - TCI (Catalog No.: P0441)
PR - 25 ml 500 Japanese Yen
500 ml 4400 Japanese Yen

-225-
CD - (-)-BETA-PINENE 75%
SO - RIEDEL (Catalog No.: 63921)
PR - Price Available from Supplier

-226-
CD - LAEVO-BETA-PINENE,93% OPTICAL 98%
SO - WILEY (Catalog No.: 8147.20)
PR - Price Available from Supplier

-227-
CD - LAEVO-BETA-PINENE,95% OPTICAL 98%
SO - WILEY (Catalog No.: 8147.20-1)
PR - 1 ml 6.00 US Dollars

-228-
CD - (+/-)-ALPHA-PINENE 98%
SO - ALDRICH (Catalog No.: 14752-4)
PR - 250 g 17.45 US Dollars
1 kg 48.40 US Dollars

-229-
CD - (1S)-(-)-ALPHA-PINENE 99%
SO - ALDRICH (Catalog No.: 27439-9)
PR - 100 g 21.40 US Dollars
25 g 8.00 US Dollars

-230-
CD - ALPHA-PINENE 98%
SO - ALFA (Catalog No.: 15744)
PR - 500 g 17.00 US Dollars
2 kg 48.00 US Dollars

-231-
CD - PINENE PRACT
SO - FISHER (Catalog No.: 1086560)
PR - 250 g 58.75 US Dollars

-232-
CD - PINENE
SO - KODAK (Catalog No.: 108 6560)
PR - 250 g 49.55 US Dollars
1 kg 116.65 US Dollars

-233-
CD - DL-ALPHA-PINENE
SO - P & B (Catalog No.: P19698)
PR - 500 g 22.00 US Dollars

-234-
CD - ALPHA-PINENE 97%
SO - PCR INC (CatalogxNo.: 17049-8)
?PR - 500 g 25.00 US Dollars

-235-
CD - ALPHA-PINENE 95%
SO - TCI (Catalog No.: P0440)
PR - 25 ml 500 Japanese Yen
500 ml 4400 Japanese Yen

-236-
CD - ALPHA-PINENE 97%/2,6,6-TRIMETHYLBICYCLO[3.1.1]-2-HEPTENE
SO - WILEY (Catalog No.: 8146.50)
PR - Price Available from Supplier

-237-
CD - (+)-ALPHA-PINENE 97%
SO - CHEMALOG (Catalog No.: 73-8880-00)
PR - 500 g 48.00 US Dollars
100 g 12.00 US Dollars

-238-
CD - (+)-ALPHA-PINENE 98%
SO - LANCSTER (Catalog No.: 4941)
PR - 50 g 6.40 Pounds Sterling
250 g 17.20 Pounds Sterling

-239-
CD - (+)-ALPHA-PINENE 98%
SO - P & B (Catalog No.: P19690)
PR - Price Available from Supplier

-240-
CD - (+)-ALPHA-PINENE
SO - SIGMA (Catalog No.: P3906)
PR - 5 g 8.50 Pounds Sterling
25 g 28.30 Pounds Sterling

-241-
CD - (+)-ALPHA-PINENE
SO - FLUKA (Catalog No.: 80605)
PR - 1 ml 14.00 Swiss Francs
5 ml 60.00 Swiss Francs

-242-
CD - (-)-ALPHA-PINENE 97%
SO - CHEMALOG (Catalog No.: 73-8900-00)
PR - 500 g 21.00 US Dollars
100 g 7.00 US Dollars

-243-
CD - (-)-ALPHA-PINENE
SO - LANCSTER (Catalog No.: 4759)
PR - 100 g 3.90 Pounds Sterling
500 g 13.10 Pounds Sterling

-244-
CD - (-)-ALPHA-PINENE 97%
SO - RIEDEL (Catalog No.: 63920)
PR - Price Available from Supplier

-245-
CD - 1S-(-)-ALPHA-PINENE
99.5%/1S,5S-2,6,6-TRIMETHYLBICYCLO[3.1.1]HEPT-2-ENE
SO - FLUKA (Catalog No.: 80599)
PR - 1 ml 14.00 Swiss Francs
5 ml 60.00 Swiss Francs

-246-
CD - 1S-(-)-ALPHA-PINENE
97%/1S,5S-2,6,6-TRIMETHYLBICYCLO[3.1.1]HEPT-2-ENE
SO - FLUKA (Catalog No.: 80600)
PR - 250 ml 6.00 Swiss Francs
1 l 25.00 Swiss Francs

-247-
CD - (1R)-(+)-ALPHA-PINENE 99%
SO - ALDRICH (Catalog No.: 26807-0)
PR - Price Available from Supplier

-248-
CD - (1R)-(+)-ALPHA-PINENE 97%
SO - D-SCHUCH (Catalog No.: 818632)
PR - 250 ml 38.00 Deutsche Marks

-249-
CD - (1R)-(+)-ALPHA-PINENE 95%
SO - FISONS (Catalog No.: P/3498)
PR - 50 g 10.35 Pounds Sterling

-250-
CD - (1S)-(-)-ALPHA-PINENE 98%
SO - ALDRICH (Catalog No.: 30571-5)
PR - Price Available from Supplier

-251-
CD - (1S)-(-)-ALPHA-PINENE 97%
SO - D-SCHUCH (Catalog No.: 818405)
PR - 500 ml 18.00 Deutsche Marks

-252-
CD - (1S)-(-)-ALPHA-PINENE/(1S,5S)-2,6,6-TRIMETHYLBICYCLO[3.1.1]HEPT-2-
-ENE
SO - SIGMA (Catalog No.: P7408)
PR - 25 g 6.50 Pounds Sterling
100 g 17.30 Pounds Sterling

-253-
CD - D-ALPHA-PINENE 95%
SO - K & K (Catalog No.: 2155)
PR - 100 g 16.50 US Dollars

-254-
CD - L-ALPHA-PINENE
SO - K & K (Catalog No.: 18374)
PR - 10 g 82.50 US Dollars

-255-
CD - (1R)-(+)-ALPHA-PINENE 91%
SO - ALDRICH (Catalog No.: P04568-0)
PR - 100 g 16.90 US Dollars
500 g 56.50 US Dollars

-256-
CD - (1S)-(-)-ALPHA-PINENE 81%
SO - ALDRICH (Catalog No.: P04570-2)
PR - 100 g 7.70 US Dollars
500 g 23.00 US Dollars

-257-
CD - (-)-ALPHA-PINENE
SO - P & B (Catalog No.: P19680)
PR - 500 g 24.00 US Dollars

-258-
CD - LAEVO-ALPHA-PINENE,91% OPTICAL 98%
SO - WILEY (Catalog No.: 8146.93)
PR - Price Available from Supplier

-259-
CD - LAEVO-ALPHA-PINENE,91% OPTICAL 98%
SO - WILEY (Catalog No.: 8146.93-1)
PR - 1 ml 9.00 US Dollars

-260-
CD - 3-CARENE 95%/3,7,7-TRIMETHYLBICYCLO[4.1.0]HEPT-3-ENE
SO - ALDRICH (Catalog No.: 11557-6)
PR - Price Available from Supplier

-261-
CD - DELTA 3-CARENE
SO - BADER (Catalog No.: S42857-4)
PR - Price Available from Supplier

-262-
CD - 3,7,7-TRIMETHYLBICYCLO[4.1.0]-3-HEPTENE
SO - WILEY (Catalog No.: 8794.10-1)
PR - 1 ml 10.00 US Dollars

-263-
CD - 3,7,7-TRIMETHYLBICYCLO[4.1.0]-3-HEPTENE
SO - WILEY (Catalog No.: 8794.10)
PR - Price Available from Supplier

-264-
CD - (DELTA-3)-(+)-3-CARENE
SO - TCI (Catalog No.: C0047)
PR - 25 ml 3150 Japanese Yen

-265-
CD - (+)-3-CARENE 99%/1S-3,7,7-TRIMETHYLBICYCLO[4.1.0]HEPT-3-ENE
SO - FLUKA (Catalog No.: 21986)
PR - 25 ml 135.00 Swiss Francs
5 ml 32.00 Swiss Francs

-266-
CD - 2-CARENE/3,7,7-TRIMETHYLBICYCLO[4.1.0]-HEPT-2-ENE
SO - ALDRICH (Catalog No.: 23238-6)
PR - Price Available from Supplier

-267-
CD - 2-CARENE
SO - BADER (Catalog No.: S46075-3)
PR - Price Available from Supplier

-268-
CD - (+)-2-CARENE 97%/(1S)-3,7,7-TRIMETHYLBICYCLO[4.1.0]HEPT-2-ENE
SO - FLUKA (Catalog No.: 21984)
PR - 5 ml 32.00 Swiss Francs
25 ml 135.00 Swiss Francs

-269-
CD - 2-CARENE 95%
SO - TCI (Catalog No.: T1206)
PR - Price Available from Supplier

-270-
CD - 1,5,9-TRIMETHYL-1,5,9-CYCLODODECATRIENE,M.I.
SO - BADER (Catalog No.: S45266-1)
PR - Price Available from Supplier

-271-
CD - 1,5,9-TRIMETHYL CYCLODODECATRIENE
SO - K & K (Catalog No.: 27281)
PR - 100 g 24.00 US Dollars

-272-
CD - 1,5,9-TRIMETHYL-1,5,9-CYCLODODECATRIENE,M.I.
SO - P & B (Catalog No.: T27168)
PR - 100 g 48.00 US Dollars

-273-
CD - 1,5,9-TRIMETHYLCYCLODODECATRIENE
SO - TCI (Catalog No.: T0448)
PR - 25 ml 4400 Japanese Yen

-274-
CD - ALPHA-HUMULENE/ALPHA-CARYOPHYLLENE
SO - SIGMA (Catalog No.: H5887)
PR - 1 ml 10.70 Pounds Sterling
5 ml 42.40 Pounds Sterling

-275-
CD - ALPHA-HUMULENE
SO - FLUKA (Catalog No.: 53675)
PR - 5 ml 105.00 Swiss Francs
1 ml 30.00 Swiss Francs

-276-
CD - ALPHA-CARYOPHYLLENE 95%/ALPHA-HUMULENE
SO - TCI (Catalog No.: C0957)
PR - 1 ml 10300 Japanese Yen

-277-
CD - CIS,TRANS-1,5-CYCLODECADIENE 90%
SO - FLUKA (Catalog No.: 28704)
PR - 50 ml 135.00 Swiss Francs
10 ml 35.00 Swiss Francs

-278-
CD - TRICYCLO[5.1.0-2.6]DECANE 98%/TETRAHYDRODICYCLOPENTADIENE
SO - ALDRICH (Catalog No.: 16427-5)
PR - 100 g 10.35 US Dollars
500 g 27.35 US Dollars

-279-
CD - TETRAHYDRODICYCLOPENTADIENE 98%
SO - COLUMBIA (Catalog No.: T-0860)
PR - 100 g 7.00 US Dollars
500 g 20.00 US Dollars

-280-
CD - TCD-HYDROCARBON A
SO - HOECHST (Catalog No.: 0444)
PR - Price Available from Supplier

-281-
CD - TCD-HYDROCARBON A/TRICYCLO[5.2.1. 2,6]DECANE
SO - HOECHST (Catalog No.: 51171.1)
PR - Price Available from Supplier

-282-
CD - TETRAHYDRODICYCLOPENTADIENE
SO - K & K (Catalog No.: 8949)
PR - 100 g 92.00 US Dollars

-283-
CD - TETRAHYDRODICYCLOPENTADIENE 97%/TRICYCLO(5.2.1.0-2,6)DECANE
SO - TCI (Catalog No.: T0409)
PR - 25 g 1200 Japanese Yen
500 g 13400 Japanese Yen

-284-
CD - TETRAHYDRODICYCLOPENTADIENE,M.I. 98%/TRICYCLODECANE
SO - WILEY (Catalog No.: 8470.00)
PR - Price Available from Supplier

-285-
CD - TETRAHYDRODICYCLOPENTADIENE,M.I. 98%
SO - WILEY (Catalog No.: 8470.00-1)
PR - 1 g 8.00 US Dollars

-286-
CD - (-)-ISOLONGIFOLINE
98%/(1R)-2,2,7,7-TETRAMETHYLTRICYCLO[6.2.1.0-3.7]UNDEC-5-ENE
SO - FLUKA (Catalog No.: 58924)
PR - 1 ml 25.00 Swiss Francs
5 ml 90.00 Swiss Francs

-287-
CD - (+)-AROMADENDRENE
SO - FLUKA (Catalog No.: 11067)
PR - 5 ml 32.00 Swiss Francs
25 ml 120.00 Swiss Francs

-288-
CD - (-)-ALLOAROMADENDRENE 98%/(-)-ALLO-AROMADENDRENE
SO - FLUKA (Catalog No.: 05680)
PR - 1

-289-
CD - (+)-LEDENE 97%
SO - FLUKA (Catalog No.: 61770)
PR - 5 ml 75.00 Swiss Francs
25 ml 285.00 Swiss Francs

Part 2:

-1-
AC - 537218 (Update: 8702)
SO - CHEMALOG (Catalog No.: 15-1388-00)
CD - BUTYLATED HYDROXYANISOLE 97%/BHA
RN - 25013-16-5
PR - 250 g 10.00 US Dollars

-2-
AC - 78531 (Update: 8802)
SO - JT BAKER (Catalog No.: 3930)
CD - SODIUM TARTRATE,DIHYDRATE ACS
MF - C4H4-NA2O6
RN - 868-18-8
WLN - OVYQYQVO &-NA- 2 &&2H2O
PR - 113 kg Price Available from Supplier
500 g 47.60 US Dollars
2.5 kg 169.90 US Dollars

-3-
AC - 70277 (Update: 8802)
SO - ALDRICH (Catalog No.: 24062-1)
CD - CITRIC ACID,ANHYDROUS 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - Price Available from Supplier

-4-
AC - 70277 (Update: 8802)
SO - ALDRICH (Catalog No.: 25127-5)
CD - CITRIC ACID,ANHYDROUS 99.5% ACS
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - Price Available from Supplier

-5-
AC - 70277 (Update: 8802)
SO - ALDRICH (Catalog No.: C08315-5)
CD - CITRIC ACID,ANHYDROUS 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - Price Available from Supplier

-6-
AC - 70277 (Update: 8802)
SO - BDH (Catalog No.: 27984)
CD - CITRIC ACID 99% GPR
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - 500 g 5.20 Pounds Sterling

3 kg 19.90 Pounds Sterling

-7-
AC - 70277 (Update: 8802)
SO - CHEMALOG (Catalog No.: 22-9220-00)
CD - CITRIC ACID 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - Price Available from Supplier

-8-
AC - 70277 (Update: 8802)
SO - LANCSTER (Catalog No.: 4238)
CD - CITRIC ACID 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - 1 kg 4.90 Pounds Sterling
5 kg 18.70 Pounds Sterling

-9-
AC - 70277 (Update: 8802)
SO - P & B (Catalog No.: C23140)
CD - CITRIC ACID
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - 4 kg 33.00 US Dollars

-10-
AC - 70277 (Update: 8802)
SO - D-SCHUCH (Catalog No.: 818707)
CD - CITRIC ACID 99%/HYDROXYTRICARBALLYLIC ACID
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ
PR - 1 kg 19.50 Deutsche Marks

-11-
AC - 70277 (Update: 8802)
SO - PROLABO (Catalog No.: 20 273)
CD - CITRIC ACID,MONOHYDRATE 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ &&H2O
PR - Price Available from Supplier

-12-
AC - 70277 (Update: 8802)
SO - PROLABO (Catalog No.: 20 275)
CD - CITRIC ACID,MONOHYDRATE 99%
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ &&H2O

PR - Price Available from Supplier

-13-
AC - 70277 (Update: 8802)
SO - PROLABO (Catalog No.: 20 276)
CD - CITRIC ACID,MONOHYDRATE 99.7% AR
MF - C6H8O7
RN - 77-92-9
WLN - QV1XQVQ1VQ &&H2O
PR - Price Available from Supplier

-14-
AC - 70227 (Update: 8802)
SO - ALDRICH (Catalog No.: 24002-8)
CD - 2,6-DI-TERT-BUTYL-4-METHYLPHENOL 99%
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 50 g 10.80 US Dollars

-15-
AC - 70227 (Update: 8802)
SO - ALDRICH (Catalog No.: D04740-4)
CD - 2,6-DI-TERT-BUTYL-4-METHYLPHENOL 99%
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 11.00 US Dollars
1 kg 18.75 US Dollars

-16-
AC - 70227 (Update: 8802)
SO - ALFA (Catalog No.: 18695)
CD - 2,6-DI-T-BUTYL-4-METHYLPHENOL 99%/BHT/2,6-DI-T-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 10.20 US Dollars
1 kg 17.00 US Dollars

-17-
AC - 70227 (Update: 8802)
SO - APIN (Catalog No.: 0414D)
CD - 3,5-DI-TERT-BUTYL-4-HYDROXYTOLUENE
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - Price Available from Supplier

-18-
AC - 70227 (Update: 8802)
SO - BAYER (Catalog No.: 12.10)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0

WLN - 1X1&1&R BQ E1 CX1&1&1
PR - Price Available from Supplier

-19-
AC - 70227 (Update: 8802)
SO - BDH (Catalog No.: 28067)
CD - 2,6-DI-BUTYL-PARA-CRESOL GPR
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 5 kg Price Available from Supplier
500 g 11.30 Pounds Sterling

-20-
AC - 70227 (Update: 8802)
SO - CHEMALOG (Catalog No.: 15-1389-00)
CD - BUTYLATED HYDROXYTOLUENE 97%/BHT/2,6-DI-T-BUTYL-4-METHYLPHENOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 9.00 US Dollars

-21-
AC - 70227 (Update: 8802)
SO - FISHER (Catalog No.: 02204)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 23.10 US Dollars

-22-
AC - 70227 (Update: 8802)
SO - FISONS (Catalog No.: D/1345)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 12.39 Pounds Sterling

-23-
AC - 70227 (Update: 8802)
SO - FLUKA (Catalog No.: 34750)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 1 kg 30.00 Swiss Francs
5 kg 125.00 Swiss Francs
250 g 10.00 Swiss Francs

-24-
AC - 70227 (Update: 8802)
SO - KODAK (Catalog No.: 118 1171)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL PRACT

MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 19.80 US Dollars
3 kg 46.40 US Dollars

-25-
AC - 70227 (Update: 8802)
SO - P & B (Catalog No.: D11900)
CD - 2,6-DI-TERT-BUTYL-4-METHYLPHENOL 98%/BUTYLATED HYDROXYTOLUENE
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 1 kg 13.50 US Dollars

-26-
AC - 70227 (Update: 8802)
SO - RIEDEL (Catalog No.: 65176)
CD - 2,6-DI-TERT-BUTYL-METHYLPHENOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - Price Available from Supplier

-27-
AC - 70227 (Update: 8802)
SO - D-SCHUCH (Catalog No.: 822021)
CD - 2,6-DI-TERT-BUTYL-4-METHYLPHENOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 500 g 22.00 Deutsche Marks
2.5 kg 91.50 Deutsche Marks
25 kg Price Available from Supplier

-28-
AC - 70227 (Update: 8802)
SO - SHELL (Catalog No.: I-01)
CD - IONOL CP 99%/BHT/2,6-DI-TERT-BUTYL-4-METHYL PHENOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - Price Available from Supplier

-29-
AC - 70227 (Update: 8802)
SO - SIGMA (Catalog No.: B1378)
CD - BUTYLATED HYDROXYTOLUENE/BHT/2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 1 kg 17.60 Pounds Sterling
500 g 10.90 Pounds Sterling
100 g 4.00 Pounds Sterling

-30-
AC - 70227 (Update: 8802)
SO - TCI (Catalog No.: D0228)
CD - 2,6-DI-TERT-BUTYL-P-CRESOL 99%/BUTYL HYDROXY TOLUENE/HYDROXY BUTYL TOLUENE
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 25 g 500 Japanese Yen
500 g 2650 Japanese Yen

-31-
AC - 70227 (Update: 8802)
SO - TRANSWLD (Catalog No.: D2020)
CD - 3,5-DI-TERT-BUTYL-4-HYDROXYTOLUENE 97%
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - 250 g 19.00 US Dollars

-32-
AC - 70227 (Update: 8802)
SO - WILEY (Catalog No.: 0985.80)
CD - 2,6-DI-TERT-BUTYL-4-METHYLPHENOL 99%/2,6-DI-TERT-BUTYL-P-CRESOL
MF - C15H24O
RN - 128-37-0
WLN - 1X1&1&R BQ E1 CX1&1&1
PR - Price Available from Supplier

-33-
AC - 52892 (Update: 8802)
SO - FLUKA (Catalog No.: 89560)
CD - (+)-GAMMA-TOCOPHEROL 97%
MF - C28H48O2
RN - 54-28-4
WLN - T66 BOT&J C3Y1&3Y1&3Y1&1 C1 HQ I1 J1 &&(+) FORM
PR - 50 mg 105.00 Swiss Francs
10 mg 30.00 Swiss Francs

-34-
AC - 43804 (Update: 8801)
SO - APIN (Catalog No.: 0729B)
CD - BUTYLATED HYDROXY ANISOLE/3-TERT-BUTYL-4-HYDROXYANISOLE
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R XQ XO1
PR - Price Available from Supplier

-35-
AC - 43804 (Update: 8801)
SO - BDH (Catalog No.: 27515)
CD - BUTYLATED HYDROXYANISOLE
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R XQ XO1

PR - 5 kg Price Available from Supplier
100 g 11.20 Pounds Sterling
1 kg Price Available from Supplier

-36-
AC - 43804 (Update: 8801)
SO - FISONS (Catalog No.: B/5270)
CD - BUTYLATED HYDROXYANISOLE
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R XQ XO1
PR - 100 g 12.92 Pounds Sterling

-37-
AC - 43804 (Update: 8801)
SO - P & B (Catalog No.: B29215)
CD - TERT-BUTYLHYDROXYANISOLE
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R XQ XO1
PR - 100 g 32.00 US Dollars

-38-
AC - 43735 (Update: 8802)
SO - FLUKA (Catalog No.: 20021)
CD - 3-TERT-BUTYL-4-HYDROXYANISOLE 98%
MF - C11H16O2
RN - 121-00-6
WLN - 1X1&1&R BQ EO1
PR - 100 g 20.00 Swiss Francs
500 g 75.00 Swiss Francs

-39-
AC - 43735 (Update: 8802)
SO - K & K (Catalog No.: 3270)
CD - TERT-BUTYLHYDROXYANISOLE TECH
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R BQ EO1
PR - 100 g 33.50 US Dollars

-40-
AC - 43735 (Update: 8802)
SO - PROLABO (Catalog No.: 22 135)
CD - 3-TERT-BUTYL-4-HYDROXYANISOLE 98%
MF - C11H16O2
RN - 121-00-6
WLN - 1X1&1&R BQ EO1
PR - 25 g 92.40 French Francs

-41-
AC - 43735 (Update: 8802)
SO - D-SCHUCH (Catalog No.: 820246)
CD - 2-TERT-BUTYL-4-METHOXYPHENOL
MF - C11H16O2

RN - 121-00-6
WLN - 1X1&1&R BQ EO1
PR - Price Available from Supplier

-42-
AC - 43735 (Update: 8802)
SO - RIEDEL (Catalog No.: 62252)
CD - 2-TERT-BUTYL-4-METHOXYPHENOL
MF - C11H16O2
RN - 121-00-6
WLN - 1X1&1&R BQ EO1
PR - Price Available from Supplier

-43-
AC - 43735 (Update: 8802)
SO - TCI (Catalog No.: B0723)
CD - 4-HYDROXY-3-TERT-BUTYLANISOLE 98%/BUTYL HYDROXY ANISOL
MF - C11H16O2
RN - 25013-16-5
WLN - 1X1&1&R BQ EO1
PR - 25 g 900 Japanese Yen
500 g 11300 Japanese Yen

-44-
AC - 32875 (Update: 8802)
SO - KODAK (Catalog No.: 118 7962)
CD - D-GAMMA-TOLOPHEROL
MF - C28H54O2
RN - 54-28-4
WLN - T66 BOTJ C3Y1&3Y1&3Y1&1 C1 HQ I1 J1
PR - 100 mg 57.75 US Dollars

-45-
AC - 32875 (Update: 8802)
SO - FISHER (Catalog No.: 1187962)
CD - D-GAMMA-TOCOPHEROL
MF - C28H54O2
RN - 54-28-4
WLN - T66 BOTJ C3Y1&3Y1&3Y1&1 C1 HQ I1 J1 &&D FORM
PR - 100 mg 54.85 US Dollars

-46-
AC - 32872 (Update: 8802)
SO - KODAK (Catalog No.: 838 1337)
CD - D-DELTA-TOCOPHEROL 93%
MF - C27H46O2
RN - 119-13-1
WLN - T66 BOT&J C3Y1&3Y1&3Y1&1 C1 HQ J1 &&D FORM
PR - 100 mg 74.50 US Dollars

-47-
AC - 32869 (Update: 8802)
SO - JT BAKER (Catalog No.: 0577)
CD - VITAMIN E 96% USP/DL-ALPHA-TOCOPHEROL
MF - C29H50O2

RN - 1406-18-4
WLN - T66 BOT&J C3Y1&3Y1&3Y1&1 C1 G1 HQ I1 J1
PR - 500 g 190.80 US Dollars

-48-
AC - 24323 (Update: 8802)
SO - ALDRICH (Catalog No.: A09290-2)
CD - L-ASCORBIC ACID 99%/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 2 kg 44.00 US Dollars
100 g 7.20 US Dollars
500 g 21.85 US Dollars

-49-
AC - 24323 (Update: 8802)
SO - FISONS (Catalog No.: A/8880)
CD - L-ASCORBIC ACID
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 100 g 4.56 Pounds Sterling
500 g 15.34 Pounds Sterling

-50-
AC - 24323 (Update: 8802)
SO - FISONS (Catalog No.: A/8882)
CD - L-ASCORBIC ACID 99.7% AR/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 500 g 19.16 Pounds Sterling
100 g 5.98 Pounds Sterling

-51-
AC - 24323 (Update: 8802)
SO - FLUKA (Catalog No.: 95209)
CD - VITAMIN C 99.5% AR/ASCORBIC ACID
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 250 g 40.00 Swiss Francs
1 kg 130.00 Swiss Francs
50 g 12.00 Swiss Francs

-52-
AC - 24323 (Update: 8802)
SO - FLUKA (Catalog No.: 95210)
CD - VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 50 g 8.00 Swiss Francs
1 kg 80.00 Swiss Francs

250 g 24.00 Swiss Francs

-53-
AC - 24323 (Update: 8802)
SO - JT BAKER (Catalog No.: 0936)
CD - ASCORBIC ACID,POWDER 20-200 MESH 99% USP
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 500 g 44.65 US Dollars
1 kg 81.25 US Dollars

-54-
AC - 24323 (Update: 8802)
SO - J - ASCORBIC ACID,POWDER 200-235 MESH 99% USP
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 500 g 71.70 US Dollars
1 kg 138.90 US Dollars

-55-
AC - 24323 (Update: 8802)
SO - JT BAKER (Catalog No.: 0938)
CD - ASCORBIC ACID,GRANULES 20-80 MESH 99% USP
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 25 g 8.75 US Dollars
1 kg 73.40 US Dollars
500 g 43.95 US Dollars
125 g 21.20 US Dollars

-56-
AC - 24323 (Update: 8802)
SO - K & K (Catalog No.: 12056)
CD - VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 1 kg 99.00 US Dollars

-57-
AC - 24323 (Update: 8802)
SO - LANCSTER (Catalog No.: 5385)
CD - L-(+)-ASCORBIC ACID/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 250 g 4.00 Pounds Sterling
1 kg 14.90 Pounds Sterling

-58-
AC - 24323 (Update: 8802)
SO - P & B (Catalog No.: A35890)

CD - L-ASCORBIC ACID/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q
PR - 500 g 23.00 US Dollars

-59-
AC - 24323 (Update: 8802)
SO - CHEMALOG (Catalog No.: 08-0160-00)
CD - L-(+)-ASCORBIC ACID 97%/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L (+) FORM
PR - 500 g 10.00 US Dollars
100 g 4.00 US Dollars

-60-
AC - 24323 (Update: 8802)
SO - JT BAKER (Catalog No.: B581)
CD - L-(+)-ASCORBIC ACID,POWDER
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L (+) FORM
PR - 100 g 16.05 US Dollars
500 g 52.55 US Dollars

-61-
AC - 24323 (Update: 8802)
SO - M & B (Catalog No.: AL285)
CD - L-(+)-ASCORBIC ACID
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L (+) FORM
PR - 25 g 2.53 Pounds Sterling
100 g 4.07 Pounds Sterling

-62-
AC - 24323 (Update: 8802)
SO - MAYBRIDG (Catalog No.: 99-807)
CD - L-(+)-ASCORBIC ACID
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L (+) FORM
PR - 1 kg 13.00 Pounds Sterling

-63-
AC - 24323 (Update: 8802)
SO - FISHER (Catalog No.: A61)
CD - L-ASCORBIC ACID 99% ACS
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM
PR - 25 g 8.60 US Dollars
100 g 23.20 US Dollars

-64-
AC - 24323 (Update: 8802)
SO - SIGMA (Catalog No.: A1417)
CD - L-ASCORBIC ACID 99% ACS
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM
PR - 100 g 8.90 Pounds Sterling
500 g 35.00 Pounds Sterling

-65-
AC - 24323 (Update: 8802)
SO - VICKERS (Catalog No.: 1569)
CD - L-ASCORBIC ACID 99%/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM
PR - 100 g 3.85 Pounds Sterling
500 g 13.30 Pounds Sterling

-66-
AC - 24323 (Update: 8802)
SO - VICKERS (Catalog No.: 1827)
CD - L-ASCORBIC ACID 99.7% AR/VITAMIN C
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM
PR - 100 g 5.40 Pounds Sterling
500 g 17.01 Pounds Sterling

-67-
AC - 24323 (Update: 8802)
SO - BDH (Catalog No.: 10303)
CD - L-ASCORBIC ACID AR
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM ANALAR
PR - 25 g 3.20 Pounds Sterling
100 g 5.90 Pounds Sterling
500 g 18.40 Pounds Sterling

-68-
AC - 24323 (Update: 8802)
SO - P & B (Catalog No.: C00930)
CD - CALCIUM L-ASCORBATE
MF - C6H8O6
RN - 5743-27-1
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM CA SALT
PR - 1 kg 30.50 US Dollars

-69-
AC - 24323 (Update: 8802)
SO - BDH (Catalog No.: 44219)
CD - L-ASCORBIC ACID SODIUM SALT
MF - C6H8O6

RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM NA SALT
PR - 100 g 4.00 Pounds Sterling

-70-
AC - 24323 (Update: 8802)
SO - K & K (Catalog No.: 15697)
CD - SODIUM L-ASCORBATE
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM NA SALT
PR - 1 kg 99.00 US Dollars

-71-
AC - 24323 (Update: 8802)
SO - ALFA (Catalog No.: 11188)
CD - L-ASCORBIC ACID
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&L FORM
PR - 250 g 23.00 Swiss Francs
1 kg 75.00 Swiss Francs

-72-
AC - 24323 (Update: 8802)
SO - PROLABO (Catalog No.: 27 688)
CD - SODIUM L-(+)-ASCORBATE 99%
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&NA SALT
PR - 250 g 129.00 French Francs

-73-
AC - 24323 (Update: 8802)
SO - ALDRICH (Catalog No.: 26855-0)
CD - L-ASCORBIC ACID SODIUM SALT 99%/SODIUM ASCORBATE
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&NA SALT L FORM
PR - 100 g 4.75 US Dollars
500 g 16.25 US Dollars

-74-
AC - 24323 (Update: 8802)
SO - CHEMALOG (Catalog No.: 08-0260-00)
CD - L-ASCORBIC ACID SODIUM SALT 97%
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&NA SALT L FORM
PR - 1 kg 25.00 US Dollars
100 g 4.00 US Dollars

-75-
AC - 24323 (Update: 8802)
SO - TCI (Catalog No.: A0539)

CD - CORIPHOSPHIN O/SODIUM L-ASCORBATE
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&NA SALT L FORM
PR - 25 g 1100 Japanese Yen
500 g 10500 Japanese Yen

-76-
AC - 24323 (Update: 8802)
SO - M & B (Catalog No.: SL1365)
CD - SODIUM L(+)-ASCORBATE
MF - C6H8O6
RN - 134-03-2
WLN - T5OV EHJ CQ DQ EYQ1Q &&XYLO FORM NA SALT
PR - 250 g 10.33 Pounds Sterling

-77-
AC - 24323 (Update: 8802)
SO - PROLABO (Catalog No.: 20 150)
CD - L-(+)-ASCORBIC ACID 99.7% AR
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&XYLO L (+) FORM
PR - 250 g 226.00 French Francs

-78-
AC - 24323 (Update: 8802)
SO - PROLABO (Catalog No.: 20 155)
CD - L-(+)-ASCORBIC ACID
MF - C6H8O6
RN - 50-81-7
WLN - T5OV EHJ CQ DQ EYQ1Q &&XYLO L (+) FORM
PR - 250 g 80.40 French Francs
1 kg 243.00 French Francs

-79-
AC - 24322 (Update: 8802)
SO - ALFA (Catalog No.: 14536)
CD - ASCORBYL PALMITATE 99%
MF - C22H38O7
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15
PR - 500 g 87.40 US Dollars
100 g 24.60 US Dollars

-80-
AC - 24322 (Update: 8802)
SO - ALDRICH (Catalog No.: 29112-9)
CD - L-ASCORBIC ACID 6-PALMITATE 97%
MF - C22H38O7
RN - 137-66-6
WLN T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 100 g 15.00 US Dollars

-81-

AC - 24322 (Update: 8802)
SO - CHEMALOG (Catalog No.: 08-0380-00)
CD - L-ASCORBYLPALMITATE 97%
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 25 g 6.00 US Dollars
100 g 16.00 US Dollars

-82-
AC - 24322 (Update: 8802)
SO - FLUKA (Catalog No.: 76183)
CD - 6-O-PALMITOYL-L-ASCORBIC ACID 99%/ASCORBYLPALMITATE
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 25 g 8.00 Swiss Francs
100 g 25.00 Swiss Francs

-83-
AC - 24322 (Update: 8802)
SO - K & K (Catalog No.: 15698)
CD - L-ASCORBYL PALMITATE
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 10 g 16.50 US Dollars

-84-
AC - 24322 (Update: 8802)
SO - KOCH LT (Catalog No.: 10463)
CD - L-ASCORBYL PALMITATE
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 25 g 5.75 Pounds Sterling
100 g 22.00 Pounds Sterling

-85-
AC - 24322 (Update: 8802)
SO - P & B (Catalog No.: A35900)
CD - L-ASCORBYL PALMITATE
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 20 g 27.00 US Dollars

-86-
AC - 24322 (Update: 8802)
SO - TCI (Catalog No.: A0540)
CD - L-ASCORBYL PALMITATE 98%
MF - C22H3807
RN - 137-66-6
WLN - T5OV EHJ CQ DQ EYQ1OV15 &&L FORM
PR - 25 g 14700 Japanese Yen

-87-
AC - 15636 (Update: 8802)
SO - D-SCHUCH (Catalog No.: 818531)
CD - (2R,3R)-(+)-TARTARIC ACID 99%/L-TARTARIC ACID
MF - C4H606
RN - 87-69-4
WLN - QVYQYQVQ &&2R 3R (+) FORM
PR - 500 g 22.00 Deutsche Marks

-88-
AC - 15636 (Update: 8802)
SO - ALDRICH (Catalog No.: 25138-0)
CD - L-TARTARIC ACID 99% ACS/(2R,3R)-(+)-TARTARIC ACID/NATURAL TARTARIC ACID
MF - C4H606
RN - 87-69-4
WLN - QVYQYQVQ &&L (+) FORM
PR - Price Available from Supplier

-89-
AC - 15636 (Update: 8802)
SO - ALDRICH (Catalog No.: T00010-9)
CD - L-TARTARIC ACID 99%/(2H,3R)-(+)-TARTARIC ACID/NATURAL TARTARIC ACID
MF - C4H606
RN - 87-69-4
WLN - QVYQYQVQ &&L (+) FORM
PR - Price Available from Supplier

-90-
AC - 15636 (Update: 8802)
SO - CHEMALOG (Catalog No.: 83-2150-00)
CD - L-(+)-TARTARIC ACID 99%
MF - C4H606
RN - 87-69-4
WLN - QVYQYQVQ &&L (+) FORM
PR - 500 g 7.00 US Dollars
3 kg 27.00 US Dollars

Part 3:

-1-
SO - JT BAKER (Catalog No.: 1649)
CD - CAFFEINE CITRATE
RN - 58-08-2
PR - 125 g 22.50 US Dollars
500 g 58.60 US Dollars

-2-
SO - ALDRICH (Catalog No.: 28411-4)
CD - (+/-)-PROMETHAZINE HYDROCHLORIDE
98%/10-(2-DIMETHYLAMINOPROPYL)PHENOTHIAZINE
RN - 58-33-3
PR - 25 g 11.45 US Dollars
100 g 31.75 US Dollars

-3-
SO - ALDRICH (Catalog No.: D17750-4)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE 99%
RN - 54-77-3
PR - 1 g 11.40 US Dollars
10 g 57.15 US Dollars

-4-
SO - FLUKA (Catalog No.: 41420)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE
RN - 54-77-3
PR - 1 g 12.00 Swiss Francs
5 g 34.00 Swiss Francs

-5-
SO - K & K (Catalog No.: 12898)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE
RN - 54-77-3
PR - 1 g 41.50 US Dollars

-6-
SO - P & B (Catalog No.: D44100)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE/DMPP
RN - 54-77-3
PR - 5 g 41.00 US Dollars

-7-
SO - SIGMA (Catalog No.: D5891)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE/DMPP
RN - 54-77-3
PR - 10 g 44.00 Pounds Sterling
250 mg 2.90 Pounds Sterling
1 g 8.00 Pounds Sterling

-8-
SO - TCI (Catalog No.: D1343)
CD - 1,1-DIMETHYL-4-PHENYLPIPERAZINIUM IODIDE 99%
RN - 54-77-3

PR - 1 g 10100 Japanese Yen

-9-
SO - ALDRICH (Catalog No.: 28541-2)
CD - CIMETIDINE 98%
RN - 51481-61-9
PR - 5 g 12.10 US Dollars
25 g 40.60 US Dollars

-10-
SO - ALDRICH (Catalog No.: 14588-2)
CD - QUINIDINE
RN - 56-54-2
PR - 5 g 14.45 US Dollars
25 g 55.45 US Dollars

-11-
SO - ALFA (Catalog No.: 17961)
CD - QUINIDINE
RN - 56-54-2
PR - 50 g 46.00 US Dollars
10 g 12.00 US Dollars

-12-
SO - BDH (Catalog No.: 30005)
CD - QUINIDINE
RN - 56-54-2
PR - 25 g 25.60 Pounds Sterling

-13-
SO - CHEMALOG (Catalog No.: 78-2800-00)
CD - (+)-QUINIDINE 97%
RN - 56-54-2
PR - 5 g 10.00 US Dollars
25 g 45.00 US Dollars

-14-
SO - FLUKA (Catalog No.: 22600)
CD - QUINIDINE 90%
RN - 56-54-2
PR - 50 g 120.00 Swiss Francs
10 g 30.00 Swiss Francs

-15-
SO - K & K (Catalog No.: 18214)
CD - QUINIDINE
RN - 56-54-2
PR - 10 g 43.00 US Dollars

-16-
SO - TCI (Catalog No.: Q0006)
CD - QUINIDINE 98%/CONQUININE
RN - 56-54-2
PR - 5 g 6550 Japanese Yen
25 g 22100 Japanese Yen

-17-
SO - ALDRICH (Catalog No.: P04590-7)
CD - PIPERAZINE 99%
RN - 110-85-0
PR - 100 g 11.35 US Dollars
500 g 15.60 US Dollars

-18-
SO - ALFA (Catalog No.: 12714)
CD - PIPERAZINE,ANHYDROUS
RN - 110-85-0
PR - 500 g 15.00 US Dollars
2 kg 39.00 US Dollars
100 g 9.00 US Dollars

-19-
SO - BAYER (Catalog No.: 61.11)
CD - PIPERAZINE
RN - 110-85-0
PR - Price Available from Supplier

-20-
SO - BDH (Catalog No.: 29794)
CD - PIPERAZINE
RN - 110-85-0
PR - 500 g 18.60 Pounds Sterling

-21-
SO - CHEMALOG (Catalog No.: 73-9400-00)
CD - PIPERAZINE 99%
RN - 110-85-0
PR - 500 g 12.00 US Dollars
2 kg 36.00 US Dollars

-22-
SO - FISHER (Catalog No.: 1177245)
CD - PIPERAZINE,ANHYDROUS PRACT
RN - 110-85-0
PR - 100 g 20.10 US Dollars
500 g 29.45 US Dollars

-23-
SO - FLUKA (Catalog No.: 80620)
CD - PIPERAZINE
RN - 110-85-0
PR - 100 g 35.00 Swiss Francs
500 g 135.00 Swiss Francs

-24-
SO - FLUKA (Catalog No.: 80621)
CD - PIPERAZINE,ANHYDROUS 99% AR/DIETHYLENEDIAMINE
RN - 110-85-0
PR - 25 g 14.00 Swiss Francs
500 g 160.00 Swiss Francs

100 g 45.00 Swiss Francs

-25-
SO - FLUKA (Catalog No.: 80622)
CD - PIPERAZINE,ANHYDROUS 97%
RN - 110-85-0
PR - 250 g 12.00 Swiss Francs
1 kg 40.00 Swiss Francs

-26-
SO - K & K (Catalog No.: 16837)
CD - PIPERAZINE ANHYDROUS
RN - 110-85-0
PR - 1 kg 78.00 US Dollars

-27-
SO - KODAK (Catalog No.: 117 7245)
CD - PIPERAZINE PRACT
RN - 110-85-0
PR - 100 g 16.25 US Dollars
500 g 22.10 US Dollars

-28-
SO - LANCSTER (Catalog No.: 2603)
CD - PIPERAZINE,ANHYDROUS 99%
RN - 110-85-0
PR - 500 g 9.20 Pounds Sterling
2.5 kg 42.80 Pounds Sterling

-29-
SO - P & B (Catalog No.: P19820)
CD - PIPERAZINE
ANHYDROUS/DIETHYLENEDIAMINE/HEXAHYDRO-1,4-DIAZINE/HEXAHYDROPYRAZI-
NE
RN - 110-85-0
PR - 500 g 14.00 US Dollars

-30-
SO - RIEDEL (Catalog No.: 64131)
CD - PIPERAZINE ANHYDROUS
RN - 110-85-0
PR - Price Available from Supplier

-31-
SO - D-SCHUCH (Catalog No.: 807325)
CD - PIPERAZINE (ANHYDROUS)
RN - 110-85-0
PR - 1 kg 53.00 Deutsche Marks
250 g 15.00 Deutsche Marks

-32-
SO - TCI (Catalog No.: P0446)
CD - PIPERAZINE 99%
RN - 110-85-0
PR - 25 g 900 Japanese Yen

500 g 5000 Japanese Yen

-33-
SO - M & B (Catalog No.: PL1213)
CD - PIPERAZINE,HEXAHYDRATE 98%
RN - 110-85-0
PR - 500 g 6.39 Pounds Sterling

-34-
SO - ALDRICH (Catalog No.: C00005-3)
CD - CAFFEINE
RN - 58-08-2
PR - 100 g 6.15 US Dollars
500 g 20.65 US Dollars

-35-
SO - BDH (Catalog No.: 10403)
CD - CAFFEINE 99.0% AR
RN - 58-08-2
PR - 250 g 11.30 Pounds Sterling

-36-
SO - BDH (Catalog No.: 22343)
CD - CAFFEINE,SOLN
RN - 58-08-2
PR - 1 l 20.00 Pounds Sterling

-37-
SO - BDH (Catalog No.: 27574)
CD - CAFFEINE GPR
RN - 58-08-2
PR - 500 g 18.60 Pounds Sterling
100 g 5.30 Pounds Sterling
25 kg Price Available from Supplier
5 kg Price Available from Supplier

-38-
SO - BDH (Catalog No.: 71850)
CD - CAFFEINE USP
RN - 58-08-2
PR - 50 kg Price Available from Supplier

-39-
SO - CHEMALOG (Catalog No.: 16-8640-00)
CD - CAFFEINE USP FCC/1,3,7-TRIMETHYLXANTHINE
RN - 58-08-2
PR - 1 kg 30.00 US Dollars
250 g 10.00 US Dollars

-40-
SO - FISHER (Catalog No.: O1728)
CD - CAFFEINE USP FCC
RN - 58-08-2
PR - 100 g 23.10 US Dollars
500 g 48.00 US Dollars

-41-
SO - FISONS (Catalog No.: C/0800)
CD - CAFFEINE
RN - 58-08-2
PR - 100 g 6.61 Pounds Sterling

-42-
SO - FLUKA (Catalog No.: 27600)
CD - CAFFEINE,ANHYDROUS 99% PH.EUR/1,3,7-TRIMETHYLXANTHINE
RN - 58-08-2
PR - 100 g 10.00 Swiss Francs
500 g 34.00 Swiss Francs

-43-
SO - JT BAKER (Catalog No.: E268)
CD - CAFFEINE
RN - 58-08-2
PR - 500 g 46.80 US Dollars
100 g 16.35 US Dollars

-44-
SO - K & K (Catalog No.: 15784)
CD - CAFFEINE
RN - 58-08-2
PR - 100 g 11.50 US Dollars

-45-
SO - KOCH LT (Catalog No.: 19968)
CD - CAFFEINE 99%
RN - 58-08-2
PR - 100 g 4.75 Pounds Sterling
500 g 16.50 Pounds Sterling

-46-
SO - KODAK (Catalog No.: 105 0319)
CD - CAFFEINE
RN - 58-08-2
PR - 100 g 17.40 US Dollars
500 g 25.95 US Dollars

-47-
SO - LANCSTER (Catalog No.: 3557)
CD - CAFFEINE 99%/1,3,7-TRIMETHYLXANTHINE
RN - 58-08-2
PR - 100 g 2.40 Pounds Sterling
500 g 9.10 Pounds Sterling

-48-
SO - M & B (Catalog No.: CL105)
CD - CAFFEINE AR
RN - 58-08-2
PR - 100 g 5.77 Pounds Sterling
500 g 18.94 Pounds Sterling

-49-
SO - P & B (Catalog No.: C00690)
CD - CAFFEINE
99.9%/GUARANINE/METHYLTHEOBROMINE/1,3,7-TRIMETHYL-2,6-DIOXOPURINE
RN - 58-08-2
PR - 500 g 22.00 US Dollars

-50-
SO - PROLABO (Catalog No.: 22 234)
CD - CAFFEINE 99.0% AR
RN - 58-08-2
PR - 100 g 66.90 French Francs
500 g 255.00 French Francs

-51-
SO - RBI (Catalog No.: A-10)
CD - 1,3,7-TRIMETHYLXANTHINE
RN - 58-08-2
PR - 5 g 2.00 Pounds Sterling

-52-
SO - RIEDEL (Catalog No.: 63964)
CD - CAFFEINE
RN - 58-08-2
PR - Price Available from Supplier

-53-
SO - SIGMA (Catalog No.: C0750)
CD - CAFFEINE/TRIMETHYLXANTHINE
RN - 58-08-2
PR - 1 kg 17.80 Pounds Sterling
100 g 3.60 Pounds Sterling
250 g 5.90 Pounds Sterling
500 g 9.90 Pounds Sterling

-54-
SO - VICKERS (Catalog No.: 0137)
CD - CAFFEINE
RN - 58-08-2
PR - 100 g 4.95 Pounds Sterling
500 g 17.38 Pounds Sterling

-55-
SO - BADER (Catalog No.: S42911-2)
CD - THEOBROMINE
RN - 83-67-0
PR - Price Available from Supplier

-56-
SO - BDH (Catalog No.: 30405)
CD - THEOBROMINE 99%/3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 100 g 14.80 Pounds Sterling

-57-

SO - FISHER (Catalog No.: 1132406)
CD - THEOBROMINE
RN - 83-67-0
PR - 100 g 28.95 US Dollars

-58-
SO - FLUKA (Catalog No.: 88304)
CD - THEOBROMINE 97%
RN - 83-67-0
PR - 100 g 50.00 Swiss Francs
500 g 210.00 Swiss Francs

-59-
SO - K & K (Catalog No.: 19205)
CD - THEOBROMINE
RN - 83-67-0
PR - 100 g 46.00 US Dollars

-60-
SO - KODAK (Catalog No.: 113 2406)
CD - THEOBROMINE
RN - 83-67-0
PR - 100 g 23.45 US Dollars

-61-
SO - LANCSTER (Catalog No.: 4360)
CD - THEOBROMINE 99%/3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 50 g 8.20 Pounds Sterling
250 g 34.80 Pounds Sterling

-62-
SO - P & B (Catalog No.: T09510)
CD - THEOBROMINE/3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 100 g 14.00 US Dollars

-63-
SO - PARISH (Catalog No.: 1412)
CD - 3,7-DIMETHYLXANTHINE 97%
RN - 83-67-0
PR - Price Available from Supplier

-64-
SO - PROLABO (Catalog No.: 28 597)
CD - THEOBROMINE
RN - 83-67-0
PR - 100 g 119.00 French Francs

-65-
SO - RBI (Catalog No.: A-6)
CD - 3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 5 g 2.00 Pounds Sterling

-66-
SO - SIGMA (Catalog No.: T4500)
CD - THEOBROMINE/3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 25 g 3.10 Pounds Sterling
100 g 6.30 Pounds Sterling

-67-
SO - TCI (Catalog No.: T0178)
CD - THEOBROMINE 98%/3,7-DIMETHYLXANTHINE
RN - 83-67-0
PR - 25 g 3700 Japanese Yen
500 g 30500 Japanese Yen

-68-
SO - ALDRICH (Catalog No.: R00017-1)
CD - RESERPINE 99%
RN - 50-55-5
PR - 1 g 5.30 US Dollars
10 g 29.00 US Dollars

-69-
SO - BDH (Catalog No.: 30018)
CD - RESERPINE 98%
RN - 50-55-5
PR - 100 g Price Available from Supplier
1 g 3.40 Pounds Sterling

-70-
SO - CHEMALOG (Catalog No.: 78-7100-00)
CD - RESERPINE 97%
RN - 50-55-5
PR - 1 g 5.00 US Dollars
5 g 20.00 US Dollars

-71-
SO - FLUKA (Catalog No.: 83580)
CD - RESERPINE
RN - 50-55-5
PR - 5 g 37.00 Swiss Francs
1 g 10.00 Swiss Francs

-72-
SO - K & K (Catalog No.: 17873)
CD - RESERPINE
RN - 50-55-5
PR - 10 g 85.50 US Dollars

-73-
SO - KOCH LT (Catalog No.: 17247)
CD - RESERPINE BP
RN - 50-55-5
PR - 1 g 3.25 Pounds Sterling
10 g 13.00 Pounds Sterling

-74-
SO - KODAK (Catalog No.: 121 2596)
CD - RESERPINE 97%
RN - 50-55-5
PR - 10 g 28.20 US Dollars

-75-
SO - LANCSTER (Catalog No.: 3506)
CD - RESERPINE 99%
RN - 50-55-5
PR - 5 g 9.80 Pounds Sterling
25 g 39.60 Pounds Sterling

-76-
SO - P & B (Catalog No.: R00390)
CD - RESERPINE/METHYL RESERPATE 3,4,5-TRIMETHOXYBENZOIC ACID ESTER
RN - 50-55-5
PR - 2 g 12.00 US Dollars

-77-
SO - SIGMA (Catalog No.: R0875)
CD - RESERPINE/METHYLRESERPATE 3,4,5-TRIMETHOXYBENZOIC ACID ESTER
RN - 50-55-5
PR - 1 g 4.40 Pounds Sterling
10 g 26.90 Pounds Sterling

-78-
SO - TCI (Catalog No.: R0007)
CD - RESERPINE 98%
RN - 50-55-5
PR - 1 g 1000 Japanese Yen
10 g 7750 Japanese Yen

-79-
SO - ALDRICH (Catalog No.: D10320-9)
CD - DIGITOXIGENIN 98%
RN - 143-62-4
PR - 100 mg 23.10 US Dollars

-80-
SO - FLUKA (Catalog No.: 37020)
CD - DIGITOXIGENIN
RN - 143-62-4
PR - 100 mg 30.00 Swiss Francs

-81-
SO - K & K (Catalog No.: 5013)
CD - DIGITOXIGENIN
RN - 143-62-4
PR - 100 mg 47.50 US Dollars

-82-
SO - P & B (Catalog No.: D26020)
CD - DIGITOXIGENIN
RN - 143-62-4

PR - 100 mg 23.00 US Dollars

-83-
SO - TCI (Catalog No.: D0541)
CD - DIGITOXIGENIN
RN - 143-62-4
PR - 10 mg 4100 Japanese Yen
100 mg 28600 Japanese Yen

-84-
SO - CHEMALOG (Catalog No.: 32-6300-00)
CD - DIGITOXIGENIN 98%
RN - 143-62-4
PR - 50 mg 12.00 US Dollars
250 mg 48.00 US Dollars

Part 4:

-1-
CD - AZINPHOS-ETHYL
RN - 2642-71-9
SO - RIEDEL (Catalog No.: 35820)
PR - Price Available from Supplier

-2-
CD - KELEVAN,PRA GRADE 99%
RN - 4234-79-1
SO - RIEDEL (Catalog No.: 35904)
PR - Price Available from Supplier

-3-
CD - PIRIMICARB 99%
RN - 23103-98-2
SO - RIEDEL (Catalog No.: 35664)
PR - Price Available from Supplier

-4-
CD - DIOXACARB 99%
SO - RIEDEL (Catalog No.: 35646)
PR - Price Available from Supplier

-5-
CD - DIALIFOS 99%
RN - 10311-84-9
SO - RIEDEL (Catalog No.: 35933)
PR - Price Available from Supplier

-6-
CD - PHOSMET 99%
RN - 732-11-6
SO - RIEDEL (Catalog No.: 35946)
PR - Price Available from Supplier

-7-
CD - PHOSALON 99%
SO - RIEDEL (Catalog No.: 35662)
PR - Price Available from Supplier

-8-
CD - CHLORDECONE
RN - 143-50-0
SO - RIEDEL (Catalog No.: 35636)
PR - Price Available from Supplier

-9-
CD - CHLORMEPHOS 95%
SO - RIEDEL (Catalog No.: 35637)
PR - Price Available from Supplier

-10-
CD - ETHIOFENCARB 99%

SO - RIEDEL (Catalog No.: 35647)
PR - Price Available from Supplier

-11-
CD - ISOFENPHOS 98%
SO - RIEDEL (Catalog No.: 35655)
PR - Price Available from Supplier

-12-
CD - PROPOXUR 99%
RN - 114-26-1
SO - RIEDEL (Catalog No.: 35915)
PR - Price Available from Supplier

-13-
CD - METHOMYL 99%
RN - 1[illegible]52-77-5
SO - RIEDEL (Catalog No.: 35940)
PR - Price Available from Supplier

-14-
CD - METHAMIDOPHOS,PRA GRADE 99%
RN - 10265-92-6
SO - RIEDEL (Catalog No.: 35684)
PR - Price Available from Supplier

-15-
CD - DISULFOTON,SOLN IN TOLUENE
RN - 298-04-4
SO - BDH (Catalog No.: 15189)
PR - 10 ml 32.60 Pounds Sterling

-16-
CD - DISULFOTON,PRA GRADE 98%
RN - 298-04-4
SO - RIEDEL (Catalog No.: 35889)
PR - Price Available from Supplier

-17-
CD - MALATHION,SOLN IN TOLUENE
RN - 121-75-5
SO - BDH (Catalog No.: 15197)
PR - 10 ml 32.60 Pounds Sterling

-18-
CD - MALATHION
SO - P & B (Catalog No.: M00825)
PR - 100 g 27.50 US Dollars

-19-
CD - MALATHION,PRA GRADE 99%
RN - 121-75-5
SO - RIEDEL (Catalog No.: 35736)
PR - Price Available from Supplier

-20-
CD - MALATHION[METHOXY-14C],1-10 MCI PER MMOL
SO - SIGMA (Catalog No.: 31343-2)
PR - 50 muCu 319.30 Pounds Sterling
100 muCu 531.60 Pounds Sterling
250 muCu 1063.10 Pounds Sterling
500 muCu 1771.50 Pounds Sterling

-21-
CD - MEVINPHOS C&T,PRA GRADE 97%
RN - 7786-34-7
SO - RIEDEL (Catalog No.: 35894)
PR - Price Available from Supplier

-22-
CD - DIMETHOATE/O,O-DIMETHYL
S(N-METHYLCARBAMOYLMETHYL)PHOSPHORODITHIOATE
RN - 60-51-5
SO - P & B (Catalog No.: D33665)
PR - 50 g 20.00 US Dollars

-23-
CD - DIMETHOATE,PRA GRADE 99%
RN - 60-51-5
SO - RIEDEL (Catalog No.: 35720)
PR - Price Available from Supplier

-24-
CD - DIMEFOX,PRA GRADE 99%
RN - 115-26-4
SO - RIEDEL (Catalog No.: 35778)
PR - Price Available from Supplier

-25-
CD - DEMETON-S-METHYLSULFON,PRA GRADE 99%
RN - 17040-19-6
SO - RIEDEL (Catalog No.: 35888)
PR - Price Available from Supplier

-26-
CD - PARATHION,SOLN IN TOLUENE
RN - 56-38-2
SO - BDH (Catalog No.: 15200)
PR - 10 ml 32.60 Pounds Sterling

-27-
CD - PARATHION-ETHYL,PRA GRADE 99%
RN - 56-38-2
SO - RIEDEL (Catalog No.: 35747)
PR - Price Available from Supplier

-28-
CD - PARATHION-ETHYL-1-14C
SO - SIGMA (Catalog No.: 31395-5)
PR - Price Available from Supplier

-29-
CD - PARATHION[RING-U-14C],1-15 MCI PER MMOL SOLN IN TOLUENE
SO - SIGMA (Catalog No.: 31396-3)
PR - 50 muCu 353.90 Pounds Sterling
250 muCu 1179.20 Pounds Sterling
100 muCu 590.00 Pounds Sterling

-30-
CD - DNOC,PRA GRADE 99%
RN - 534-52-1
SO - RIEDEL (Catalog No.: 35713)
PR - Price Available from Supplier

-31-
CD - AZINPHOS-METHYL
RN - 86-50-0
SO - RIEDEL (Catalog No.: 35821)
PR - Price Available from Supplier

-32-
CD - TRANS-4,5-DIHYDROXY-1,2-DITHIANE/OXIDISED DDT
SO - SIGMA (Catalog No.: D3511)
PR - 500 mg 7.70 Pounds Sterling
100 mg 2.70 Pounds Sterling
1 g 12.80 Pounds Sterling
5 g 51.70 Pounds Sterling

-33-
CD - DIAZINON,SOLN IN TOLUENE
RN - 333-41-5
SO - BDH (Catalog No.: 15186)
PR - 10 ml 32.60 Pounds Sterling

-34-
CD - DIAZINON
RN - 333-41-5
SO - P & B (Catalog No.: D07030)
PR - 10 g 20.00 US Dollars

-35-
CD - DIAZINON,PRA GRADE 99%
RN - 333-41-5
SO - RIEDEL (Catalog No.: 35851)
PR - Price Available from Supplier

-36-
CD - DIELDRIN 90%
RN - 60-57-1
SO - ALDRICH (Catalog No.: 29121-8)
PR - 25 g 7.45 US Dollars

-37-
CD - DIELDRIN,SOLN IN TOLUENE
RN - 60-57-1

SO - BDH (Catalog No.: 15188)
PR - 10 ml 32.60 Pounds Sterling

-38-
CD - DIELDRIN
RN - 60-57-1
SO - K & K (Catalog No.: 5855)
PR - 100 g 92.00 US Dollars

-39-
CD - DIELDRIN,PRA GRADE 99%
RN - 60-57-1
SO - RIEDEL (Catalog No.: 35719)
PR - Price Available from Supplier

-40-
CD - DIELDRIN
RN - 60-57-1
SO - SIGMA (Catalog No.: D7519)
PR - 25 g 5.80 Pounds Sterling
50 g 11.50 Pounds Sterling
250 g 47.40 Pounds Sterling

-41-
CD - DIELDRIN/HEXACHLORO-EPOXY-OCTAHYDRO-ENDO-EXO-DIMETHANO-NAPHTHALEN-
E
RN - 60-57-1
SO - TCI (Catalog No.: H0059)
PR - 25 g 2850 Japanese Yen

-42-
CD - HEPTACHLOR,SOLN IN TOLUENE
RN - 1024-57-3
SO - BDH (Catalog No.: 15195)
PR - 10 ml 32.60 Pounds Sterling

-43-
CD - ENDOSULFAN,SOLN IN TOLUENE
RN - 115-29-7
SO - BDH (Catalog No.: 15190)
PR - 10 ml 32.60 Pounds Sterling

-44-
CD - ALLETHRIN
SO - K & K (Catalog No.: 11405)
PR - 1 g 9.50 US Dollars

-45-
CD - ALDRIN
RN - 309-00-2
SO - BDH (Catalog No.: 15177)
PR - 10 ml 32.60 Pounds Sterling

-46-
CD - ALDRIN,PRA GRADE 99%

RN - 309-00-2
SO - RIEDEL (Catalog No.: 35700)
PR - Price Available from Supplier

-47-
CD - HEPTACHLOR,SOLN IN TOLUENE
RN - 76-44-8
SO - BDH (Catalog No.: 15194)
PR - 10 ml 32.60 Pounds Sterling

-48-
CD - HEPTACHLOR[U-14C],1-10 MCI PER MMOL SOLN IN TOLUENE
RN - 15189-24-9
SO - SIGMA (Catalog No.: 31314-9)
PR - 100 muCu 310.00 Pounds Sterling
1 mCu 1722.30 Pounds Sterling
250 muCu 620.00 Pounds Sterling
500 muCu 1033.10 Pounds Sterling

-49-
CD - METHOXYCHLOR 98%/2,2-BIS(4-METHOXYPHENYL)-1,1,1-TRICHLOROETHANE
RN - 72-43-5
SO - ALDRICH (Catalog No.: 26831-3)
PR - 5 g 13.20 US Dollars
25 g 44.00 US Dollars

-50-
CD - METHOXYCHLOR,SOLN IN TOLUENE
RN - 72-43-5
SO - BDH (Catalog No.: 15198)
PR - 10 ml 32.60 Pounds Sterling

-51-
CD - METHOXYCHLOR
TECH/METHOXY-DDT/1,1,1-TRICHLORO-2,2-BIS(P-METHOXYPHENYL)METHANE
RN - 72-43-5
SO - P & B (Catalog No.: M07415)
PR - 500 g 11.00 US Dollars

-52-
CD - METHOXYCHLOR 95%
SO - SIGMA (Catalog No.: M1501)
PR - 100 g 4.10 Pounds Sterling
500 g 10.90 Pounds Sterling
1 kg 17.20 Pounds Sterling

-53-
CD - METHOXYCHLOR
98%/DMDT/1,1,1-TRICHLORO-2,2-BIS(P-METHOXYPHENYL)ETHANE
SO - SIGMA (Catalog No.: M7757)
PR - 1 g 3.40 Pounds Sterling
5 g 11.20 Pounds Sterling
10 g 18.70 Pounds Sterling
25 g 37.30 Pounds Sterling

-54-
CD - METHOXYCHLOR[RING-U-14C],1-10 MCI PER MMOL
SO - SIGMA (Catalog No.: 31356-4)
PR - 100 muCu 417.70 Pounds Sterling
500 muCu 1393.10 Pounds Sterling
250 muCu 836.20 Pounds Sterling

-55-
CD - 1,1-BIS(4-CHLOROPHENYL)-2,2,2-TRICHLOROETHANE 99%/P,P'-DDT
RN - 50-29-3
SO - ALDRICH (Catalog No.: 10002-1)
PR - Price Available from Supplier

-56-
CD - P,P'-DDT,SOLN IN TOLUENE
RN - 50-29-3
SO - BDH (Catalog No.: 15183)
PR - 10 ml 32.60 Pounds Sterling

-57-
CD - 4,4'-DDT,PRA GRADE 99%
RN - 50-29-3
SO - RIEDEL (Catalog No.: 35723)
PR - Price Available from Supplier

-58-
CD - 4,4'-DDT 99.8%
SO - RIEDEL (Catalog No.: 35958)
PR - Price Available from Supplier

-59-
CD - 1,1-BIS(P-CHLOROPHENYL)-2,2,2-TRICHLOROETHANE/DDT
RN - 50-29-3
SO - SIGMA (Catalog No.: C8894)
PR - 25 g 12.10 Pounds Sterling
100 g 34.00 Pounds Sterling

-60-
CD - DDT 98%/DICHLORODIPHENYLTRICHLOROETHANE
RN - 50-29-3
SO - TCI (Catalog No.: T0379)
PR - 25 g 1500 Japanese Yen
500 g 11200 Japanese Yen

-61-
CD - 4,4'-DDT-C14(RING)
RN - 29411-63-0
SO - SIGMA (Catalog No.: 29726-7)
PR - 50 muCu 99.80 Pounds Sterling
250 muCu 365.80 Pounds Sterling
100 muCu 179.80 Pounds Sterling

-62-
CD - DDT,M.I.,SOLN IN TOLUENE
SO - BDH (Catalog No.: 15184*)

PR - 10 ml 32.60 Pounds Sterling

-63-
CD - O,P'-DDT,SOLN IN TOLUENE
RN - 789-02-6
SO - BDH (Catalog No.: 15182)
PR - 10 ml 32.60 Pounds Sterling

-64-
CD - O,P'-DDT
RN - 789-02-6
SO - LANCSTER (Catalog No.: 8781)
PR - Price Available from Supplier

-65-
CD - 2,4'-DDT,PRA GRADE 99%
SO - RIEDEL (Catalog No.: 35604)
PR - Price Available from Supplier

-66-
CD - DDT,M.I. SOLN IN TOLUENE
SO - BDH (Catalog No.: 15184)
PR - 10 ml 32.60 Pounds Sterling

-67-
CD - BROMOPHOS-ETHYL,PRA GRADE 99%
RN - 4824-78-6
SO - RIEDEL (Catalog No.: 35838)
PR - Price Available from Supplier

-68-
CD - BROMOPHOS,PRA GRADE 99%
RN - 2104-96-3
SO - RIEDEL (Catalog No.: 35839)
PR - Price Available from Supplier

-69-
CD - FENCHLORPHOS,PRA GRADE 99%
RN - 299-84-3
SO - RIEDEL (Catalog No.: 35853)
PR - Price Available from Supplier

Part 5:

-1-
CD - PRIMIDONE 97%/2-DESOXYPHENOBARBITAL/PRIMACLONE
PR - 25 g 12.00 US Dollars
100 g 36.00 US Dollars

-2-
CD - MEPHOBARBITAL,SOLN IN METHANOL
PR - 1 ml 10.80 Pounds Sterling

-3-
CD - MEPHOBARBITAL/METHYLPHENOBARBITAL
PR - 10 g 7.20 Pounds Sterling
25 g 14.40 Pounds Sterling
100 g 40.00 Pounds Sterling

-4-
CD - 5-ETHYL-5-PHENYL-BARBITURIC ACID 97%
PR - 250 g 40.00 Swiss Francs

-5-
CD - PHENOBARBITAL 98% USP
PR - 125 g 21.15 US Dollars
500 g 74.25 US Dollars

-6-
CD - PHENOBARBITAL/5-ETHYL-5-PHENYL-2,4,6-TRIOXOHEXAHYDROPYRIMIDINE
PR - 25 g 3.70 Pounds Sterling
100 g 9.20 Pounds Sterling
500 g 30.40 Pounds Sterling

-7-
CD - PHENOBARBITAL,SOLN IN METHANOL
PR - 1 ml 10.80 Pounds Sterling

-8-
CD - 5-ETHYL-5-PHENYL-BARBITURIC ACID SODIUM SALT 97%
PR - 250 g 40.00 Swiss Francs

-9-
CD - PHENOBARBITONE SODIUM 98%
PR - 100 g 10.50 Pounds Sterling

-10-
CD - PHENOBARBITAL SODIUM USP
PR - 30 g 11.00 US Dollars
125 g 34.00 US Dollars

-11-
CD - PHENOBARBITAL SODIUM SALT
PR - 25 g 1900 Japanese Yen
500 g 21500 Japanese Yen

-12-

CD - 5-ETHYL-3-METHYL-5-PHENYLHYDANTOIN
PR - Price Available from Supplier

-13-
CD - 5,5-DIPHENYLHYDANTOIN 99%
PR - 100 g 8.80 US Dollars
500 g 36.20 US Dollars

-14-
CD - 5,5-DIPHENYLHYDANTOIN 99%
PR - 100 g 8.00 US Dollars
500 g 32.00 US Dollars

-15-
CD - 5,5-DIPHENYLHYDANTOIN
PR - 500 g 46.00 Swiss Francs
100 g 12.00 Swiss Francs

-16-
CD - 5,5-DIPHENYLHYDANTOIN
PR - 100 g 21.50 US Dollars

-17-
CD - 5,5-DIPHENYLHYDANTOIN 99%
PR - 100 g 3.50 Pounds Sterling
500 g 16.00 Pounds Sterling

-18-
CD - 5,5-DIPHENYLHYDANTOIN
PR - Price Available from Supplier

-19-
CD - 5,5-DIPHENYLHYDANTOIN
PR - 250 g 30.50 Deutsche Marks

-20-
CD - 5,5-DIPHENYLHYDANTOIN 99%
PR - 25 g 3050 Japanese Yen

-21-
CD - 5,5-DIPHENYLHYDANTOIN SODIUM SALT 98%/SODIUM
5,5-DIPHENYLHYDANTOIN
PR - 25 g 2250 Japanese Yen
500 g 17700 Japanese Yen

-22-
CD - 17-BETA-HYDROXY-17-METHYL-ANDROSTRA-1,4-DIEN-3-ONE 99%/DIANABOL
PR - 5 g 24.00 Swiss Francs
25 g 100.00 Swiss Francs

-23-
CD - 17ALPHA-METHYL-DELTA5-ANDROSTEN-3BETA,17BETA-DIOL
PR - 1 g 16.50 US Dollars

-24-

CD - 17 ALPHA-METHYL-DELTA5-ANDROSTEN-3BETA,17BETA-DIOL
PR - 5 g 22.00 US Dollars

-25-
CD - 17-ALPHA-METHYL-DELTA-5-ANDROSTEN-3-BETA,17-BETA-DIOL 97%/METHYL ANDROSTENEDIOL
PR - 1 g 9.00 US Dollars
5 g 36.00 US Dollars

-26-
CD - 17-ALPHA-METHYL-5-ANDROSTENE-3-BETA,17-BETA-DIOL
PR - Price Available from Supplier