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20312

Distr.  
RESTRICTED

IO/R.281  
8 July 1993

UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

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PREPARATORY ASSISTANCE FOR THE INDUSTRIAL UTILIZATION  
OF MEDICINAL AND AROMATIC PLANTS IN COSTA RICA

UC/COS/92/118

COSTA RICA

Technical report: Preparatory assistance\*

Prepared for the Government of Costa Rica  
by the United Nations Industrial Development Organization

Based on the work of R. O. B. Wijesekera & K. F. Klesch, consultants

Backstopping Officer: T. De Silva,  
Chemical Industries Branch

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\* This document has not been edited.

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**ABSTRACT**

The preparatory assistance mission team consisting of Mr. ROB Wijesekera and Mr. Klesch was in Costa Rica from 20 January to 6 February 1993 to evaluate the potential for the industrial utilization of medicinal and aromatic plants of Costa Rica. The mission completed the work as detailed in the job description during the short period despite a heavy schedule. The plants to be used for a technical assistance project and other useful plants were rank listed. After assessing the current state of development of research and processing in the field of medicinal and aromatic plants, the consultants recommended the institutional requirements for technical assistance to develop the subsector and the counterpart staff for the management and implementation responsibilities. A draft project document was also prepared.

### Acronyms & Definitions

1. UCR - CIPRONA: University of Costa Rica - The National Products Research Center
2. CENPRO Center for the Promotion of Exports and Investment
3. CATIE Tropical Agronomy Center for Research and Education
4. CNAA National Chamber of Agriculture and Agroindustry
5. GTZ German Program for Economic Development
6. AECI Spanish Agency for International Cooperation
7. COOPIPECA Producers Cooperative for Ipecacuana

## 1. INTRODUCTION

The purpose of the preparatory assistance mission as designed in the project document UC/COS/92/118 was to evaluate the potential for the industrial utilization of medicinal and Aromatic Plants of Costa Rica and to assess the requirements in terms of infrastructural facilities, human resource development, equipment and technology for a technical assistance project". It was considered by UNIDO that a preparatory assistance mission was needed in order to formulate a large scale project proposal for presentation to special purpose donors.

Accordingly the terms of reference of the mission, carried out by the two consultants, an Industrial Technologist, (team leader) and an expert in marketing, included the following: (Summarized from the Job descriptions of the consultants, vide Annex 1 & 2).

1. Collation of available data on medicinal and aromatic plants of Costa Rica, assessment of the potential for industrial processing and product development, including infrastructural features and the country's capability in the relevant discipline areas.
2. Investigation of the market potential, local as well as regional and international and the preparation of a rank ordered list of plants suitable for cultivation with a view to processing.
3. Formulation of marketing strategies and mechanisms.
4. The preparation of a draft report and project proposal.

The current report is accordingly in fulfillment of the mission's objective and the terms of reference summarized above.

The mission was briefed on the technical aspects by the UNIDO Special Technical Adviser, at headquarters in Vienna prior to departure for San Jose.

The field work of the mission took place during January 20 to February 6th during which time the mission completed the field assignments recommended to them by the local UNIDO office and the Costa Rican counterpart personnel. The mission was able to complete the preliminary work, despite a heavy schedule of internal travel resulting from the need to assess at first hand the various field stations and institutional branches which would be involved in the development activity (Annex 3 & 4). Finally, the mission was able to formally present to all interested parties its findings and particularly the recommendations for further support. The mission was able to derive a rank ordered list of plants (Schedule A) with consensus endorsement by all parties based on a list of criteria (Schedule B) of relevance to the situation.



## Schedule A

**LIST OF CANDIDATE PLANT SPECIES SELECTED AS A PRIORITY LIST  
FOR ATTENTION OF THE PROJECT**

The list includes all priority categories. Priority No 1 are plants rank ordered 1-5. Next in priority are those ranked 6-10. The third category of priority are those ranked 11-15.

Rank order	Botanical name ( family )	Local name	Product
1.	<i>Cephaelis ipecacuanha</i> ( Rubiaceae)	Raicilla	Extract
2.	<i>Quassia amara</i> (Simaroubaceae)	Hombre grande	Extract
3.	<i>Zingiber officinale</i> (Zingiberaceae)	Gengibre	Oleoresin, & Essential oil
4.	<i>Curcuma longa</i> (Zingiberaceae)	Spiwiwo	Oleoresin & Essential oil
5.	<i>Capsicum annum</i> (Solanaceae)	Chillie	Oleoresin
6.	<i>Melissa officinalis</i> (Labiatae)	Melissa	Essential oil
7.	<i>Justicia tinctoria</i> (Acanthaceae)	Azul de Mata	Pigment-blue
8.	<i>Lippia graveolens</i> (Verbenaceae)	Oregano Cimarron	Essential oil
9.	<i>Lippia alba</i> (Verbenaceae)	Juanilama	Essential oil
10.	<i>Pachyrrhisus erosus</i>		Extract, Rotenone
11	<i>Arabidaea chica</i>		pigment, red
12	<i>Smilax spp</i> (Smilacaceae)	Cuculmeca	Extract
13	<i>Simarouba glauca</i> ( Simaroubaceae )	Aceituno	Extract
14.	<i>Justicia pectoralis</i> (Acanthaceae)	Tilo	Extract
15	<i>Thymus vulgaris</i> (Labiatae)	Tomillo	Essential oil

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N.B. All the above plants are used medicinally as well as for culinary and cosmetic purposes. Two plant species generating pigments are also medicinally used.

Plants 1-5 are considered as the first priority for the project. Plants 6-10 are of next priority and plants 11-15 follow these in the order. The order of priority was based on a concensus opinion of the parties at the meeting on Febuary 3rd and the choices were made based on the agreed criteria set out in the schedule B.

## Schedule B

**CRITERIA ON WHICH THE SELECTION OF PRIORITY PLANTS WERE BASED**

1. *Can be obtained in abundant quantity as it is currently being cultivated in substantial quantity or could be cultivated.*
2. *The end product after processing will have a market demand, locally, regionally or internationally.*
3. *The processing of a marketable product could be achieved with relatively simple technology envisaged within the project.  
( Extraction, Steam distillation, Purification, standardisation)*
4. *The research back-up necessary for processing is within the scope of the current capability at the University of Costa Rica and associated collaborating institutions ( ARVI and CATIE ) in all aspects including, agronomy, chemistry, process technology, and biological testing).*
5. *Standardisation of the products are within the scope of the present capability of the University of Costa Rica (CIPRONA)*
6. *There is ongoing research on the plant species in at least one relevant discipline area.*
7. *There is a distinct prospect of local usage of products, and/or some social implication in the development of the plant species such as the interest of a particular region within the country, or particular groups.*
8. *The plant is a good prospect for future development on account of the importance of its medicinal value or its capacity to generate economically valuable products.*

-----  
N.B. All the chosen species of plants scored high points in most of the criteria outlined above and were rank ordered in accordance by the group that met on 3rd February 1993.

## 2. PRESENT SCENARIO WITH RESPECT TO THE MEDICINAL & AROMATIC PLANT INDUSTRY

### 2.1 Features of the Industry

It is now an established fact that plant-based medicines and cosmetics are enjoying a revival in the modern industrial world. UNIDO's own programmes in this sub-sector bear testimony to the relevance of this industry, ( regarded here under the title; "Industrial Natural Products" so as to include medicinal, aromatic and other plants with economic product potential), to the countries of the developing world.

Costa Rica is no exception to the trend. It has an interesting flora which boasts 5% or thereabouts of the world's biodiversity.

It also has in abundance some of the plants which are well known in the world as spices, medicinals, essential oil bearing plants and those that generate other market products in market demand. One of the features of the modern industry based on medicinal, aromatic and other plants of utility, is that no longer is it possible, or desirable to obtain plants from wild flora. Too many plant species are rendered extinct throughout the world by such an exercise. Also from an industrial standpoint it is far more desirable to systematically cultivate the required plant species. This will ensure standardized plant material, in the desired quality and quantity to sustain the industry, and maximum usage of any processing facility.

Accordingly any industry based on such plants should ensure availability of good agrotechnological expertise, modern laboratory facilities for phytochemical and analytical research for the purpose of instituting good manufacturing practices and quality control. Technology development can only be introduced in the presence of these two factors.

### 2.2. The Costa Rican situation in context

In Costa Rica the major elements necessary for basing an industry for processing industrial natural products are in evidence. They are the following;

- a. *Social acceptance of herbal products.*
- b. *Market demand for processed plant-products. (Annex 5)*
- c. *A capability in the relevant discipline areas pertinent to the industry.*
- d. *Some expertise in chemical process technology.*
- e. *Capability in the fabrication of equipment for processing.*

- f. *Packaging & marketing capability*
- g. *Access to a Laboratory facility.*

The presence in most of the supermarkets of herbal teas among other preparations, signal the presence of a social acceptance, a market demand as well as efficient packaging and marketing.

There was also present in many smaller shops not only such packaged teas, as the mission noted, but dried herbals for dispensing according to prescriptions in some books written by herbal healers.

One such publication: *Plantas Medicinales - La Naturaleza Como Guardian de su Salud* by Seidy Vargas Chinchilla, (Especialista en Medicina Natural), describes a variety of plants used in natural cures inclusive of poly-prescriptions. The book contains good line drawings of all plants mentioned which includes aromatic as well as other well known categories all of which are evidently employed in healing as well.

The country possesses in the University of Costa Rica a facility dedicated to the development of research into the chemistry and processing of medicinal, aromatic and other plants including those that have utility as pigments among the indigenous Indian population in the Talamanca region. The University's research facility CIPRONA (Centro de Investigacion en Productos Naturales) is well equipped but for one or two items of crucial instrumentation, and is manned by a group of well qualified chemists and pharmacognosists, with research capability in the right areas.

The country possesses also several private enterprises with capability for fabricating process equipment. One of these with associations with CIPRONA was visited by the mission. The company which is a Costa Rican branch of a regional company has an ongoing operation to fractionate cut-offs of special boiling point mixtures from the petroleum refinery. They have designed and constructed their own equipment and the mission felt that here was an opportunity where the UNIDO design of a polyvalent pilot plant could with ease be fabricated in a developing country.

Indeed, the Director of research & development of this company Laboratorios Quimicos ARVI, told the mission that he had visited Guatemala to inspect the pilot plant (installed there under a UNIDO project). Given the detailed engineering drawings that UNIDO had published a similar pilot plant could be fabricated by his company if suitable materials were provided.

The mission had no doubt on this score as the equipment constructed by the company was more complex than the UNIDO pilot plant (Vide Fig 1).

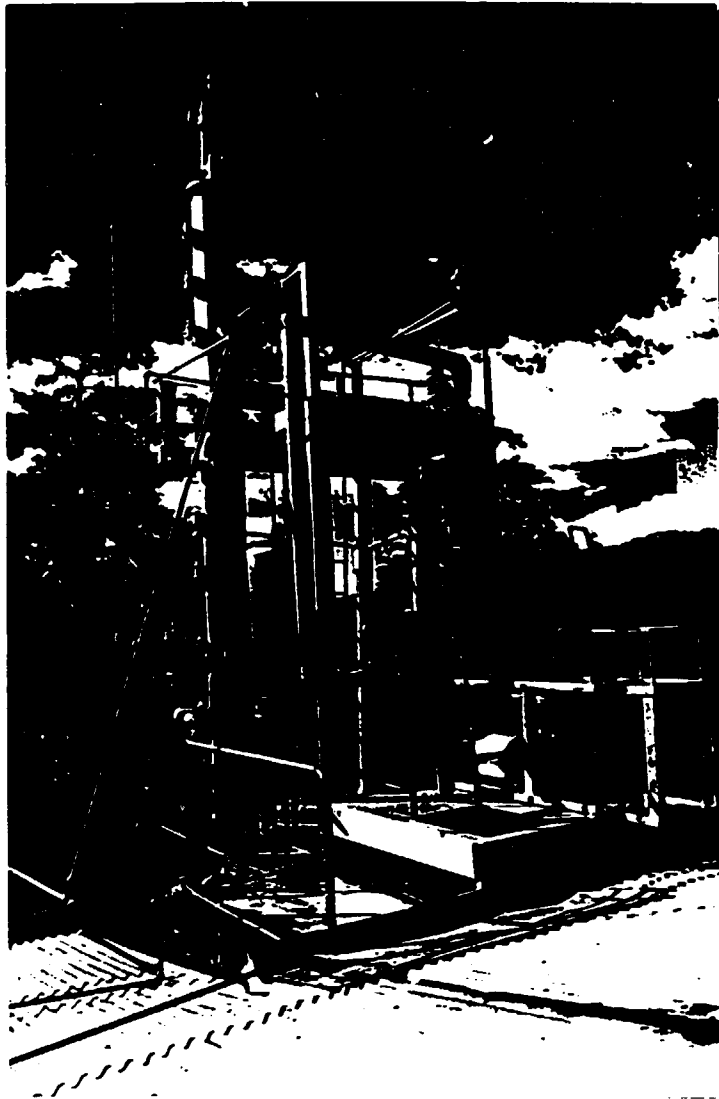


Fig. 1

A distillation plant fabricated by ARVI and sited  
at their premises near San Jose

# Talamanca

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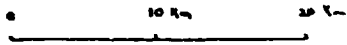
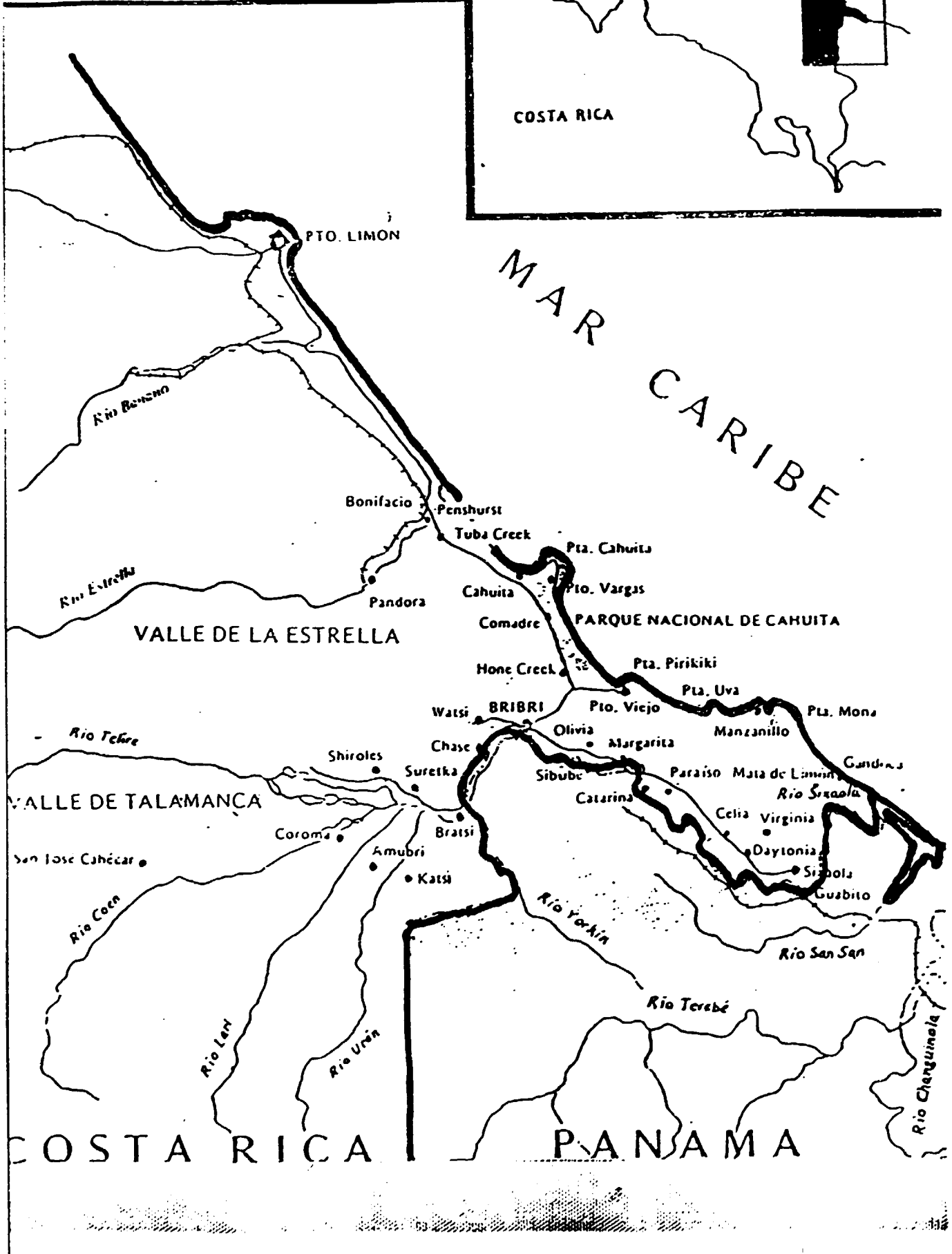


Fig 2.



In accordance with the above considerations the mission felt that there was a good prospect for a successful project in Costa Rica. The Mission felt that there should be three collaborating institutions in such an endeavor. Besides, the University of Costa Rica through CIPRONA and the Laboratorios quimicos ARVI, the important function of developing the necessary agrotechnological requirement could be undertaken within the organization CATIE- i.e. Centro Agronomico Tropical De Investigacion Y Ensenanza.

The mission visited a major cultivation field station belonging to CATIE in the Talamanca area (Fig. 2) and here impressive agronomic trials were being conducted on plants of all types including ornamental plants. Medicinal, aromatic and other plants were being cultivated with a view to developing resistant strains with good phytochemical profiles and there was good collaboration with the University's CIPRONA. These considerations lead to the conclusion of the mission that a viable project involving these three institutions was in fact feasible and the proposal formulated by the mission is in accordance with these observations.

It shall be mentioned that the mission visited the Aloe processing factory of Carrington in Liberia (Fig. 3). This was a high technology, capital intensive, bilateral venture with American participation to satisfy the market needs of the parent company in the United States. It was designed to obtain the extractives as well as a carbohydrate anti-cancer agent. The entire operation sited within the free trade zone was not relevant to the present exercise.

### 3. MARKET POTENTIAL FOR PROCESSED PRODUCTS

#### 3.1 The Present Situation

As indicted earlier in this report there is market demand for herbal teas and dried herbal products as evidenced by the common availability of such products in supermarkets and other retail facilities. Still, while there is modest cultivation of medicinal and aromatic plants in Costa Rica, several significant factors impede the market and industrial growth of the natural products industry. The Mission found:

- a. - *lack of stable & consistent markets for unprocessed natural products such as ipecacuana & ginger\* largely based on the lack of in-country processing facilities (& to a lesser extent, difficulty in penetrating and serving export markets for unprocessed product);*
- b. - *current channels of distribution are rudimentary & subject to price control by "middlemen" interests;*
- c. - *most cultivators are micro or small scale producers due to lack of commercial & marketing knowledge;*



- d. - special climatic requirements of certain plants (e.g. ipecacuana appears to favor the humidity and natural shade of rain forests;
- e. - common perception (based on the above) that local (Costa Rica) demand is too small and that international markets are unresponsive to sales and marketing inquiries (except from established brokers-see case below)

\* Ironically, according to CCNA representatives, Costa Rica's imports 100% of its ginger and chile essential oils in order to satisfy local demand.

While some cultivators have formed producer cooperatives Costa Rican law apparently limits its marketing functions (a separate cooperative entity must be formed). This situation encourages individual cultivators to sell their harvest to middlemen who can set prices and demand. Consequently existing producer cooperatives are weakened (based on interviews with COOPE INDIA and COOPIPECA) when cultivators approach the middleman directly. (This situation was reported by COOPIPECA - mostly due to a faulty contract that had set cooperative purchase prices lower than prices fetched by the open market)

The Mission found evidence that cultivators would grow more natural products if Costa Rican commercial demand increased (especially if extractive & processing industries were developed) and if channels of collection/distribution were more systematic and fair to producers. Presently the Costa Rica market for unprocessed plants (as sources for essential oils) is erratic due to the lack of processing facilities, especially for ginger and chile. Moreover producers often have to wait for payment (from brokers) 30 days or more. Existing collection/distribution channels also tend to discourage competitive marketing of natural product to potential industrial end-users. Still, producers enjoy a few agro-economy incentives (e.g. preferential loans for sustainable cultivation of rain forest medicinal plants and relatively high prices vs. traditional crops) in their efforts to earn a living.

#### Costa Rica Marketing Challenges:

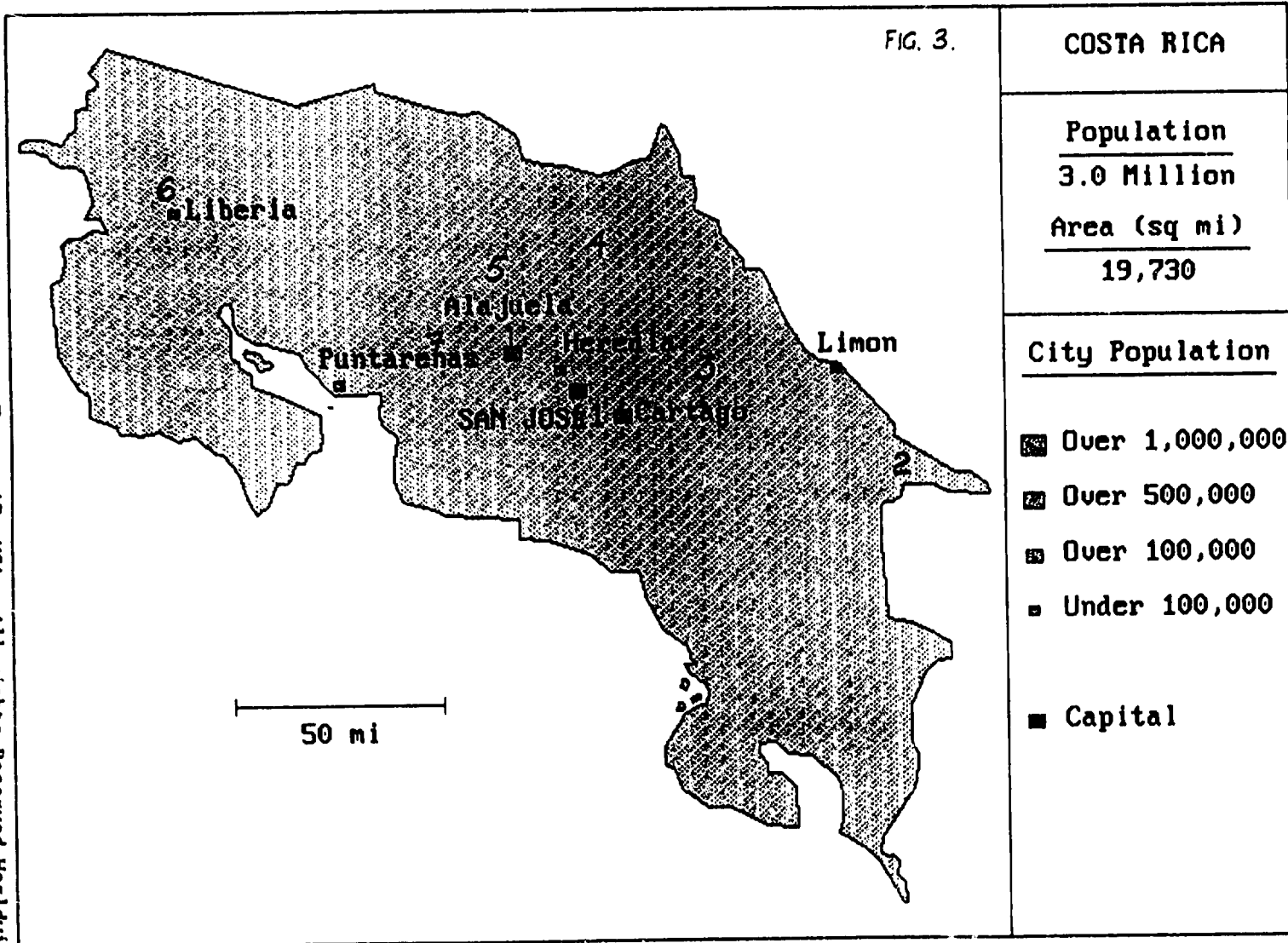
Both natural product cultivators and agricultural institutions are not fully knowledgeable about the commercial applications of unprocessed natural products. Similarly the local industrial sector (either involved in food processing or limited pharmaceutical production) not only have limited knowledge of the same but also consider, with certain justification, the lack of consistent supply of raw material or the lack of local demand for such products.

The last point is certainly not surprising. Often the mission was told it was the proverbial "chicken and egg - what comes first" situation: local commercial demand for unprocessed plants would increase if commercial applications, technology, and

PREPARATORY ASSISTANCE TEAM  
FIELD VISITS

- |   |   |
|---|---|
| 1. Plant site of Laboratorios Quimicos ARVI near San Jose                       | 5. Instituto Tecnologico, Santa Clara                               |
| 2. CATIE - Field station, Talamanca Atlantic Coast Research Project, Home Creek | 6. LIBERIA CARRINGTON - Aloe Vera Plantation and Processing Factory |
| 3. EARTH - Tropical region (wet forest), School of Agriculture, Squires         | 7. PALMARES - Coope India   |
| 4. FOCC SOL, San Carlos - Producers Cooperative for Ipecacuanha                 |   |

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local (& export) demand and steady supply of raw material existed. Producers would grow more if industrial and export markets presented more demand but since cultivators and their products are not "pulled" the private industrial sector reacts accordingly. The natural products sector is nonetheless growing - due to an increased awareness of Costa Rica's comparative advantages in this arena. A pilot plant would assuredly enhance the technology and skills needed for full scale natural product processing as well as serve as a "model" for replication in the private sector. Moreover the growth of local industry would also serve to reduce the large import bill for foreign pharmaceutical and essential oils. Knowledge of commercial applications and the high valued added prices for processed natural products is not fully appreciated by cultivators. If such information were widely known there would be much more a "market push".

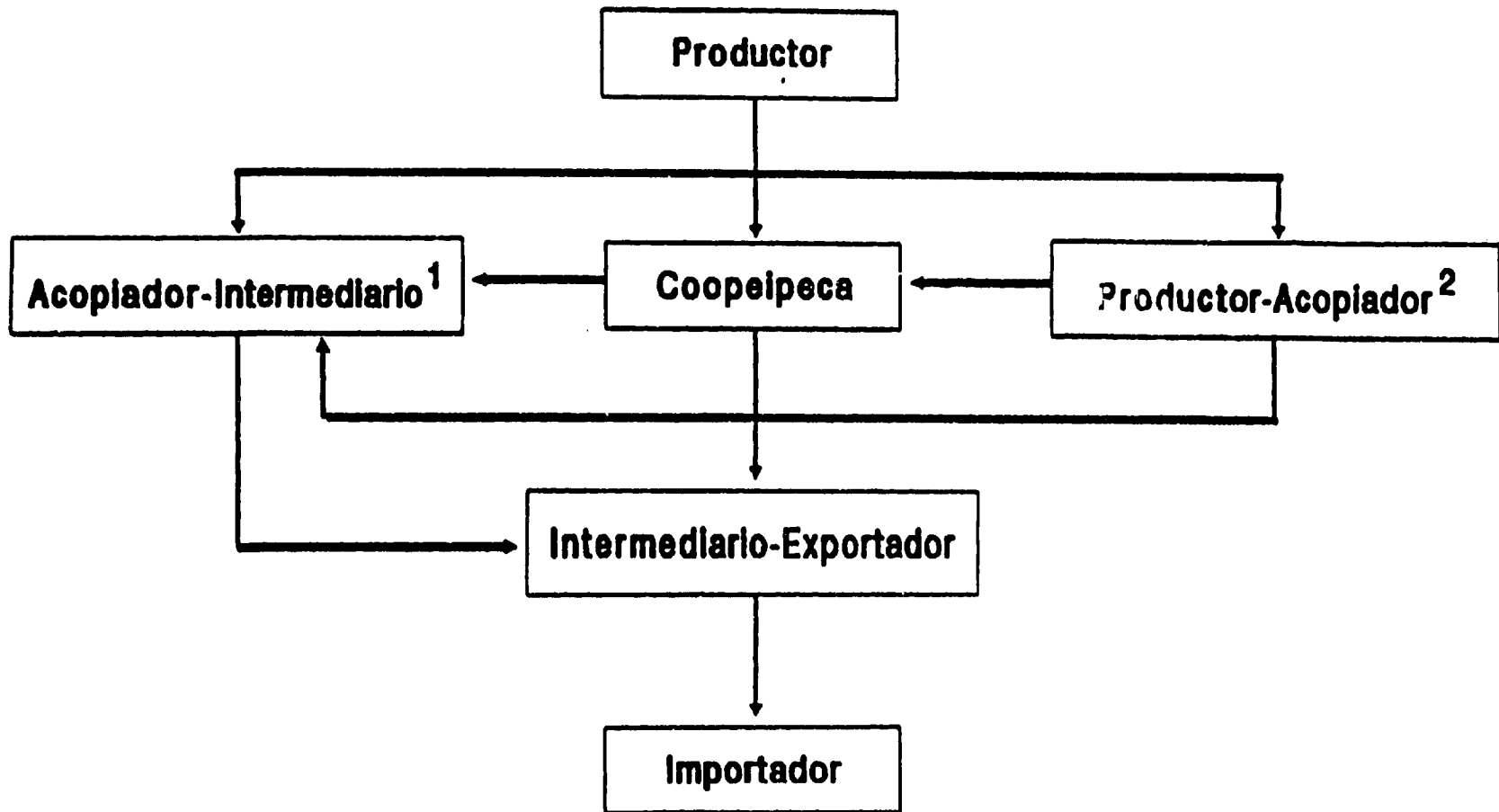
#### **A Case study of COOPEIPECA Demand (C. ipecacuana):**

Ipecacuana is a major medicinal plant sold usually through intermediaries. Producers can receive between c1000 - c1200 per kilo (US\$7.20 to 8.75) per kilo from intermediaries (brokers) (Annex 6).

#### **Present market channels:**

A producer/gather delivers the small quantities (1-2 kilos) to a village grocer or large quantities (average 50 kilos) to a cooperative collector of intermediates (Sp. "Acopiador-Intermediario") There are only four brokers/exporters (Sp. "Intermediario-Exportador") in Costa Rica who purchase the warehoused product from the collector/intermediate (Fig. 4). The product is then shipped to San Jose where these four product/exporters then resell it locally (to health food retailers - SP. "macrobioticos") or export product to foreign brokers who in turn re-sell the product to pharmaceutical firms. Often the producer must wait for 30 days or more for payment from brokers. Brokers insist this is fair because they must find a market first, obtain their payment and thus remit payment to producers (which is presently more than the COOPEIPECA's price). COOPEIPECA was formed to overcome this cash flow or "good faith" risk but has lost much business to the promise of a higher price later (from brokers). COOPEIPECA is attempting to establish a "marketing" cooperative that would sell direct to brokers in San Jose who represent national and export demand. Presently, it cannot meet the brokers' prices of c1400 because brokers are utilizing & manipulating export tax credits (viz. "CATs") that allow for higher prices & therefore higher payments to producers. CATs may be eliminated due to unorthodox practices, according to some respondents.

**Fig. 4** Costa Rica. Canal de comercialización de la ipecacuana.



1. Son agentes de compras que tienen los intermediarios en las zonas de producción.
2. Se refiere a dueños de pulperías que reciben raicilla a cambio de comestible.

### 3.2 Potential for marketing in the local and regional scene

Regionally, Costa Rica enjoys an enviable position; but it has not been as commercially active in the natural products sector as it could be. This is attributable to its neighbors' own sources of unprocessed product and therefore little or no market demand for such by its neighbors. The potential to serve as the region's processing center for natural products is huge (and encouraged by the loosely confederated but modest Central American Common Market). Although the second smallest nation in Central America it is by far the wealthiest and most stable country with a well educated work-force and a well developed industrial sector. Most importantly its bio-diversity is its most valuable natural resource as well as one of the most significant in the world. For these reasons alone Costa Rica's regionally marketing potential is considerable in view not only of the essential oil needs (e.g. ginger & chillie) of the region but of medicinal requirements of the region's poor - especially in Guatemala and El Salvador as well (Annex 6). Costa Rica's political & economic stability coupled with its well developed transportation facilities are especially attractive.

### 3.3 Possibilities for entry into international markets

Internationally, however, the challenge and opportunities are quite different. Presently, entrepreneurs (apart from the four major brokers referred to above) and cultivators alike are discouraged by the perceived "cavalier" \* attitude of importers in Western & Asian countries. Many of these importers are not "end users" (i.e. pharmaceutical, food and non-food manufactures and natural product retailers) but rather import brokers who re-sell product to the above. Obviously it is not in the best interest of such import brokers to encourage the development of more direct marketing approaches formed, by the producers, to the end-users. Similarly, other importers who indeed perform some value added processing, would not necessarily welcome the growth of market oriented export by producers, industrial processors, or marketing entities from Costa Rica.

Nonetheless the market for processed natural products would certainly grow if the existing marketing techniques were enhanced - most obviously by formal marketing to the right "target audience" International market demand for certain products (e.g. ipecacuana) is growing rapidly.

\* The Mission found respondents claim that many of their export inquiries were ignored by Western & Asian importers (Annex 7 & 8). Analysis of some of the correspondence suggests that such inquiries were not presented in the form (price, quantity, quality, F.O.B., C.I.F & other shipping and relevant terms) , language and "ease of reply" format that importers and international business-people prefer.

## Analysis of Available Costa Rica Production & Export Data

### A. Ipecacuana Root exports:

Total Value for 1989: US\$ 4,161,500  
 1990: US\$ 3,458,175  
 1991: US\$ 1,574,454

Average F.O.B. price per kilo over three year period:  
 US\$37.50

Major importers for Costa Rica Ipec. root: Germany, France, United Kingdom and USA (Annex 9).

### B. Other Medicinal & Aromatic Plant Exports: 1989: US\$ 13,444

1990: unavailable  
 1991: US\$ 890,609

Major importers for Costa Rica: France & Malaysia

### C. Perfume or toiletry products, cosmetics, aromatics (water distilled, essential oils (including medicinals)

1989: US\$5,577,300  
 1990: US\$4,161,252  
 1991: US\$6,542,734

Major importers for Costa Rica: El Salvador, Guatemala, Nicaragua, Panama, USA, Dominican Republic

### D. Ginger 1989: US\$1,654,088 1990: US\$1,860,731 1991: US\$2,105,352

Average price per kilo of ginger US\$.92 per kilo

Major importers for Costa Rica: Great Britain, USA and Holland

Total Export Market (plus some misc. categories not included above) for natural products: 1991 US\$ 12,000,000

Approx.

## 3.4 Strategies and Mechanisms

Select a Technical Project Marketing Team (with assistance from Executive Board) to establish the criteria for a Costa Rican Natural Products Market Board (vide scheme 1). The Market Board model, successful in many developing countries, would establish a clearing house for producers/foreign buyers who seek information on buying and selling of natural products (this could be financed through export revenues, membership dues, coop fees etc). For example GTZ 's office in Costa Rica could be a good model and/or source of funding and expertise. Through a Market Board functioning as a trade association, the following sample steps would provide the training skills and promotional strategies necessary for the development of Costa Rica's natural

# PROPOSED TECHNICAL PROJECT MARKETING STRUCTURE-NATURAL PRODUCTS:

Producers

Large Plantations  
(e.g. aloe vera)

Local Market Cooperatives

Local brokers  
National brokers  
exporters

Pilot process  
Plant (proposed)

Spin-off Process  
Plants

Essential Oils  
(e.g. ginger &  
chile)  
food processing  
industrial buyers

Medicinal Plant Extractions  
(e.g. emetin, pharmaceutical industry)

National retail distribution

National distribution chain

Costa Rica Natural Products Board

CENPRO

Import Agents

Brokers

Manufactures  
(e.g. Foods/non Foods  
pharmaceuticals)

Distributors/large retailers  
(e.g. "The Body Shop")

Consumers

Compatible import  
Marketing Boards (e.g.  
PROTRADE-Germany)

products industry. Private sector partnership would be essential as well.

- a) "Train the Trainers Seminars" for producers, marketing cooperatives, and brokers on export marketing techniques such as:
  - How to Identify New Markets for Natural Products
  - How to Conduct an Export Marketing Campaign
  - Selection Criteria for Choosing Your Export Representative
  - How to Write Export Letters of Credit
  - How to Utilize International Marketing Data Bases.
  - How to Attract Foreign Buying Missions for Natural Products
  
- b) Conduct coordinated (with other institutions such as CENPRO) market surveys of present marketing channels nationally, regionally and internationally to determine market for selected pilot plant's list of processed products & select 20 end-users (pharmaceutical, food & non-food processors). TARGET THESE 20 & be relentless in selling orders to them.
  
- c) Launch a promotional campaign "Costa Rica: An Eden of Natural Products" to target countries (e.g. Germany, France, Italy, USA and Japan)
  - identify trade shows for participation, advance-market your presence by research of targeted buyers;
  - produce, publish and distribute monthly glossy & attractive newsletters (or a video - the 90's marketing tool of choice for its effectiveness) or trends and buying opportunities for Costa Rica's Natural products (appeal to potential buyers the ease of "one stop shopping" - by offering one "clearinghouse" (proposes Costa Rica Natural Products Board) for all buying inquiries with contact name/telephone, FAX, Telex numbers available;
  - deliver marketing quality by establishing standards for timely response to all inquiries, & requests for information - a good reputation is the best marketing tool.

#### 4. PRODUCT NATURE AND DEVELOPMENT

##### 4.1 Basis for Selection

It was necessary from the point of view of developing a viable project proposal to ascertain which species of plants were suitable for development to a further stage namely that of processing. After prolonged discussions with all likely participants in the project the mission finalized the criteria that would need to be considered in such an exercise( Schedule B).

Based on these criteria the mission had a formal meeting with the participants and discussed the various aspects related to this set of criteria. The meeting assiduously applied itself to the task of selecting the plant species and hence the respective products for which technology would be developed as well as methods of assessment of quality, in the proposed



project.

The meeting agreed on the priority list of plants represented in Schedule A.

#### 4.2 The five priority candidate species

The dominant considerations that characterized the priority of these species were\;-

- The availability of raw material presently in abundance.
- The agrotechnological expertise available to cultivate these species to ensure a continuing supply when needed for processing.
- The feasibility of processing the products, mainly extracts with solvents, and essential oils by steam distillation, using the UNIDO - type design of a pilot plant, with if at all, very small design modification which is fully within the bounds of local capability.
- The ready availability of markets for the ensuing products.

The species of highest priority are as follows from the standpoint now of the products.

Total Extract from Ipecacuana  
 Total extract from Quassia  
 Oleoresin from Ginger  
 Oleoresin from Curcuma  
 Oleoresin from chillie

It may be noted that two of the products to be made were the Oleoresins of Ginger and Chillie. These are more or less ubiquitous species of plants and it may be questioned as to where the rationality of the operation lies. The fact was, as the mission was informed by the representatives of the CNAA i.e the Camara Nacional de Agricultura Agroindustria, that there was a considerable production of these two species of plants, in Costa Rica, yet it was difficult to find local markets for them. On the other hand the country was importing for its use in the food industry substantial quantities of the oleoresins of both Ginger and Chillie. This situation absolutely called for inclusion of the production of these two oleoresins as priority items. Curcuma is also produced in many countries but the oleoresin of curcuma is in demand as a yellow colorant acceptable to the food industry as well as on account of its recognized anti-inflammatory activity which is of interest to the pharmaceutical industry. Since the agrotechnological factors as well as the processing is similar to the other two this was an automatic inclusion into the priority category.

The country is already producing sizeable amounts of Ipecacuanha, and this is exported in the form of the crude dried roots. There is a demand for a standardized extract from which the well known alkaloids Emetine, and Cephaeline are isolated. These two alkaloids which are closely related, and the latter could easily be converted to the former are important to the pharmaceutical industry for its action as an anti-amoebic agent. CIPRONA, the mission was informed, has already submitted to a Canada-based organization (IDRC) a proposal to fund its fundamental research on Ipecacuanha to develop a laboratory scale method for extraction and optimal conditions for isolating the alkaloids in good yield. This would be complimentary and advantageous to the inclusion of this plant species for the proposed UNIDO project, which is for the development of production scale technology.

The market prices, trends, statistics and potential buyers for the five selected products are given in Annex 10.

#### 4.3 The technological aspects

The country is already producing and exporting as raw material the roots of Ipecac and the bark of Quassia. Both as stated heretofore are ingredients used in the pharmaceutical industry. They could be exported as standardized extracts e.g as extracts containing a standard percentage of total alkaloids in the one case and total quassinoids in the other. Both preparation of the extracts, as well as their standardisation will be within the capability of CIPRONA and ARVI, - given the modest inputs envisaged in the present project.

The two commodities Ginger and Chillie are readily available in the country in the raw form and is utilized thus. The markets for them in this form are variable because of a variability in quality. The preparation of an oleoresin will give the country an opportunity to produce a commodity of standard quality with for example in the case of chillie , a standard content of capsaicin or the coloring matter or both; and in the case of ginger a standard content of gingeroils. Ginger can also generate an essential oil which also has a market. In the case of curcuma the oleoresin is in demand, for its content of curcumin. It finds application as a coloring matter in the food industry, as well as an anti-inflammatory agent in the pharmaceutical industry. Another attractive factor is that the country produces its own alcohol which could be used for the extraction of these oleoresins and the technological aspects can be accomplished again using a pilot plant of polyvalent capability such as the UNIDO design. The pilot plant can as mentioned earlier even with any desirable modifications be fabricated locally.

## 5. INSTITUTIONAL REQUIREMENTS

### 5.1 Mechanism for Collaboration

As mentioned heretofore the three main collaborating institutions will be the UCR-CIPRONA, CATIE, & ARVI. The chemical research, analytical research, control and assessment of quality will be carried out by CIPRONA. The research in agronomy, the supervision of cultivation trials and technology transfer in this area will be the task of CATIE. ARVI will be responsible for the technological aspects. In the proposed project the mission feels that a distinct advantage here is the ability of ARVI to fabricate process equipment. It would be in the interest of any UNIDO sponsored project to utilize this, not only on the grounds of budgetary economy but for the more important consideration that this facility may be one that could be used to benefit the region. Detailed engineering drawing of still designed proposal is annexed. (Annex 11)

Given their respective expertise and the complimentary nature of this, together with the fact that there has already been forged between them a collaborating relationship with respect to their ongoing endeavors the mission is convinced that a successful project could be executed collaboratively by these three institutions. Accordingly, the mission proposes a mechanism for this collaboration to be placed on a formal footing.

### 5.2 Project Management

The mission proposes the establishment of an EXECUTIVE BOARD consisting of the key representatives of the three collaborating institutions, that is the three main project leaders in the discipline areas of natural product chemistry, chemical technology and agrotechnology. The University of Costa Rica being the lead institution in this exercise, ( they were the counterpart agency for the present mission ) could provide the National Director as well as perhaps the Chairperson of the executive board. The chairperson would be the one who will be responsible for monitoring the delivery of the government inputs identified in the project proposal and ensuring that the obligations are met. The mission also recommends the inclusion of a representative from the organization known as APPTA to serve the interests of the growers in the Talamanca region on account of their very special interests as an indigenous community. This representation would be of observer status on the Board. The mission also recommends that two coopted members from the Industry/Academia be included to deliver to the board some special expertise.

The mission discussed these mechanisms of project management with the Director of Research of the University of Costa Rica under whom the organization CIPRONA functions. The Director was in accord with the proposals and pledged his support for the proposed project.

## 6. UNIDO INPUTS

### 6.1 Budgetary inputs

The UNIDO inputs to the proposed project were assessed by the mission after site-visits to the respective facilities and following discussions on-site with the obvious participants of a likely project. They are as presented in the project proposal document attached.

#### International Staff

Post.	Title	Total m/m		
11.01	Industrial Chemist	6m/m	USD	75,300
11.02	Chemist (analytical)	4m/m		50,200
11.03	Marketing expert (split)	4m/m		50,200
11.04	Women-in-Development	1.5m/m		16,875
11-50	Short term consultants	4m/m		52,700
		sub-total 19.5m/m	USD	245,275

#### Other expenses.

13.00	Administrative support.		USD	5,000
15.00	Project Travel		USD	5,000
16.00	UNIDO technical evaluation visits		USD	18,000

#### National experts

17.01	National Director (Honorarium)		USD	18,000
17.02	Principal Agronomist (Honorarium)		USD	12,000
17.03	Technologist Pilot Plant (Honorarium)		USD	12,000
	sub-total			42,000

#### Sub-contract

	Fabrication of Pilot plant cum distillation unit.		USD	20,000
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#### Training

31.00	Fellowships:			
	Marketing	3m/m		
	Process technology	3m/m		
	Agro-technology	2x3m/m		
	Essential Oils	3m/m		
	sub-total	15 m/m	USD	32,000

32.00	Study tours.			
	National director for site-visits to ongoing UNIDO projects in Guatemala, Turkey, and Viet Nam.			
	Essential oils chemist to visit, France, Hungary, and Turkey.			
	Pilot plant technologist to visit Turkey, France, and Guatemala.			
	sub-total	05 m/m	USD	20,000

33.00	<b>In-service training</b> Costs for staging work-shops for Agronomy A total of three workshops, one national and two regional.	USD	20,000
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**Equipment:**

41.00	Expendable (see annex 12)	USD	90,000
42.00	Non-expendable (see annex 13)	USD	135,000

Sundries		USD	10,000
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<b>TOTAL</b>	USD	<b>642,275</b>
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**6.1 National experts**

Special mention must be made of the decision of the mission to propose honoraria for the national experts who will serve the project. The National project director should ideally be a full-time person preferably seconded for the duration from his present position. This ideal situation is unlikely to be achievable as the candidate persons have commitments which cannot be fulfilled by others as no adequate substitutes would be available. In this situation the next best option is to obtain the services of these persons on a part-time basis with the definite understanding that they devote time in addition to their present commitments. This calls for much additional work on their part and it will not be proper from the individuals point of view, to ask them to do this additional work without reward. The salaries of top category personnel in Costa Rica are high in comparison to those in other developing nations but not high enough in terms of what these same persons can get in an industrialized country. The mission was impressed by the dedication as well as the competence and technical quality of the personnel encountered. It is a fact that Costa Rica does not suffer from the effects of the "Brain Drain" in comparison with other similar sized countries but it is imperative that the country retains its present skills in this area of activity which is in the formative stage. The payment of such honoraria for special work is recognized, the mission was informed, by the University. Similar honoraria, as proposed for the National Director is also proposed for the key actors in the disciplines of agro and process technology. They too are crucial to the success of the project and the mission is of the view that the proposal for monetary reward should be considered in all sincerity and seriousness.

**6.2 Human resource development**

As this aspect is one of supreme significance in any development project of this type the mission has given intense attention to this. The training schemes proposed in the project proposal are based on the assessments made by the mission. A

significant feature is the proposal of workshops both regional and local for the on-site training of agronomists. Although the principal agronomists were very impressive it was clear that a number of them would be needed for the successful implementation of the project.

The experts proposed is the minimum, and the study tours proposed should also take the participants into other regions like Asia to absorb the techniques and mechanisms used in other typical UNIDO projects in this sub-sector.

#### **CONCLUSIONS AND RECOMMENDATIONS**

The mission has no hesitation in recommending the implementation of a suitable project to enhance the capability of the three institutions viz the University of Costa Rica's CIPRONA, the laboratorios quimicos ARVI, and CATIE so as to facilitate the development of a Natural Product based Industry within the country and accordingly the following specific recommendations are made.

The preparatory assistance mission was convinced that in Costa Rica attractive conditions exist for the commercial development of plant based industries. Based on the preparatory mission just completed a UNIDO technical assistance project will be proposed by the Mission Team. The following recommendations are made by the mission: -

#### **Recommendations:**

1. **Agrotechnology - Government responsibility through CATIE**
  - 1.1 The plant species, selected in Schedule A (1-5), be systematically cultivated for processing. Collaboration with Agencia Espanola de cooperacion Internacional and GTZ, as international assistance agencies, is respectfully solitied.
  - 1.2 The micropropagation methods, being developed at the Instituto Tecnologico (Costa Rica), should be enhanced by provision of opportunities for training and study.
  - 1.3 Macro methods of propagation be developed by UCR and CATIE for the cultivation on a semi-commercial scale of the priority species outlined in Schedule A (6-11).
  - 1.4 CATIE be responsible for the staging of demonstration workshops in agrotechnology for regional as well as local participants.

**2. Process Technology - Government responsibility through CIPRONA-ARVI, UNIDO responsibility for delivery of inputs**

Pilot scale processing plants are needed in order to develop technology for processing of:-

- Essential oils
- Spice oleoresins
- Medicinal plants.

Accordingly, it is recommended that:

- 2.1 The UNIDO design of the Polyvalent pilot plant be made available, with sufficient funds for procurement of construction materials, for local fabrication of a pilot plant. ARVI, an organization which possesses fabrication capability, shall be entrusted with task of fabrication, installation, servicing, maintenance and operation of such a pilot plant for the project.
  - 2.2 A suitable design for an essential oil distillation still be made available for local fabrication and installation by ARVI for processing of essential oils.
  - 2.3 That ARVI be entrusted with the task of processing essential oils, medicinal plants extracts and spice oleoresins for the project. All laboratory scale preliminary process development will be the responsibility of CIPRONA.
- 3. Quality Assessment - Government responsibility through CIPRONA, UNIDO responsibility for delivery of inputs**
- 3.1 The University of Costa Rica - CIPRONA shall be entrusted with the task of quality assessment of all three categories of processed products.
  - 3.2 The UCR (CIPRONA) will be responsible for the development of quality standards and analytical methods for quality control of all products.
  - 3.3 UCR's instrumental testing facilities should be strengthened to enable these tasks to be performed, by provision of additional equipment (HPLC and TLC densitometry), as well as study tour facilities, for its personnel.
  - 3.4 As R & D serves to develop technology as a continuing requirement UCR - CIPRONA should be the focal point of project implementation. UCR - CIPRONA should second, to the project, a suitable leader to be designated National Project Director.

**4. Management and Implementation - Government responsibility through collaborating agencies and marketing organizations**

These project activities are interdisciplinary. The project, therefore requires a multi-institutional team. UCR, ARVI, and CATIE are envisaged as the leading partners, and as such, would be the lead participants in the project management and implementation (annex 14). Accordingly, it is recommended that:

- 4.1 The project be managed by an Executive Board consisting of: One representative each from UCR (CIPRONA), ARVI and CATIE. Additionally, it is recommended that a representative (observer status only) from APPTA be included. This would serve as a growers platform for the indigenous communities' interests from the Talamanca region. Also two selected consultants from industry or academia would serve as advisors to the Executive Board.
- 4.2 The National Project Director should be convener of the Executive Board and the Executive Manager of the project and as such, will be responsible for communicating with UNDP (San Jose) and UNIDO (Vienna). The Chairman of the Executive Board will be from the lead agency viz the University of Costa Rica.

**5. Commercial & Marketing Development**

The Pilot project and distillation assembly will establish a measure of the technical and productive potential for a Costa Rica based plant extraction, and essential oil industry. Present methods of marketing of middlemen result in low prices, lack of uniform quality and ignorance of market demand for new or novel uses of plant products. Commercial and marketing linkages need to be established to sustain the down-stream capacity of both the pilot project and future entrepreneurial spin-off plants. National, regional and international market strategies of plant based products need to reflect the potential market demand of such "higher value added" products as well as the land use factors (e.g. medicinal plant and essential oil substitution over some land traditionally used for coffee cultivation).

It was deemed necessary to tackle two immediate problems that inhibit the growth of the medicinal and aromatic plant industry viz:-

- (a) Too little production of specific medicinal plant due to an apparent lack of existing markets and processed applications; and
- (b) Lack of infrastructural support to sustain existing cultivation and marketing efforts.



Accordingly, it is recommended that:

- 5.1 Investigations regarding existing Costa Rican Marketing boards for "High valued" processed plant products (if any) be made, to serve as a model for an external marketing promotion channel.

A marketing Board for medicinal and aromatic plants and their downstream products could serve the interests of producers, middlemen and manufactures alike with a variety of services not presently rendered.

- 5.2 The moribund Medicinal Plant Growers Association be re examined with a view of ascertaining if such an association could serve the interests of the Technical Assistance project through the following outputs:

Market Research & Analysis of purchasing habits of buyers, brokers, distributors, processors and pharmaceutical end user firms of targeted products (schedule one).

Liaison be established with CENPRO to obtain present export data of medicinal and aromatic plants and downstream products.

6. Expert Assistance and Technology Transfer (UNIDO responsibility)

- 6.1 In order to accomplish the activities of the project it is recommended that experts be fielded in the subject areas of marketing and chemical process technology and short-term consultants where needed to accomplish specialised tasks.

- 6.2 Training programmes as stipulated should enhance manpower development. It is recommended that this takes two forms viz:

- (a) Agrotechnological workshops for local and regional training (Government & CATIE responsibility)
- (b) Study tour and Fellowships for project personnel (UNIDO responsibility).

JOB DESCRIPTION  
COSTA RICA

- Post Title: Industrial Technologist
- Duration: 1.0 m/m
- Date Required: 1 June, 1992
- Duty Station: Costa Rica
- Purpose of Project: To evaluate the potential for industrial utilization of medicinal and aromatic plants in Costa Rica and to assess the requirements in terms of infrastructural facilities, human resource development, equipment and technology for a technical assistance project.
- Duties: The Industrial Technologist as team leader and the marketing expert with assistance and cooperation of counterparts will perform the following duties:
1. Study the data available on the indigenous medicinal and aromatic plants and assess the potential for industrial processing and product development in terms of raw material availability, agrotechnology and infrastructural facilities for processing, quality control, research and development and trained personnel.
  2. Investigate the local, regional and international market potential including the demand and supply situation and price trends and based on the findings prepare a rank ordered list of plants (endemic or introduced) to be systematically cultivated for processing.
  3. Suggest methods of stream lining market practices and recommend arrangements for marketing and sales promotion.
  4. Prepare a comprehensive joint report on the findings and recommendations and prepare a draft project document indicating the inputs in terms of equipment, training, expertise, infrastructural facilities, and potential sources of financing, both domestic and international, required for a technical assistance project on the industrial utilization of medicinal and aromatic plants.

**Qualification:**

A graduate in Chemistry or Pharmacy or Chemical Engineering with at least 10 years of experience in the industrial utilization of medicinal and aromatic plants.

**JOB DESCRIPTION  
COSTA RICA**

**Post Title:** Marketing Expert

**Duration:** 1.0 m/m

**Date Required:** 1 June, 1992

**Duty Station:** Costa Rica

**Purpose of Project:** To evaluate the potential for industrial utilization of medicinal and aromatic plants in Costa Rica and to assess the requirements in terms of infrastructural facilities, human resource development, equipment and technology for a technical assistance project.

**Duties.** The marketing expert together with the Industrial Technologist (Team Leader) and with assistance and cooperation of counterparts will perform the following duties:

1. Study the data available on the indigenous medicinal and aromatic plants and assess the potential for industrial processing and product development in terms of raw material availability, agrotechnology and infrastructural facilities for processing, quality control, research and development and trained personnel.
2. Investigate the local, regional and international market potential including the demand and supply situation and price trends and based on the findings prepare a rank ordered list of plants (endemic or introduced) to be systematically cultivated for processing.
3. Suggest methods of stream lining market practices and recommend arrangements for marketing and sales promotion.
4. Prepare a comprehensive joint report on the findings and recommendations and prepare a draft project document indicating the inputs in terms of equipment, training, expertise, and potential sources of financing, both domestic and international, required for a technical assistance project on the industrial utilization of medicinal and aromatic plants.

**Qualifications:**

A graduate in marketing or economics or other science with at least 10 years of experience in marketing, sales and cost analysis in plant derived products.

## Mission Programme

18	January 1993	0800	Commence UNIDO Preparatory Mission Briefing - UNIDO HQ/Vienna
19	January	1700	Briefing concluded
20/21	January	AM/PM	En route to San Jose, Costa Rica
21	January	all	Settling in - San Jose
22	January	AM	Briefing with Ms. Malene Hedlund JPO - UNIDO/UNDP
		PM	Briefing with Dr. Gerardo Mora CIPRONA/UCR
23	January	all	Orientation/discussions with Dr. Mora
24	January	all	" " "
25	January	AM	Dr. Eduardo Arguedas, Laboratorios ARVI. Meetings & Plant Tour of pharmaceutical & cosmetic operation & CIPRONA test facility
		PM	Ms. Gabriela Lobo - CENPRO. Discussion on export/import of pharmaceuticals and food based industries pertinent to Mission.
26	January	all	Field mission departure to Atlantic Coast Region (Talamanca) visits of demonstration plots of medicinal & aromatic plants at EARTH (Tropical Humid Forest School) & CATIE research project and indigenous Indian cooperative (APPTA). Discussion held with staff.

27	January	all	Continuation of above activities and return to San Jose
28	January	AM	Economic/industrial research at CENPRO & discussions with Lic. Ciccio.
		PM	Meeting with Mr. Carlos Ramos (AECN) & Mr. Alfonso Sanabria - Torteguero Project on cooperation and assistance for technical project.
		PM	Meeting with Mr. Hermann Heise (GTZ) on private sector participation for technical project.
29	January	AM	Field Mission departure to northern regions (Santa Clara
29	January	(cont.)	San Carlos, Alajuela). Meeting with Ing. Tomas Palma on medicinal and aromatic plant biotechnology and cooperation on Technical Project.
		PM	Meeting with Ofran Berrocal, Manager, COOPIPECA (Producers Cooperative of Ipecacuana) on commercial/marketing difficulties and rain forest hikes to ipecacuana plots.
30	January	all	Departure to Liberia (Guanacaste Region) through Volcano Arenal region. Arrival late PM
31	January	AM	Visit to Carrington Aloe Vera Plantation & processing facility Plantation & Plant tour. Discussions held on production and usages (possible anti-cancer agent).
		PM	Departure to Valle Escondido, San Ramon

- |    |          |     |   |
|----|----------|-----|---|
| 01 | February | AM  | Hike to rain forest (Rio Balsa) and discussion with Fiberto Vega, Manager, Valle Escondido Ornamental Plant producer. Departure for Palmares  |
|    |          | PM  | Meeting with COOPEINDIA & AECN on commercial cultivation of medicinal plants to augment coffee production - Palmares Alajuela Region. Return to San Jose.   |
| 02 | February | all | Preparation of draft findings and recommendations for round table meeting with key institutions and personnel. Lecture presentation and meetings with Dr. Ocampo and UCR to prioritized list of plants and infrastructure requirements. |
| 03 | February | AM  | Meeting with representatives from CNAA (National Chamber of Agriculture & Agroindustry) to outline Mission objectives and solicit cooperation.  |
|    |          | PM  | Formal presentation to CATIE, ARVI, UCR - CIPRONA senior staff to verify, modify and confirm strategies to be elaborated in project documents.  |
| 04 | February | all | Start Mission Assessment and Technical Project document preparation.  |
| 05 | February | AM  | Meeting with host government agency responsible for technical project implementation - Dr. Mario Segnini - Vicereactory of Research UCR.  |
|    |          | PM  | Continue report(s) preparation  |



06 February	AM	Review meeting with Dr. Mora - UCR and Ms. Malene Hedlund - UNIDO/UNDP
	PM	Continue report(s) preparation
07 February	all	Departure to Vienna
08 February	PM	Late arrival to Vienna
09 February	all	Recovery (rest day)
10-13 February	all	Prepare reports and obtain technical data from UNIDO library
16-17 February	all	Debriefing and review of reports

List of individuals and institutions consulted by Preparatory Mission Team. Key " \* " = participants in Feb. 3 meeting - see below

- 1.\* Ms. Malene Hedlund, Junior Programme Officer, UNIDO, UNDP San Jose, Costa Rica
- 2.\* Gerardo A. Mora Ph.D., Director - CIPRONA (Natural Products Research Center) & Professor of Medicinal Chemistry University of Costa Rica, San Jose
3. Lic. Jose Francisco Ciccio, Professor & Coordinator of the Organic Chemistry Section, University of Costa Rica (see above)
4. Dr. Mario Segnini, Director - Research Management, Vice Director of Research, University of Costa Rica
- 5.\* Lic. Victor Castro, School of Chemistry, University of Costa Rica
- 6.\* Dr. Eduardo Arguedas, Research & Development Manager, Laboratorios Quimicos ARVI, Apdo 200 Centro Colon, C.R.
- 7.\* Ing. Rafeal A. Ocampo, Agronomist & Manager of the Central American Project for the Sustainable Development of Conservation - CATIE (Tropical Agronomy Center for Research & Education), Turrialba, Costa Rica
8. Ms. Gabriela Lobo, Executive Director - CENPRO (Center for Promotion of Exports & Investment), P.O. Box 54118-1000 San Jose, C.R.
9. Ms. Sabiola Murillo, Research Assistant, CENPRO (see above)
10. Ing. Francisco Azofeita, Coordinator - CATIE (Tropical Agronomy Center for Research & Education) Demonstration Project - Atlantic Coast (OLAFO), Talamanca Region
11. Dr. Francisco Ling Nieto, Biologist, ANAI-CATIE, Talamanca Region (see above), Costa Rica
12. Ing. Guido Solano, Agronomist, CATIE (see above)
13. Mr. Juan C. Barrantes, Agronomist, CATIE (see above)
14. Ms. Lorena Flores, Sociologist, CATIE (see above)
15. Mr. David Sanchez, Administrator, CATIE (see above)
16. Mr. Carlos Ramos, Agricultural & Cooperative Advisor - AECI (Spanish Agency for International Cooperation) seconded to European Community project San Jose, Costa Rica

17. Mr. Alfonso Sanabria, National Director, Tortuguero Project (MIRENEM, UICN and EC projects) affiliated with #12
  18. Mr. Hermann S. Heise, Manager - GTZ (German Programme for Economic Development) Apartado 1114-1000, San Jose, C.R.
  19. Ing. Tomas Palma, Chief of Research (Plant Tissue Grafting), Technological Institute of Costa Rica, Santa Clara, C.R.
  20. Mr. Orfran Berrocal, Manager - COOPEIPECA (Producers Cooperative of Ipecacuana), Santa Rosa de Poco, Alajuela, C.R.
  21. Mr. Manual Sibaja, Plant Manager, Carrington Plantacion de sabila (aloe vera), Liberia, Costa Rica
  22. Mr. Filiberto Vega, Manager, Valle Escondido Ornamental Plant Project, San Ramon, C.R.
  23. Ing. Jose Angel Vasquez. General Manager. COOPE INDIA R.L., Apdo. 25, Palmares, Costa Rica (& met with senior staff)
  24. Mr. Luis J. Poveda, Botanist for Aromatic, Medicinal, and Toxic Plants, National University of Costa Rica, Heredia, C.R.
  25. Lic. Alejandro Delgado, Advisor - Special Studies, CNAA (National Chamber of Agriculture & Agroindustry), Apdo. 1671-1000, San Jose, C.R.
  26. Ing. Jose Rafeal Corrales, Technical Department & Economic Studies, CNAA (see above).
- \* Participants, along with the UNIDO Preparatory Mission Team, met on Wednesday February 3 to discuss and modify findings, analysis and preliminary recommendations of the UNIDO Team. As a result, consensus agreement was reached on all subjects including:
- selection criteria for priority plants as candidates for the technical assistance project;
  - the rank ordered list of natural products to be processed by the pilot fabrication plant;
  - technology required for extraction, separation and distillation;
  - expected technological and industrial outputs from the project team (multi-disciplinary);
  - marketing model with national, regional & international channels of distribution for downstream products;
  - project team structure (executive board) to implement the above.

**Cuadro 4. Importaciones mundiales del rubro "Vegetales utilizados en farmacia y otros", para el período 1985-1989. En US dólares.**

PAIS	1985	1986	1987	1988	1989	TOTAL PERIODO	PROMEDIO ANUAL
ALEMANIA	61,921	74,592	76,177	72,265	68,808	353,763.0	70,752.6
ARABIA SAUDITA		18,577	16,253			34,830.0	17,415.0
ARGENTINA	1,743	2,147	1,838	1,811		7,539.0	1,884.8
AUSTRALIA	4,535	4,836	6,643	6,966	7,649	30,629.0	6,125.8
AUSTRIA	4,545	6,864	7,896	7,482	7,147	33,934.0	6,786.8
BANGLADESH	778	415	487			1,680.0	560.0
BARBADOS	235	183	197	201		816.0	204.0
BELGICA	6,735	12,491	12,171	11,187	12,118	54,702.0	10,940.4
BRASIL		2,918	3,199	2,232		8,349.0	2,783.0
CAMERUN		185	211			396.0	198.0
CANADA	6,959	8,479	9,081	11,916	14,130	50,565.0	10,113.0
CHECOSLOVAQUIA	164	1,123	1,980			3,267.0	1,089.0
CHILE			148	162		310.0	155.0
CHINA	36,630	22,390	22,549			81,569.0	27,189.7
COLOMBIA	392	377	290	444		1,503.0	375.8
CYPRUS	53	93	115		46	307.0	76.8
DINAMARCA	2,800	2,961	4,053	3,346	4,046	17,206.0	3,441.2
EGIPTO	3,744	7,654	6,715	11,977		30,090.0	7,522.5
ESPAÑA	9,270	12,277	14,132	16,656	17,897	70,232.0	14,046.4
FILIPINAS	188	212		236		636.0	212.0
FINLANDIA	808	986	1,127	1,307	1,310	5,538.0	1,107.6
FRANCIA	38,448	45,197	49,955	48,590	52,950	235,140.0	47,028.0
GRECIA	741	1,200	1,427	1,382	2,064	6,814.0	1,362.8
GUADALUPE	54	56	111	185	238	644.0	128.8
HOLANDA	6,624	7,580	6,453	5,695	5,861	32,213.0	6,442.6
HONDURAS		203	503			706.0	353.0
HONG KONG	197,698	248,988	304,689	332,802	319,289	1,403,436.0	280,687.2
ICELAND	24	83	255	102	66	500.0	100.0
INDIA	3,628	3,358	2,977			9,963.0	3,321.0
INDONESIA	666	825	1,028	712	990	4,221.0	844.2
IRLANDA	3,157	6,100	9,120	7,648	5,946	31,971.0	6,394.2
ISRAEL	1,552	3,595	3,642	2,946	3,136	14,871.0	2,974.2
ITALIA	20,268	20,190	24,673	28,503	27,552	121,186.0	24,237.2
JAMAICA	77	164	90	99		430.0	107.5
JAPON	75,257	81,863	115,172	139,709	157,646	569,647.0	113,929.4
JORDANIA	437	466	428	416		1,744.0	436.0
KENIA	166	157	130			453.0	151.0
KOREA	9,295	11,698	13,385	21,519	28,097	83,994.0	16,798.8
MACAO	193		219	145		557.0	185.7
MALASIA	30,366	28,512	30,785	29,841		119,474.0	29,868.5
MARRUECOS	795	649	1,186	725	988	4,343.0	868.6
MARTINICA	104	140	247	300	217	1,008.0	201.6
MEXICO					5,474	5,474.0	5,474.0

continúa ...

Cuadro 4. Importaciones mundiales del rubro "Vegetales utilizados en farmacias y otros", para el período 1985-1989. En US dólares.

... continuación

PAIS	1985	1986	1987	1988	1989	TOTAL PERIODO	PROMED ANUAL
NEPAL	67	120				187.0	93.5
NORWAY	540	639	893	1,066	1,763	4,901.0	980.2
NUEVA ZELANDA	415	658	634	654	906	3,267.0	653.4
PAKISTAN	10,664	9,652	10,628	12,500		43,444.0	10,861.0
PERU	109	208	172	161		650.0	162.5
POLONIA	1,078	1,013	647			2,738.0	912.7
PORTUGAL	479	760	1,086	1,173	991	4,489.0	897.8
PUERTO RICO	70,242	58,711	72,809	71,674	77,544	350,980.0	70,196.0
REINO UNIDO	11,887	11,463	14,137	20,087	17,307	74,881.0	14,976.2
REUNION	228	218	200	248	311	1,205.0	241.0
SINGAPUR	47,751	57,321	74,531	86,646	71,384	337,633.0	67,526.6
SRI LANKA	516	540	424			1,480.0	493.3
SUECIA	2,643	2,867	3,195	2,925	3,828	15,458.0	3,091.6
SUIZA	9,384	13,228	14,537	14,376	12,331	63,856.0	12,771.2
SYRN ARAB. RP	432	238				670.0	335.0
TAILANDIA	4,574	4,707	4,258			13,539.0	4,513.0
TUNEZ	255	125	332	441	380	1,533.0	306.6
TURQUIA	175	106	131	116		528.0	132.0
URUGUAY	91	146	255	279		771.0	192.8
VENEZUELA	1,617	698	630	1,098		3,173.0	868.3
YUGOSLAVIA				1,152	929	2,081.0	1,040.5
<b>TOTAL</b>	<b>693,863</b>	<b>804,389</b>	<b>951,332</b>	<b>984,233</b>	<b>931,309</b>	<b>4,365,126.0</b>	<b>873,025.2</b>
TASA GENERAL		15.93	18.27	3.46	(5.38)	32.3	8.1
TASA HONG KONG		25.94	22.37	9.23	(4.07)	53.5	13.4
TASA JAPON		8.78	40.69	21.30	12.84	83.6	20.9
TASA ALEMANIA		20.46	2.12	(5.14)	(4.78)	12.7	3.2
TASA PTO. RICO		(16.42)	24.01	(1.56)	8.19	14.2	3.6
TASA SINGAPUR		20.04	30.02	16.25	(17.61)	48.7	12.2
TASA FRANCIA		17.55	10.53	(2.73)	8.97	34.3	8.6

Fuente: CINDE, con base en datos de la CCI

## COSTA RICA. EXPORTACIONES DE HIERBAS MEDICINALES Y AROMATICAS.

1989 - 1991

PRODUCTO	DESTINO	1989		1990		1991	
		VOLUMEN	VALOR	VOLUMEN	VALOR	VOLUMEN	VALOR
RAIZ DE IPECA- CUANA	ESTADOS UNIDOS	4.398	242.850	4.702	188.250	1.929	111.223
	MEXICO	152	4.050	251	11.500	191	3.000
	ALEMANIA	36.368	2.019.950	10.052	403.525	23.540	1.070.829
	BELGICA-LUXEM- BURGO	18.021	1.000.000	5.000	245.000	-	-
	FRANCIA	3.213	120.900	2.962	90.200	7.051	162.302
	HOLANDA	502	22.000	2.067	20.500	-	-
	REINO UNIDO	2.516	77.000	5.125	179.000	6.529	207.100
	MALASIA	10.065	594.750	45.163	2.255.200	-	-
	TOTAL		75.229	4.161.500	75.336	3.458.175	39.949
OTRAS PLANTAS Y PARTES DE PLANTAS	ESTADOS UNIDOS	3.650	2.680	768	768	37.762	7.534
	PANAMA	320	5.325	-	-	287	1.395
	REINO UNIDO	1.284	5.459	-	-	629	18.693
	EL SALVADOR	-	-	-	-	73	2.037
	NICARAGUA	-	-	-	-	714	10.250
	BRASIL	-	-	-	-	201	200
	FRANCIA	-	-	-	-	101.284	101.000
	FILIPINAS	-	-	-	-	5.033	1.500
	MALASIA	-	-	-	-	15.225	748.000
	TOTAL		5.254	13.444	768	768	161.308
PRODUCTOS DE PERFUMERIA O DE TOCADOR Y COSMETICOS PREPARADOS. AGUAS DESTI- LADAS AROMA- TICAS Y SOLU- CIONES ACUOSAS DE ACEITES ESENCIALES INCLUSO ME- DICINALES.	CANADA	413.700	58.086	4.331	56.828	345	2.089
	ESTADOS UNIDOS	147.350	1.232.363	95.617	701.625	104.187	1.005.673
	EL SALVADOR	310.136	1.576.665	164.443	678.613	239.330	1.158.243
	GUATEMALA	223.751	1.052.655	141.256	795.047	226.659	1.029.185
	NICARAGUA	63.204	294.892	71.263	355.813	464.996	1.531.680
	PANAMA	256.549	934.078	350.705	1.359.642	302.939	1.225.716
	CUBA	6.438	29.018	231	1.734	168	1.100
	CURAZAO	592	4.042	770	5.162	-	-
	CHINA-TAIWAN	56	238	-	-	-	-
	MEXICO	-	-	495	925	-	-
	HONDURAS	-	-	2.420	3.975	10.359	27.304
	ARUBA	-	-	220	1.057	367	2.142
	PUERTO RICO	-	-	19.653	128.742	36.137	111.601
	GUAYANA	-	-	7.298	12.964	-	-
	CHILE	-	-	2.437	5.953	-	-
	SUECIA	-	-	764	3.790	273	1.955
	REPUBLICA DOMI- NICANA	-	-	-	-	195.333	408.207
	TRINIDAD Y TOBAGO	-	-	-	-	16.743	28.629
	PERU	-	-	-	-	457	5.040
	TOTAL		1.012.017	5.577.506	711.074	4.061.262	1.368.716

## COSTA RICA. EXPORTACIONES DE HIERBAS MEDICINALES Y AROMATICAS.

1989 - 1991

PRODUCTO	DESTINO	1989		1990		1991	
		VOLUMEN	VALOR	VOLUMEN	VALOR	VOLUMEN	VALOR
JABONES MEDICINALES. EXCEPTO JABONES DESINFECTANTES	PANAMA	1.606	15.000	-	-	-	-
OTROS	ESTADOS UNIDOS	14.179	51.587	4.272	24.901	11.128	55.520
	EL SALVADOR	3.717	4.000	7.927	28.102	-	-
	GUATEMALA	3.594	3.050	1.125	2.338	-	-
	HONDURAS	4.808	6.167	670	499	30	258
	NICARAGUA	48.454	66.751	33	125	835	4.004
	PANAMA	4.203	11.468	997	11.945	112	1.531
	PUERTO RICO	75.646	43.798	-	-	-	-
	PAISES BAJOS (HOLANDA)	105	104	-	-	-	-
TOTAL		154.706	186.925	15.014	67.910	12.105	61.313
OTRAS MEZCLAS PARA PERFUMERIA	ESTADOS UNIDOS	-	-	19.476	19.476	-	-
	EL SALVADOR	1.740	6.372	588	12.039	3.736	34.104
	GUATEMALA	544	7.857	666	8.294	564	7.225
	HONDURAS	10.651	19.514	6.863	17.758	1.509	21.451
	NICARAGUA	2.767	95.329	735	5.826	40.258	21.470
	PANAMA	1.969	7.286	221	2.668	1.264	20.906
	ALEMANIA OCC.	845	2.837	7.911	22.605	-	-
	MEXICO	-	-	-	-	45	477
TOTAL		19.516	141.195	36.253	89.666	47.376	105.636
JENGIBRE	CANADA	-	-	6.125	3.775	2.300	1.866
	ESTADOS UNIDOS	345.134	406.715	561.996	473.386	712.138	641.660
	HONDURAS	-	-	96	244	-	-
	PANAMA	512	1.200	288	896	107	291
	PUERTO RICO	-	-	4.350	3.895	41.689	25.546
	ALEMANIA OCC.	125.718	140.756	28.988	27.523	73.931	77.644
	BELGICA	38.602	36.918	10.574	11.622	-	-
	FRANCIA	2.473	2.688	45.011	37.927	17.400	15.604
	ITALIA	6.633	4.886	10.950	7.500	14.180	14.100
	HOLANDA	96.572	144.124	102.504	75.775	325.049	293.162
	INGLATERRA	797.817	915.157	1.168.791	1.214.188	1.092.023	1.024.960
	SUIZA	1.656	1.750	2.123	2.000	-	-
	ESPAÑA	-	-	-	-	18.465	10.517
TOTAL		1.415.511	1,654,098	1,941,936	1,860,731	2,297,282	2,105,352

A. List of Potential Distributors & Contacts (California, USA)  
for Medicinal & Aromatic Plants:

Mr. Amuary Dos Santos  
Product Development Systems  
12242 Mockingbird Place  
Apple Valley, California 93208 USA

tel. (619) 240-6291  
FAX (619) 240-1385

Dos Santos is a leading California importer of Latin American herbal products. He also enjoys extensive contacts in the huge Japanese market.

Ms. Teri Holcomb-Halstead  
President  
Bio-Defense Nutritionals, Inc.  
22807 Barton Rd.  
Grand Terrace, California 92324 USA

tel. (909) 783-7815  
FAX (909) 783-3477

Bio-Defense Nutritionals is a leading distributor of medicinal plants and also maintains an extensive research & development facility. This firm works consults with producers for the development of extraction and distillation facilities.

Greater Los Angeles World Trade Center Association (GLAWTCA)  
1 World Trade Center, Suite 295  
Long Beach, California 90831 USA

Att. Ms. Merry Tuten - President

tel. (310) 495-7070  
FAX (310) 495-7071

GLAWTCA is the leading international trade clearing-house for southern California. This region is the USA's largest market for herbal and medicinal plants. GLAWTCA has brought together buyers and Latin American producers/brokers and can provide assistance for locating these markets throughout the USA and in over 90 countries. GLAWTCA, as all affiliated World Trade Centers, provides on-line data access to buyers and sellers of all commercial trade goods & services including medicinal and aromatic plants. This on-line system - NETWORK - is also directly available to subscribers in most countries. For more information on NETWORK and subscription (modest fees) please contact ~~any WTC listed in the attached list~~ or WTC headquarters in New York City:



Mr. Tom Kearney  
Secretary General  
att. NETWORK  
World Trade Centers Association  
One World Trade Center  
New York, New York 10048 USA

tel. (212) 435-2329  
FAX (212) 435-2810

## B. IMPORTANT TRADING HOUSES IN MAJOR MARKET CENTRES

<u>Name &amp; Full Address.</u>	<u>Telephone No.</u>	<u>Telex No.</u>
1. M/s. John Kellys (London) Ltd., Prescot House, Prescot Street, London E1 8BB (Dealers)	71-48212110 (10 Lines)	884659 & 884650
2. M/s. Furest Day Lawson Ltd., St. Clare House, 30-33 Minorities London EC3N 1LN (U.K.) (Dealers)	01-4880777	887871 & 8952097
3. M/s. R.C. Treatt & Co. Ltd., Northern Way, Bury St. Edmunds, Suffolk, England IP32 6NL. (Dealers)	0284-702500	81583
4. M/s. Albert Vieille, Subreville, B.P. 40, Route De Grasse 06220 Vallauris (France)	637405 & 637430	470875
5. M/s. Agipal, 12, Rue De Puebla, B.P. No.50, 78600 Maisons-Laffitte (France)	(1)39623277	698198
6. M/s. H. Reynaud & Fils, 26570 Montbrun-Les-Bains France.	75280255	345690
7. M/s. Southseas Essential Oils Co. No.36A, Hillview Terrace, Singapore - 2366.	7641070 & 7641071	42049
8. M/s. Flavodor B.V., Industrieweg 78, 5145 PW Waalwijk, Holland (Netherlands) (Dealers)	04160-40405	35435
9. M/s. Adrian S.A., 15, Rue De Cassis, 13008 Marseille B.P. 89/13268 Marseille Cedex 8. (France) (Dealers)	91.79.91.81	410085
10. M/s. Citrus & Allied Essences Ltd. 65, South Tyson Avenue, Floral Park, N.Y.11001 (USA).	212-343-0030 516-354-1200	967736 6852146

- |   |                          |
|---|--------------------------|
| 11.A/s. Firmenich Inc.<br>Case Postale 239,<br>CH-1211 Geneva -8<br>Switzerland                                 | Processors/Compounders   |
| 12.A/s. Felton International Inc.<br>599 Johnson Avenue<br>Brooklyn N Y 11237                                   | Flavour House            |
| 13.Fritzsche Dodge and Olcott Inc.<br>76 Ninth Avenue<br>New York<br>NY 10011                                   | Processors/Manufacturers |
| 14.Givaudan Roure S.A.<br>1214 Verneir<br>Geneve. (Switzerland)   | Processors/Compounders   |
| 15.Haarmann & Reimer GmbH<br>D-3450 Holzwinden<br>West Germany  | Processors/Compounders   |
| 16.A/s. D.W. Hutchinson and Co.<br>700 South Columbus Avenue<br>Mount Vernon<br>NY 10550                        | Dealer                   |
| 17.International Flavours & Fragrances<br>I.F.F. (Nederland) B.V.<br>Liebergerweg, 72-98, Hilversum<br>Holland. | Processors/Compounders   |
| 18.Ivolin Enterprises<br>500 Fifth Avenue<br>Suite 4330, New York<br>NY 10036.                                  | Dealer                   |
| 19.A/s. Kalsec Inc.<br>P.O. Box 511<br>Kalamazoo<br>MI 49005  | Flavour House            |
| 20.A/s. Lautier Aromatiques<br>5 Peri Court<br>Allendale<br>NJ 07401  | Processors/Importers     |
| 21.A/s. Lever Brothers Co.<br>390 Park Avenue<br>New York<br>NY 10022   | End-Users                |
| 22.A/s. Ludwig Mueller Co. Inc.<br>2 Park Avenue<br>New York<br>NY 10016  | Brokers                  |
| 23.A/s. J. Manheimer Inc.<br>47-22 Pearson Place<br>Long Island City<br>NY 11101                                | Dealer                   |

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|--|---|
| 24. <u>M/s.</u> Naarden International USA<br>Inc.<br>43-23 37th Avenue<br>Long Island City<br>NY 11101 | Processors/Compounders  |
| 25. <u>M/s.</u> Norda Inc.<br>140 Route 10<br>East Hanover<br>NY 07936                                 | Processors/Compounders  |
| 26. <u>M/s.</u> Polak's Frutal Works Inc.<br>Middletown<br>NY 10940                                    | Processors/Compounders  |
| 27. <u>M/s.</u> Polarome International Inc.<br>22 Ericsson Place,<br>New York.                         | Dealer  |
| 28. <u>M/s.</u> SCM Organic Chemicals<br>Clark Road<br>PO Box 389<br>Jacksonville<br>FL 32201          | Manufacturers of Synthetic<br>Perfumery and Flavouring<br>materials |
| 29. <u>M/s.</u> E.L. Scott and Co. Inc.<br>1 World Trade Centre<br>Suite 2347<br>NY 10048              | Agents  |
| 30. <u>M/s.</u> George Uhe Co. Inc.<br>76 Ninth Avenue<br>New York<br>NY 10011                         | Broker  |
| 31. <u>M/s.</u> Ungerer and Company<br>4 Bridgewater Lane<br>PO Box U Lincoln Park<br>NJ 07035.        | Processors/Manufacturers  |
| 32. <u>M/s.</u> Union Camp Corporation,<br>PO Box 60369<br>Jacksonville<br>FL 32205                    | Manufacturers of Aromatic<br>Products.                              |
| 33. <u>M/s.</u> Quest International<br>Ashford,<br>Kent TN24 0LT<br>England.                           | Processors/Compounders  |
| 34. <u>M/s.</u> R. Sarant and Co. Ltd.,<br>Priestley Road,<br>Basingstoke<br>Hants RG24 9PU.           | Dealers/Compounders   |
| 35. <u>M/s.</u> A.E. Wells and Co.<br>(Produce) Ltd.,<br>500 Old Kent Road,<br>London SE1 5AH          | Dealers   |

- |  |                             |
|--|-----------------------------|
| 36.M/s. Zimmermann Hobbs Ltd.,<br>Dawson Road, Bletchley<br>Milton Keynes<br>Bucks MK1 1JR | Compounders                 |
| 37.M/s. Benard et Honnorat SA<br>BP 67<br>06332 Grasse.                                    | Processors/Compounders      |
| 38.M/s. Madame Boyer<br>62 Rue Lafayette<br>75009 Paris                                    | Brokers                     |
| 39.M/s. Pierre Chauvet SA<br>83770 Seillans.   | Essence Manufacturers       |
| 40.M/s. Les Fils et Petits-Fils<br>De Maurice Duclos<br>8 Place Vendome<br>75001 Paris     | Brokers                     |
| 41.M/s. Lautier Fils<br>06 Grasse.   | Processors/Compounders      |
| 42.M/s. V. Mane Fils,<br>06620 Bar-Sur-Loup<br>France.                                     | Processors/Compounders      |
| 43.M/s. P. Robertet et Co.,<br>Avenue Sidi-Brahim<br>06333 Grasse.                         | Processors/Compounders      |
| 44.M/s. Schmolter et Bompard<br>Chemin De La Madeleine<br>06331 Grasse                     | Processors/Compounders      |
| 45.M/s. Cornehlis and Bosse<br>Bei Den Mohren 91<br>2000 Hamburg 11. Germany.              | Broker                      |
| 46.M/s. Dragoco GmbH<br>D-3450 Holzminden.<br>Germany.                                     | Processors/Compounders      |
| 47.M/s. Hermann Dullberg<br>Alsterdorfertrasse 19<br>D-2000 Hamburg.                       | Essential Oil Manufacturers |
| 48.M/s. Frey and Lau<br>Behringstrasse 116<br>D-2000 Hamburg 50.                           | Essential Oil Manufacturers |
| 49.M/s. Paul Kaders GmbH<br>Eschelsweg-27,<br>P.O.B 500826, D-2000<br>Hamburg 50.          | Dealers                     |
| 50.M/s. C.Melchers and Co.,<br>48A Steindamm<br>D-2820 Bremen 77.                          | Dealers                     |

- 51.M/€. Worlee-Drogen Dealers  
Bellevue 7-8  
2000 Hamburg 60.
- 52.M/s. Maschmeijer Aromatics Processors/Compounders  
PO Box 4170  
Ornval 81  
1009 AD Amsterdam
- 53.M/s. Mirandolle, Voute and Co BV Dealers/Agents  
Maasstraat 12A-14A,  
3016 DC Rotterdam.
- 54.M/s. Polak's Frutal Works Processors/Compounders  
Nijverheidsweg Zuid 7  
Amersfoort.
- 55.M/s. A. Valenkamp BV Broker  
Prins Hendrikkade 152  
1011 AW Amsterdam.
- 56.M/s. Jules Chiquet SA Dealers  
Dreispietzstrasse 11  
Bau 181  
4142 Basle. (Switzerland)
- 57.M/s. Purescence Zorich Dealers  
Blumlisalpstrasse 3  
8033 Zorich. (Switzerland)
- 58.M/s. Bush Boake Allen Ltd., Processors/Compounders  
Blackhorse Lane,  
London E17 5QP.
- 59.M/s. Dragoco (GB) Ltd., Processors/Dealers  
Lady Lane Industrial Estate,  
Hadleigh, Ipswich,  
Suffolk IP7 6AX (U.K.)
- 60.M/s. T.M. Duche and Sons (UK) Ltd Dealers/Merchants  
Berisford House  
50 Mark Lane  
London EC3R 7QS.
- 61.M/s. S. Figgis and Co., Ltd., Brokers  
53, Aldgate High Street,  
London EC3N 1LU.
- 62.M/s. Lionel Hitchen (Essential Processors/Compounders  
Oils) Ltd.,  
50 Albert Road North  
Reigate, Surrey. (U.K.)
- 63.M/s. International Flavours and Processors/Compounders  
Fragrances (GB) Ltd.,  
Crown Road, Southbury Road,  
Enfield,  
Middlesex EN1 1TX. (U.K.)
- 64.M/s. Pauls and Whites International Manufacturers of  
Albert Road North Flavoursing Essences  
Reigate  
Surrey. (U.K.)

Cuadro 32. Costa Rica. Precios FOB de ipecacuana por mes y país para el año 1991.  
En kilogramos y US dólares.

PAIS	MESES												X
	ENE.	FEB.	MAR.	ABR.	MAY.	JUN.	JUL.	AGO.	SET.	OCT.	NOV.	DIC.	
ALEMANIA	58.66	--	55.91	--	49.92	--	35.73	37.94	--	36.46	31.95	31.95	42.32
FRANCIA	31.47	--	--	--	34.26	--	29.18	8.58	28.69	--	--	--	26.44
MALASIA	--	--	--	49.13	--	--	--	--	--	--	--	--	49.13
MEXICO	--	--	--	--	29.70	--	--	--	--	--	--	--	29.70
R.UNIDO	--	--	--	--	33.51	--	--	35.71	29.54	--	--	--	32.92
USA	--	--	--	--	--	--	38.26	--	--	--	79.05	--	58.66
PROMEDIO	45.07	0.00	55.91	49.13	36.85	0.00	34.39	27.41	29.11	36.46	55.50	31.95	19.93
TASA PROMEDIO			24.05	(12.12)	(25.00)		(6.67)	(20.30)	6.21	25.24	52.23	(42.43)	1.21

Fuente: Elaboración personal con base a datos de Estadística y Censos.

**I. CURRENT MARKET PRICES (for 5 products indicated in Costa Rica Mission Report):**

Ipecac (liquid extract)	\$US	240.00 per gallon
Ipecac (raw root)	\$US	23.50 per kilo
Quassia Amara	\$US	20.00/pound (16 ounces) in heavy paste
	\$US	90.00 per ounce in a medicinal form for FDA testing
Ginger - essential oil (Chinese)	\$US	15.50/pound
Ginger - essential oil (Indian)	\$US	15.00 - 20.00/pound
Ginger - oleoresin (Indian)	\$US	27.00/kilo - C&F
Capsicum Annum - oleoresin		
6% papsaicin	\$US	17.00/kilo - C&F
10% papsaicin	\$US	25.00 - 27.00/kilo C&F
Turmeric (curcuma domestica & C. loga)		
36% curcumum oleoresin	\$US	10.00/kilo C&F
5% "Alleppey" oleoresin	\$US	.70/pound
5.5% Alleppey oleoresin	\$US	.80/pound

Indicative world prices quoted in dollars (wholesale/broker "spot" prices given above).

Prices (composite) were compiled with information supplied by the World Trade Centers Association, International Trade Center (GATT/UNCTAD), Gesellschaft fuer Technische Zusammenarbeit (GTZ), and 22 major world traders in the five products under discussion. **Note: Prices vary depending on "heat" content (e.g. capsicum annum), color content (e.g. turmeric) and if used for special experimental medicinal preparations (e.g. Quassia amara).**

**II. MARKET TRENDS**

**A. Medicinal Plants (medicinals) - Ipecuanha and Quassia amara**

The USA is the world's largest consumer of pharmaceuticals. Medicinals and botanicals imports climbed from \$US 2.32 billion in 1986 to approximately \$US 5.7 billion in 1992

Germany's imports of medical and botanical pharmaceuticals in 1987 was DM 150,500,000 and is projected to be close to DM 320 million in 1992.

Demand studies for medicinal plants are difficult exercises because German and American government authorities do not compile statistics on importation or exportation of plants such as Ipecuanha and Quassia amara (although used as an ingredient in bitters, its principal usage's are as intestinal tonic and insecticide). Jeremy Wells of ITC laments how the USFDA and German Pharmaceutical Association do not have readily available statistics. However contacts made with a limited number of US and European traders of Ipecuanha do provide limited information.

The major Ipecuanha trader in Europe is Paul Muggenburg GmbH

Ipecuanha - World-wide production is approximately 100 tons  
Europe is the major consumer market. Germany, France and U.K. are major importers.  
Majority of production is from Central America and India.



**Leading Buyers include:**

Paul Muggenburg GmbH  
 24 Wandaleweg 24  
 2000 Hamburg 1  
 Germany  
 Tel: (040) 236 0010  
 Contact person: Mr. H. Muggenburg, President

Gumix International Inc.  
 2160 North Central Road  
 Fort Lee, New Jersey 07024-7552  
 Tel: (201) 947-6300  
 Contact: Mr. Sean Katir, President

(See Section III. for other buyers of raw ipecuanha and emetin.)

Major importers for Quassia amara are George Uhe Co. (New Jersey, USA) and E.L. Scott (New Jersey). The food trade in Quassia amara has become more limited, according to several sources, but medically there are extensive tests being conducted by FDA and prices are rising.

**B. Food Oleoresins & Essential Oils**

Demand for ginger essential oil and oleoresins, capsicum and curcuma oleoresins are very cyclical. In 1992 and early 1993 demand is lower (than in past years) for ginger oleoresin and prices for this oleoresin is falling. Producers in India are undercutting each other to maintain their market shares.

However, raw demand for all products in question, over the last ten years is rising, on average of 4% to 9% in major markets - importing countries such as Germany, France, Japan, U.S.A., Canada, Netherlands, U.K., and Australia.

Specifically, market demand for the products in question is driven by usage. When a plant product has a dual food/medicinal usage (as most of above do) then two different markets "pull" the market.

For instance, pharmaceutical extracts (e.g. emetin) are mostly processed and consumed by developed countries (and therefore limited) while the market for plant products in food seasonings and coloring is unlimited.

Major importing countries for 5 natural products (extracts, oleoresins, and essential oils):

Ipecac (liquid & root ):	Germany, France, U.K. USA
Quassia amara (extract):	USA, France, U.K.
Ginger essential oil:	USA, U.K., Netherlands, France, Mexico,
Ginger oleoresins:	USA, Canada, France
Capsicum annum oleoresin:	USA, Mexico, Germany, Netherlands
Curcuma longa oleoresin:	USA, Canada, U.K., Netherlands

C: Available U.S. Import Statistics for Natural Products:

IMPORTS (USA) Customs (\$000,s)	1992	1991	1990	1989
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1. Prepared oleoresins	8976*	11,687	9792	8328
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Principal source of imports: 1. India (40% - 60% depending on year), 2. Netherlands (approx. 18%), 3. Canada 8% - 14%), followed by Spain France, Brazil etc. None from Costa Rica.

2. Resinoids, nesoi 2186	1789*	3258	2867	
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Principal source of imports: 1. France (47% - 60%), 2. Netherlands (approx. 15%), 3. Brazil (approx. 6%) followed by Germany, Honduras, Morocco etc. None from Costa Rica.

3. Essential oils (terpenes or not) 6532*	4425	1940	1646	
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Principal sources of imports: 1. Brazil (12% - 74%), 2. Germany 3. France, followed by Japan, U.K., Mexico etc.

4. Paprika	17,310*	18,735	19,013	14,468
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Principal sources of imports: 1. Spain, 2. Morocco, 3. Ethiopia followed by India, Israel, Germany etc.

5. Paprika (capsicum) dried, crushed or ground	5346*	8713	7359	7494
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Principal sources of imports: 1. Spain, 2. Morocco, 3. Hungary followed by Israeli, Chile and Mexico

6. Turmeric (curcuma)	3846	2064	1375	1807
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Principal sources of imports: 1. India, 2. Thailand, 3. China followed by Indonesia, El Salvador, Fiji etc.

Costa Rica is a very minor source

7. Curry	1410	1339	1280	1443
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Principal sources of imports: 1. Japan, 2. India, 3. U.K. followed by Malaysia, Thailand, Pakistan etc.

**Market Trends Summary:**

The world market for natural products continues to increase each year but is poorly documented concerning individual plant and derivative categories. Often botanical imports are listed as agglomerations in official trade statistics (from both producer and importing country). Moreover the component plants comprising "botanical imports or exports" often change from year to year depending on changing pharmaceutical needs.

**III. LIST OF POTENTIAL BUYERS FOR 5 SELECTED PRODUCTS****IMPORTERS, WHOLESALERS, DISTRIBUTORS OF:**

- A. Emetin
- B. Ipecuanha Root
- C. Quassia Amara
- D. Essential Oil
- E. Turmeric and Capsicum
- F. Ginger and other Spices

## C. List of Potential Buyers for Emetine

COMPANIA	PAIS	DIRECCION
BEECHAN LABORATORIES	U.S.A	501 fifth St. Bristol, TN 37620
MAY AND BAKER PHARMACEUTICALS RHONE POULANG, LTD.	U.K.	Rainham Rd South Dagenham, Essex RM 10 7X5
MEDO PHARMACEUTICALS LTD.		East St, Chesam, Bucks HP5 1DG
NEOLAB INC.	CANADA	5476 Upper Lachine Rd, Montreal, Quebec H4A 2A4
H.N. NORTON AND CO. LTD.	U.K.	Patman House, George Lane South Woodford, London E18 2LY
PISLWORTH MANUFACTURING CO LTD.	U.K.	252 Nunchurch Rd, Bacup, Lancs OL13 0UE
UNIMED PHARMACEUTICALS LTD.	U.K.	24 Steynton Ave, Bexley, Kent DA5 3HP.
WARNER-LAMBERT HEALTH CARE	U.K.	Mitchell House, Southampton Rd Eastleigh, Hants SO5 5RY
ROXANE LABORATORIES INC.	U.S.A	P.O. Box 16532, Columbus, OH 43216

D. POTENTIAL BUYERS OF IPECACUANHA ROOTS

Cuadr

COMPANIA	PAIS	DIRECCION	TELEFONO-FAX
MEER CORPORATION	U.S.A.	9500 Railroad Avenue, North Bergen, N.J. 07047 P.O. Box 9006	(201) 8619267
J.F. CHEMICAL INC.	U.S.A.	238 1/2 East 83 Street, New York, N.Y. 10028	(212) 7943687 (212) 7943688
MORGAN CHEMICALS INC.	U.S.A.	5500 Main Street Williamsville N.Y. 14221	(716) 4000 (716) 4074
CHEMISALES INC.	U.S.A.	10727 180th Street, Jamaica, N.Y. 11433	(718) 6580400 (718) 5265798
JHON KELLYS (LONDON) LIMITED	U.K.	32 Prescott Street, London E1 8BB, Inglaterra	N.D.
SAS PHARMACEUTICALS LTD	U.K.	Sas Group Wycombe End, Beaconsfields, Bucks HP9 1LZ	04946-78181
LETAP PHARMACEUTICALS LTD.	U.K.	861 Coronation Road, London NW10.	01961-6868
GALLEON CONSULTANS LTD	U.K.	Western House, Victoria Street, Douglas, Isle of man	0624-23303/4
WILLIAM RANSOM & SON PLC	U.K.	104 Bancroft, Hitchin, Hertfordshire SG5 1LY	0462-37615
TEODOR ASMUS	GERMANY	Katherinentraße 30, 200 Hamburg 11, Hamburgo	N.D.
DUVENSTEDT PHARMA GmbH	"	Spargelkoppel 7, D-200 Hamburg Nordstedt	N.D.
WOLTER BOLKE	"	Deichstr, 29, 2000 Hamburg 11	N.D.
INTERDROGAS INTERNACIONALE	"	Nattermannallee, 5000 Köln 30	N.D.
CHEMISCHE FABRIK	"	Gebhardstr. 5, 8510 Führt	N.D.
HERMES FABRIK PHARM	"	Geor-Kalbstr. 4-8, 8023 Grosshesselohe München	N.D.
WILHELM KRAMER	"	Rothleinerstr. 3, 8721 Schwebheim	N.D.
PAUL MUGGENBURG	"	Wandalenweg 24, 2000 Hamburg 1.	N.D.
CHEMISCHE FABRIK	"	Reinsholz Oerschbachstr. 10, 4000 Düsseldorf	N.D.
CORNEHLS & BOSSE	"	P.O. Box 630 646, 2000 Hamburg 63	N.D.
ERNST H. SINGELMANN	"	Hoplensack 20, 2 Hamburg 11	N.D.
	"	P.O. Box 450740, 500 Köln 41	
OTTO ALDAG	"	Curslackter Neuer Deich 66 P.O. Box 800120, 2050 Hamburg 80	72567-0
PAUL MUEGGENBURG GmbH & CO.	"	Wandalenweg 24, 2000 Hamburg 80	72567-0

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PAIS/COMPANIA	PAIS	DIRECCION	TELEFONO-FAX
TRAMAR S.N.T.C.	FRANCIA	118 Rue Marceau. E-76600 Le Havre, Francia	3525-1218
ENTRAITS VEGETAUX & DERIVES "E.V.D."	FRANCIA	Zone industrielle La Palum Gardanne F-13120	4258-3762
SISTEL S.P.R.L.	BELGIUM	Sur Miemont, 14 B-4671 Saive, Belgium	041-622199
ATLANTIS LABORATORIES CORP. LTD.	TAILAND	2038 Sukhumvit Road. Bangchak Bangkok 25	N.D.
LABORATORIOS MIXIN S.A.	MEJICO	Calle Jardín Sur N° 6, Apartado N° 3, Méjico	5765800
CENTRAL DE CERVEJAS, E.P.	PORTUGAL	Apartado 1318. 1009 Lisboa	5765800
FERNANDEZ CRUZ & SILVA	PORTUGAL	A Antonio Cândido N° 83.	486699

Fuente : PROEXPO, 1982; JETRO, 1983; UNCTAD/GATT, 1982; CHEMICAL,  
MARKETING REPORTER, 1991

**IMPORTERS / WHOLESALERS / DISTRIBUTORS OF QUASSIA AMARA**

Paul Mueggenburg GmbH  
Wandalenweg 24  
2000 Hamburg i

Tel: +49-40-2360010

Contact: Mr. H. Mueggenburg, President

E. H. Worlee and Co.  
Bellevue 7  
2000 Hamburg 60

Tel: +49-40-271340

Contact: Mr. Braake

Boehringer Ingelheim KG  
Chemicals Division  
6507 Ingelheim/Rhein

Tel: +49-6132-772633

Contact: Mr. Hans Elmar Bisle

Gumix International Inc.  
2160 North Central Road  
Fort Lee, New Jersey 07024-7552

Tel: (201) 947-6300

Contact: Mr. Sean Katir, President

Traditional Medicines Inc.  
4515 Ross Road  
Sebastopol, California 95472

Tel: (707) 823-8911

Contact: Ms. Lydia Saderly, President

E.L. Scott & Company, Inc.  
70 Floral Avenue  
Murray Hill, New Jersey 07974-1511

Tel: (908) 464-5800

George Uhe Co., Inc.  
12 Route 17 North  
P.O. Box 970  
Paramus, New Jersey 07653-0970

Tel: (201) 843-4000

**Wholesaling/distributing/importing/retailing essential oils**

Mr. Ray Merriam

President

Career for the 90's Inc.

83 Oakwood Drive

Truro, NS B2N 5A9

Canada

PHONE: 902/893-7652

YEAR ESTABLISHED: 1989

NO. OF EMPLOYEES: 2

RELATIVE SIZE: SMALL

INFORMATION DATE: 03/13/92

FAX: 902/895-9508

Mr. Bin Goguen

President

Entreprises Bertin N. Goguen Ltee

P.O. Box 519

Bouctouche, NB E0A 1G0

Canada

PHONE: 506/743-6047

YEAR ESTABLISHED: 1986

NO. OF EMPLOYEES: 16

RELATIVE SIZE: SMALL

INFORMATION DATE: 03/13/92

Mr. Basil Christopoulos

Imports-Exports Anastase-Basile

3340 Rue Belair

Longueuil, PQ J4M 2E8

Canada

< OTHER COMPANY INFORMATION >

PHONE: 514) 468-1296

YEAR ESTABLISHED: 1985

NO. OF EMPLOYEES: 1

RELATIVE SIZE: SMALL

INFORMATION DATE: 03/13/92

TELEX: 055-62317

Mr. Don Williams

Director of New Business Dev.

William M. Dunne & Associates Ltd.

10 Director Court, Suite 3000

Woodbridge, ON L4L 3Z5

Canada

PHONE: (416) 856-5240

YEAR ESTABLISHED: 1964

NO. OF EMPLOYEES: 90

GLAWTCA



RELATIVE SIZE: SMALL  
INFORMATION DATE: 04/25/91  
TELEX: (416) 856-5241 (FAX)

Mr. Pierre Caillau  
President Directeur General  
Soules et Cie. S.A.  
Tour Vendome  
204, Rond Point du Pont de Sevres  
France  
PHONE: 33/1/46-08-81-80  
NO. OF EMPLOYEES: 51  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 09/26/91  
TELEX: 203382F  
FAX: 33/1/48-08-81-57

Mr. Michel Deroy  
President  
Docks de France S.A.  
Avenue Charles Bedaux  
Tours, X 37018  
France  
PHONE: 33/47-77-77-77  
YEAR ESTABLISHED: 1904  
NO. OF EMPLOYEES: 2344  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 05/21/92  
TELEX: 750809F  
FAX: 33/47-39-34-52

Mr. Toppenberg  
President  
Xylochimie S.A.  
7, Boulevard de Courbevoie  
Neuilly Sur Seine, X 92200  
France  
PHONE: 33/1/47-15-83-00  
YEAR ESTABLISHED: 1950  
NO. OF EMPLOYEES: 180  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 04/10/92  
TELEX: 630915F  
FAX: 33/1/47-15-00-00

Mr. Olivier Jacqueau  
Directeur General  
BCB S.A.R.L.  
2, Place de l'eglise  
Ermenonville, X 60950

GLAWTCA

**France**

PHONE: 011/33/44-54-02-72  
 YEAR ESTABLISHED: 1977  
 NO. OF EMPLOYEES: 6  
 RELATIVE SIZE: SMALL  
 INFORMATION DATE: 09/16/92  
 TELEX: 145110  
 FAX: 011/33/44-54-00--12

**Sumitomo Corporation**

2-2 Hitotsubashi 1-chome  
 Tokyo, J 100  
 Japan  
 PHONE: 81/3/3217-5000  
 YEAR ESTABLISHED: 1919  
 NO. OF EMPLOYEES: 8630  
 RELATIVE SIZE: UNKNOWN  
 INFORMATION DATE: 06/17/91  
 TELEX: 22202 \*SUMIT X J222; (FAX) 81/3/3217-636

**Marubeni Corporation**

1-4-2, Otemachi  
 Tokyo, J 100-88  
 Japan  
 PHONE: 81/3/3282-2111  
 YEAR ESTABLISHED: 1858  
 NO. OF EMPLOYEES: 9937  
 RELATIVE SIZE: UNKNOWN  
 INFORMATION DATE: 01/14/92  
 TELEX: J22326 : (FAX) 81/3/3282-717

**Wholesaling/importing/distributing/retailing turmeric and capsicum****Mr. David Wall**

President

Dee's Catering

P.O. Box 11073

Windsor Jen.. NS B0N 2V0

Canada

PHONE: 902/860-0303

YEAR ESTABLISHED: 1987

NO. OF EMPLOYEES: 4

RELATIVE SIZE: SMALL

INFORMATION DATE: 03/13/92

**Mr. Elmer King**

President

Trebley Brokerage Limited

67 Wright Avenue

GLAWTCA

Dartmouth, NS B3B 1H2  
Canada  
PHONE: 902/468-2007  
YEAR ESTABLISHED: 1953  
NO. OF EMPLOYEES: 28  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 03/13/92  
FAX: 902/468-1053

Mr. Leo Christensen  
Managing Director  
Carl Lange & Co. Ltd.  
Nordholmen 2  
Hvidovre, - 2650  
Denmark  
PHONE: 36 77 20 02  
YEAR ESTABLISHED: 1898  
NO. OF EMPLOYEES: 46  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 08/23/91  
TELEX: 19572  
FAX: 36 77 06 85

Mr. Max Vinther  
Managing Director  
Trianon Bakery A S  
Roskildevej 5  
Albertslund, - 2620  
Denmark  
< OTHER COMPANY INFORMATION >  
PHONE: 42 96 65 55  
YEAR ESTABLISHED: 1941  
NO. OF EMPLOYEES: 100  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 08/23/91

Mr. E.P. Hulsman  
Manager  
Brusse & Sippel  
P.O. Box 6050  
Haarlem, N A 2001 HB  
Netherlands  
PHONE: 31/23/319159  
YEAR ESTABLISHED: 1920  
NO. OF EMPLOYEES: 4  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 08/18/92  
TELEX: 41155  
FAX: 31/23/310179

GLAWTCA

Mr. Jean Claude Plassart  
President Directeur General  
Comptoirs Moderne S.A.  
1 Place du Cure Maunoy  
Le Mans, X 72044  
France  
PHONE: 33/43-86-28-20  
YEAR ESTABLISHED: 1928  
NO. OF EMPLOYEES: 12600  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 05/11/92  
TELEX: 723-671F  
FAX: 33/43-72-32-75

Mr. Assad Dagher Hayeck  
President  
Soeximex S.A. (Societe  
31-33 rue pleyel  
Saint-Denis, X 93200  
France  
< OTHER COMPANY INFORMATION >  
PHONE: 011/33/1/42-42-96-57  
YEAR ESTABLISHED: 1963  
NO. OF EMPLOYEES: 33  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 10/04/92  
TELEX: 234175 OR 234024F SOEXIM  
FAX: 011/33/1/42-43-89-00

Mr. Rigis Pelen  
President  
Distriborg S.A.  
217 CHEMIN GRAND REVOYET  
Saint Genis Laval, X 69230  
France  
PHONE: 33/72.39.97.97  
YEAR ESTABLISHED: 1970  
NO. OF EMPLOYEES: 151  
RELATIVE SIZE: SMALL  
INFORMATION DATE: 06/17/92  
TELEX: 300-268F  
FAX: 33/72.39.94.56

Mr. Giovanni Rana  
Titolare  
Pastificio Rana SpA  
Via Pacinotti 25  
San Giovanni Lupatoto, VR 37057  
Italy  
PHONE: 39/45/545588

GLAWTCA

YEAR ESTABLISHED: N/A  
RELATIVE SIZE: UNKNOWN  
INFORMATION DATE: 01/16/92  
FAX: 39/45/547317

Wholesaling/distributing/importing/retailing ginger and other spices

Mr. Oscar Calle Sanchez  
Gerente de Produccion  
Fabrica de Especies y Productos El  
Apartado Aereo 26905  
Bogota, CUNDI -  
Colombia  
PHONE: 57/1/204-5621/238-3616  
YEAR ESTABLISHED: 1941  
NO. OF EMPLOYEES: 250  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 12/18/91  
TELEX: 45275

Mr. Jose Kusman  
Gerente  
Productos Yupi S.A.  
Apartado Aereo 4439  
Cali, VALLE -  
Colombia  
PHONE: 57/23/644330  
YEAR ESTABLISHED: 1983  
NO. OF EMPLOYEES: 90  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 06/06/91  
TELEX: 55431  
FAX: 57/23/647399

Mr. Leo Christensen  
Managing Director  
Carl Lange & Co. Ltd.  
Nordholmen 2  
Hvidovre, - 2650  
Denmark  
PHONE: 36 77 20 02  
YEAR ESTABLISHED: 1898  
NO. OF EMPLOYEES: 46  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 08/23/91  
TELEX: 19572  
FAX: 36 77 06 85

Mr. J. de Zwart  
Managing Director

GLAWTCA

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Bleuze N.V.  
Golden Hope. 35  
Drogenbos, - 1620  
Belgium  
PHONE: 32/2/331-15-00  
YEAR ESTABLISHED: 1960  
NO. OF EMPLOYEES: 29  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 09/09/92  
TELEX: 25233  
FAX: 466-00-37

Mr. W. Verbaenen  
General Manager  
Swift & Co. N.V.  
Frankrijklei, 8, Box 7  
Antwerp, 2000  
Belgium  
PHONE: 32/3/231-28-24  
YEAR ESTABLISHED: 1927  
NO. OF EMPLOYEES: 5  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 11/06/90  
TELEX: 32406  
FAX: 232-98-40

Mr. Ivan Merckx  
General Manager  
Borden Belgium  
Hogerheistraat, 130  
Ramsdonk, - 1880  
Belgium  
PHONE: 32/15/71-16-38  
YEAR ESTABLISHED: 1981  
NO. OF EMPLOYEES: 40  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 08/29/91  
TELEX: 63050  
FAX: 71-35-95

Mr. Mr. Verol  
President  
S.O.P.A.D. SA - Nestle  
17-19 Quai du President Doumer  
Courbevoie Cedex, X 92411  
France  
PHONE: 33/19-04-21-00  
YEAR ESTABLISHED: 1933  
NO. OF EMPLOYEES: 6000  
RELATIVE SIZE: LARGE

GLAWTCA

INFORMATION DATE: 06/11/92  
TELEX: 120337F ; FAX: 33/1/49-04-29

Mr. Stanislaw Szymanski  
President  
SON-POL Company Ltd.  
ul. Kwistowa 36  
Piotrkow Trybunalski, PT 97-300  
Poland  
PHONE: 48/841/47-22-69  
YEAR ESTABLISHED: 1987  
NO. OF EMPLOYEES: 532  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 02/05/91  
TELEX: 884893

Mr. Mariusz Walter  
General Manager  
ITI Przedsiębiorstwo Zagraniczne w  
ul. Wernyhory 14 m. 2  
Warsaw, WA 02-727  
Poland  
PHONE: 48/22/43-34-88  
YEAR ESTABLISHED: 1984  
NO. OF EMPLOYEES: 460  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 07/16/91  
TELEX: 816943  
FAX: 48/22/43-45-32

Mr. Antonio Ramirez  
Director  
Aperitivos Medina, S.A.  
Apartado de Correos 17  
Madrid, ES 28080  
Spain  
PHONE: 34/1/616-0193  
YEAR ESTABLISHED: 1963  
NO. OF EMPLOYEES: 81  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 01/23/92  
FAX: 34/1/616-2395

Mr. Salman Al Naimi  
Chairman  
Al Naimi Trading Est.  
P.O. Box 2286  
Al Khobar, EP 31952  
Saudi Arabia  
PHONE: 966/3/894-1732, 894-9055

GLAWICA

YEAR ESTABLISHED: 1972  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 04/12/92  
TELEX: NA  
FAX: 966/3/894-5436

Mr. Mohammad Jaroudi  
General Manager  
Saleh & Abdulaziz Abahsain Co.  
P.O. Box 40  
Al-Khobar, 31952  
Saudi Arabia  
PHONE: 966/3/895-0912, 895-1160  
YEAR ESTABLISHED: 1980  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 03/21/90  
TELEX: 871060 BASEN SJ  
FAX: 966/3/898-0573

Mr. Riad Natour\*  
Business Development Manager  
A.A. Turki Corporation  
P.O. Box 718  
Dammam, 31421  
Saudi Arabia  
PHONE: 966/3/833-2339, 833-5588  
YEAR ESTABLISHED: 1967  
NO. OF EMPLOYEES: 2500  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 05/16/92  
TELEX: 801067 TURKI SJ  
FAX: 966/3/833-9881

Mr. Junir Intan  
President Director  
Eresindo Jaya Trading Company, PT  
Agung Podomoro Block KI Kav.38-39  
Jl. Agung Perkasa 8  
Indonesia  
PHONE: 62/21/494799 (8lines)  
YEAR ESTABLISHED: 1971  
NO. OF EMPLOYEES: 195  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 11/05/91  
TELEX: 44701 ERESIN IA  
FAX: 62/21/490580

Mr. DRS. Haji Subadio Partosutrisno  
DIRECTOR  
Wotraco, PT

GLAWTCA



Ji. Hayam Wuruk No. 103-104  
Jakarta,  
Indonesia  
PHONE: 62/21/6295785, 6290065  
YEAR ESTABLISHED: 1968  
NO. OF EMPLOYEES: 160  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 12/16/91  
TELEX: 41147 ; WOTRACO JKT  
FAX: 62/21/6394455

SOCOMIN INT'L FINE FOOD  
PO BOX 295  
Melbourne, VIC 3205  
Australia  
PHONE: (03) 699 5988  
YEAR ESTABLISHED: 1949  
NO. OF EMPLOYEES: 325  
RELATIVE SIZE: MEDIUM  
INFORMATION DATE: 12/02/91  
TELEX: (03) 699 9371

Mr. ANDREW TURNBULL  
CHIEF EXECUTIVE OFFICER  
BURNS, PHILP & CO. LTD.  
G.P.O. BOX 543; SYDNEY NSW 2001  
Sydney, NSW 2000  
Australia  
PHONE: (02) 259 1111  
YEAR ESTABLISHED: 1883  
NO. OF EMPLOYEES: 11800  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 10/25/91  
TELEX: (02) 251 1631 ; BURPHIL SYDNEY

GEORGE WESTON FOODS LIMITED  
P.O. BOX 88  
Sydney, NSW 2065  
Australia  
PHONE: (02) 439-1499  
YEAR ESTABLISHED: 1962  
NO. OF EMPLOYEES: 6970  
RELATIVE SIZE: LARGE  
INFORMATION DATE: 10/31/91  
TELEX: (02) 438 1281 ; WESTFOODS SYDNEY

Mr. V. FUCHS  
GENERAL MANAGER  
KEITH HARRIS & CO. LTD.  
P.O. BOX 147

GLAWTCA

Sydney, NSW 2120  
 Australia  
 PHONE: (02) 484-1341  
 YEAR ESTABLISHED: 1932  
 NO. OF EMPLOYEES: 350  
 RELATIVE SIZE: MEDIUM  
 INFORMATION DATE: 11/05/91  
 TELEX: (02) 481 8145 ; KEHAR SYDNEY

Mr. FREDERICK KAHN  
 DIRECTOR  
 KITCHENS OF SARA LEE AUSTRALIA PTY  
 PO BOX 572  
 Sydney, NSW 2250  
 Australia  
 PHONE: (043) 28-3333  
 YEAR ESTABLISHED: 1969  
 NO. OF EMPLOYEES: 527  
 RELATIVE SIZE: LARGE  
 INFORMATION DATE: 11/05/91  
 TELEX: (043) 28 2744 ; NA

Mr. MR. P. RICHIE  
 MANAGING DIRECTOR  
 MCDONALDS SYSTEMS OF AUSTRALIA PTY  
 21 CENTRAL AVENUE  
 Sydney, NSW 2120  
 Australia  
 PHONE: (02) 875 6666  
 YEAR ESTABLISHED: 1971  
 NO. OF EMPLOYEES: 10000  
 RELATIVE SIZE: LARGE  
 INFORMATION DATE: 11/15/91  
 TELEX: (02) 875 6565 ; NA

Indconsult-Industrial and  
 27, Talaat Harb St., Apt. #25  
 P.O.Box 28  
 Egypt  
 PHONE: 01120/2/3931079, 3927332  
 YEAR ESTABLISHED: 1969  
 NO. OF EMPLOYEES: 30  
 RELATIVE SIZE: LARGE  
 INFORMATION DATE: 10/23/91  
 TELEX: 21721 STINO UN, 937; STININDCON,  
 FAX: 01120/2/3563837

Swan Industries Ltd  
 P.O. Box 708  
 Kisumu, KENYA -

GLAWTCA

**Kenya****PHONE: 254/35/40291,2****YEAR ESTABLISHED: 1979****NO. OF EMPLOYEES: 400****RELATIVE SIZE: LARGE****INFORMATION DATE: 07/16/90****TELEX: 31087 SWAN SWEET ; 43469****Trufoods Ltd.****P.O. Box 41521****Nairobi, KENYA****Kenya****PHONE: 254-2-557700****YEAR ESTABLISHED: 1958****NO. OF EMPLOYEES: 300****RELATIVE SIZE: MEDIUM****INFORMATION DATE: 10/16/90**





- 93 SEE DRG. 01-RT-05
- 114 - CONNECTING PIPE FLANGED ONE END TO MATE WITH ITEM 13 AND FLANGED OTHER END TO MATE WITH ITEM 77, TAPER REDUCER IN BETWEEN, FABRICATED ALL ALUMINIUM 02
- 115 - BOILER, PACKAGED OIL FIRED TYPE CAPACITY 160 KW FOR SPECIFICATION SEE MANUAL 01
- 116 - FUEL OIL DAY SERVICE TANK DIMENSIONS 600x600x500 MAKE FROM 3 THK MS PLATE, INLET & OUTLET CONNECTIONS 25  $\phi$  PLUS 40 NB DRAIN & VENT 50NB AT TOP, MOUNT WITH BASE AT LEVEL 2000 01
- 117 - BLOWDOWN PIT, CONCRETE, SIZE 300x300xDEPTH 600 C/W CI MANHOLE COVER TO SUIT, CONNECT TO DRAIN 01
- 118 - BOILER FEED WATER TANK DIMENSIONS 400x400x400 MAKE FROM 5THK MS PLATE, C/W CONNECTIONS AS LISTED  
1x INLET SIZE 20NB C/W FLOAT VALVE 1x OUTLET SIZE 25NB C/W CHECK VALVE 2x CONDENSATE RETURN SIZE 25NB 1x VENT 50 NB
- THERMALLY INSULATE ALL OVER WITH MINERAL WOOL 50 THK, CLAD WITH ALUMINIUM SHEET GAUGE 24 01
- 119 - SPRAY CIRCULATION PUMP, CAPACITY 24 M<sup>3</sup>/HR AGAINST TOTAL HEAD MWC FLOODED SUCTION CENTRIFUGAL TYPE MONOBLOC DESIGN WITH MECHANICAL SEAL C/W NON OVERLOADING MOTOR-TOTAL HEAD 6.0 MWC 01
- 120 - CONDENSER WATER CIRCULATION PUMP AS ITEM 119 BUT CAPACITY 2.5 M<sup>3</sup>/HR AND TOTAL HEAD MWC 4.0 02
- 21 - FLUE GAS STACK SEE DRG 01-LT-04 200  $\phi$  01
- A1 - STILL LEFT HAND - DRG RT-01-02 01
- A2 - STILL RIGHT HAND - DRG RT-01-02 01
- A3 - CONDENSER - DRG RT-01-04 01

## NOTES

- 01 - DIMENSIONS ARE IN MILLIMETRES
- 02 - DO NOT SCALE
- 03 - THERMALLY INSULATE ALL STEAM & CONDENSATE PIPERUN. & BFW PIPERUN FROM ITEM 118 TO BOILER USING MINERAL WOOL / FIBREGLASS PREFORMED SECTIONS

## TITLE

## DISTILLATION PLANT TYPE RT LAYOUT & SERVICES SYSTEMS

### INTECNO ASSOCIATES

INDUSTRIAL CONSULTANTS,  
38, BEDEGANA ROAD SOUTH,  
PITAKOTTE, SRILANKA.  
TEL-565242

DRAWN - CHR

TRACED - DHAMMIKA

SCALE - SHATED

DATE - 92.08.18

DRG NO -

RT-01-06

BL 41 -	Expendable Equipment	
Item 1	Material as per bill of quantities for UNIDO Polyvalent Pilot Plant Unit as per page 42-52 in UNIDO Document IPCT.143 (spec)	US\$ 50,000
Item 2	material for construction of Distillation unit for essential oils (as per design drawing to be supplied as an addendum)	US\$ 30,000
Item 3	Sundry requirements in measuring instruments	US\$ 10,000
	Subtotal	US\$ 90,000

## Annex 13

bl-42 LIST OF EQUIPMENT

## Item 1 Laboratory facilities

## 1. Complete: High Pressure Gradient, Liquid Chromatography system comprising:

2 Nos.	Liquid pump, LC 10 AS
1 No	Mixing Chamber
1 No	System controller
1 No	Automatic rinsing kit
1 No	Suction filter set
1 No	Column oven capable of accommodating upto six (6) columns, 25 cm. Temperature control: Ambient + 10°C to 80°C.
1 No	UV-VIS Spectrophotometric detector
1 No	Rheodyne sample injector including 20 ml loop.
1 No	Piping kit
1 No	Injector holder
1 No	Adapter for indicator
1 No	Position sensing switch for automatic start of data processor
1 No	Data processor (compatible) 40 mB. HDD, 1 x FDD (3.5")
10 rolls	Thermal chart paper
1 set	Chartpaper for ink jet
2 Nos.	Ink jet heads
1 No	Current loop interface
1 No	Plunger LC-H Assay
1 No	Check Valve spares kit
1 No	Filter F6 Assay
3 Nos.	Gaskets
1 set	Drain gasket
1 No	Suction filter assay
2 each	Syringes, 25 pcl, 50 pcl
1 No	Column, packed 4.6 mm x 25 cm
1 No	Guard column 4 mm x 1 cm.

Total cost                      US\$ 40,500

## N.B. The supplier to include the following:

- (a) Installation by the supplier's agent, at the University of Costa Rica, CIPRONA Laboratories.
- (b) Supply complete all necessary and sufficient spares and accessories for two years trouble-free use.
- (c) Training local technicians in use and maintenance.
- (d) Nominate suitable agent, or propose suitable mechanism to hand trouble-shooting.

## Item 2 - General Laboratory ware and Bench-scale Processing equipment

1 No	Soxhlet-Type extractor, Solid-Liquid complete with ground glass joint condenser and 5 L Flask (capacity of extractor 5L).
1 No	Chemical Reaction Assembly- all glass, capacity 50 L



complete with stirrer, steam jacketted reactor vessel, and all necessary and sufficient scaffolding for bench scale work.

1 No All glass assembly for steam-distillation of essential oils (capacity to distill about 5 Kg of raw material) complete with condenser, receiver flasks, and all necessary attachments.

1 set "Quickfit" or similar ground-glass jointed assortment of chemical reaction equipment. Roundbottom flasks 1 L. 2 L. Bends B24, B19, B34, core. Condensers with B24 socket, and core. Adapters B19/24, B24/19, B24/34, B34/24.

Item 3 - Vehicle, 4 W.D. Landcruiser US\$ 20,000

Senior Counterpart Staff  
As recommended by the UNIDO Preparatory Team

1. Dr. Gerardo A. Mora is Director of CIPRONA - The Natural Products Research Center of the University of Costa Rica (UCR). CIPRONA is Costa Rica's major facility for the study and applied research of natural products, their derivatives and analogies. CIPORONA investigates natural products that are economically exploitable - from the chemical and industrial point of view - and seeks to develop technologies to generate non-traditional agroindustrial products.

Dr. Mora has completed post doctorate research in Natural Products, as a Fellow, at the Institute fuer Organische Chemie at the Technishe Universitaet Berlin (1992). Dr. Mora holds a doctorate in Medicinal Chemistry from the University of Kansas (1977) as well as a M.Sc. in Medicinal Chemistry (1975) from the same institution. His B.Sc. (Chemistry - 1971) was earned at the University of Costa Rica. Dr. Mora, besides his duties with CIPRONA, is Professor of Medicinal Chemistry at the School of Pharmacy at UCR. Dr. Mora has been a quality control consultant with Coca-Cola Interamerican Corp., Costa Rica Breweries and Stein Pharmaceutical Laboratories.

In the opinion of the Mission Dr. Mora would be a most suitable candidate for the position of National Project Director.

2. Lic. Jose Francisco Ciccio is a Full professor and Coordinator of the Organic Chemistry Section - School of Chemistry - University of Costa Rica (UCR). He is a founding member of CIPRONA and a former director of the institution. His honors include Fellow for the Organization of American States (Industrial Technology) and UNDP/UNESCO Fellow at the University of Concepcion (Chile).

Lic. Ciccio has conducted research in Natural Products at the University of La Laguna (Spai) and holds degrees (Lic. & B.Sc.) in Chemistry from the University of Costa Rica.

3. Dr. Jose Alberto Lopez is a Full Professor for Pharmacacognosy & Instrumental Drug Analysis - School of Pharmacy University of Costa Rica. He is the author of numerous articles & publications on medicinal plant alkaloids. His professional associations include membership in the american Society of Pharmacognosy and the Costa Rican Association of Industrial Pharmacists.

Dr. Lopez earned his Ph.D and M.Sc. in Pharmacognosy, respectively, from the University of Pittsburgh and his Licenciado (Pharmacy) from the University of Costa Rica.

4. Mr. Luis Jorge Poveda is the Curator of the National Herbarium, National Museum of Costa Rica and Associate Professor at the School of Environmental Sciences, National University - Heredia, Costa Rica. He also serves as an Adjunct Professor for the Masters Program in Ecological Tourism, Latin American University of Science & Technology - San Jose, Costa Rica. Mr. Poveda is a eminent botanist in the research of anti-cancer activity of Costa Rican flora.

Mr. Poveda earned his B.Sc. in Biology from the University of Costa Rica. He has authored numerous articles and publications on phytochemistry.

## Annex 15

**Backstopping Officer's Technical Comments  
based on the works of Messrs. R.O.B. Wijesekera and M. Klesch  
UC/COS/92/118**

The report contains a comprehensive account of the findings and activities of the experts including very valid recommendations for technical assistance in the industrial use of medicinal and aromatic plants.

The experts have visited the important institutions and assessed the potential for the project that they have proposed. Interviews have been held with the relevant government, and non-governmental institutions, UNDP and the potential entrepreneurs to discuss their findings and conclusions. A draft project document has also been prepared which is to be discussed with donor countries for financing. Extensive market information including prices, trends, statistics and potential buyers for the five products selected have been included in the report.

A draft document has been prepared enlisting the cooperation of three institutions which have the capabilities and competence to manage project activities. Training in marketing management has been included as a substantial input for the project. Backstopping Officer while agreeing with the recommendations of the experts hopes that the government will follow up on a priority basis the recommendations in order to develop industrial utilization of medicinal and aromatic plants in the country. The experts have discharged their duties very efficiently in accordance with the job descriptions.