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21398

DP/ID/SER.A/1746
22 January 1996
ORIGINAL: ENGLISH

11.26p
table
diagrams

**PRODUCT PROCESS DEVELOPMENT CENTRE FOR ESSENTIAL OILS
Kannauj**

DP/IND/133/11-54

INDIA

**Technical report: Training in techniques of creative
fragrance formulation***

Prepared for the Government of India
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

*Based on the work of Ms. Magdalena Chmielewska,
perfume blending consultant*

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* This document has not been edited.

V.96 80248

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ABSTRACT

Project No: DP/IND/89/133/11-54

Title: Product & Process Development Centre for Essential Oils
Kannauj, Uttar Pradesh

Type: Technical Report

Country: INDIA

Objective: Training in Techniques of creative fragrance formulation

Duration of activity: 15 to 31 May 1995

- The report contains the work undertaken by the consultant during the two weeks mission including training in creations of fragrances, practical work on basic compounding of fragrances and lists of fragrance formulations.
- The Perfumery Laboratory was also arranged and furnished under the supervision of the consultant. The work included in the job description was completed (Annex 1).

I. INTRODUCTION

The consultant had discussions with the UNDP officials and the counterparts before starting her work. (Annex 2).

During the short mission (2 weeks including travel) the consultant assisted the counterpart staff to develop perfume formulation for new applications and trained counterpart staff in fragrance formulations using as many indigenous raw-materials as possible.

- The consultant had to work according to the existing situation and needs of PPDC.
- The consultant had discussions with counterpart staff and advised them on fragrance and flavour compounds range which can be prepared to improve existing market products (soaps, detergents, hair preparations, chewing tobacco, colour perfumes etc.), gave basic instruction on fragrance creation, promotion and marketing.

II. ACTIVITIES

Fragrance creative compounding laboratory was arranged and equipped according to up to date standards required for a small research centre. One specialised perfumer is sufficient to work there with an assistant. The assistant shall be selected as a future potential trained perfumer. The present perfumer with his experience and abilities can run the laboratory and create basic fragrances as needed for development of PPDC activities in the fragrance area. There are two basic goals of fragrance creation. First is to create new fragrances for specific uses but without particular user or defined odour. In this case the perfumer is free to use his knowledge and fantasy. Such formulations which were attempted with raw-materials, purchased in PPDC are included in Annex 3.

The second case is when the customer orders a fragrance for a defined product and specifies the type of fragrance required. In this case, very often price limits are also given. Here the perfumer has to work within a specified target. The manner in which a perfume is elaborated in a factory is given in Annex 7.

Perfumes are created by trial and error methods and the time necessary to achieve the requested quality depends on perfumer's experience. Once an acceptable fragrance is formulated, it has to be tested in the customer product (unperfumed sample shall be requested), or in a standard product prepared by the application laboratory. When the finished product goes to a manufacturer of fragrance compounds, there is a great deal

of information that must be supplied to the perfumer before selling the fragrance. (See Annex 4).

Top notes in perfumery

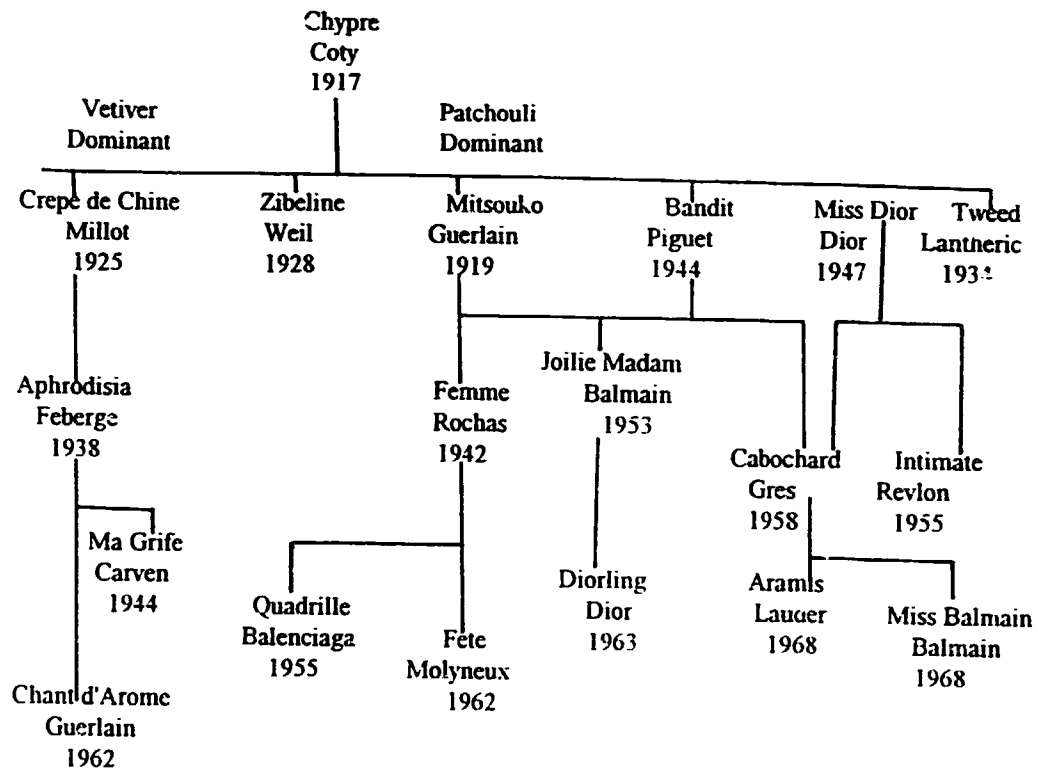
Regarding a bouquet as a balanced odour forming in harmonious progression at all stages of evaporation, the effect first experienced by the olfactory nerves, on opening a bottle of perfume, is the head odour or top note. A list of representative floral compositions is given in Annex 5.

Chypre as a very important fragrance in perfumery.

The island of Cyprus is known to the French as Chypre, and the perfume appears to have originated in this island. There is no clear record as to dates, although it was in the twelfth century. The word chypre was first given to a perfume in the fourteenth century, when oyselets de chypre were composed of labdanum, styrax, and calamus, made into a paste with tragacanth and then moulded in the form of a bird. The traditional materials in perfumery were natural oils and resins extracted from a variety of plants. This was probably true for perfumery mentioned in the Old Testament, and earlier; it is still true today. The finest oils are very costly, and this is the principal reason why most of the perfumers have had the opportunity to experience fragrances from the "Golden Age" of perfumery. In most current perfumes these oils would be replaced by synthetic chemicals.

The development of the new families of perfumes which characterized the present century, such as the green family ("Vent Vert" Balmain 1945) and the aldehydic floral family starting with "Chanel No 5" (1921), required the invention of new synthetic odorants. This example of classical chypre formulations help to understand the evolution of a perfume family. The classical chypre was invented by Francois Coty in 1917. The mood appeal of this perfume, originally based on the types of natural oils shown in the formula, could not easily be extended in a new direction without the help of the perfumery chemist.

Some classical chypre perfumes



An important advance for chypre perfume was the incorporation of the synthetic peach - smelling gamma-undecalactone. This was a milestone in technical perfumery; it was one of the first powerful synthetic odorants to be blended with natural oils. This lactone requires a skilful, empirical blending into the oils lest it "ride high" and so dominate the odour complex that the intended subtle, gentle effect is ruined. The resulting perfume, Guerlain's Mitsouko, created in 1919, is a masterpiece among classical perfumes. It was the first member of a subdivision of the chypre family - the fruity chypres. Mitsouko and the other members of this family have a distinct appeal. This perfume was interesting in terms of the psychology of perfumery.

Chypre perfumes have always found great favour among women and men. Characteristic of the Chypre odour are bergamot, oakmoss, civet, linalyl acetate, amyl salicylate, rose, neroli, vetiver, sandalwood, labdanum and the little rustic or herbal notes. Many Chypre variants have been introduced, each with its slightly different note or emphasis which distinguishes it from the other members of its class. During the past few years aldehydic chypres have made headway. Examples of chypres are given in Annex 6.

It is also important, that the Fragrance Laboratory monitors all new raw-materials available in the local and international markets as it is in most cases true that really new and valuable fragrance compositions are created with use of new ingredients. These can also be produced by the PPDC from certain fractions of essential oils, mixtures of isolates and chemicals etc. These products are called Bases on Hearts and are the most valuable property of the company which makes its fragrance compounds very difficult to imitate.

III. CONCLUSIONS AND RECOMMENDATIONS

1. Fragrance creative laboratory is fully organised to start initial work.
2. There is limited experience in PPDC on creation and marketing of fragrances. Basic information on integrated and complete procedures was given by the Consultant. It shall be adapted to local conditions and market. Close links shall be established between PPDC and the local industry.
3. Further training of the specialised perfumer and his group is necessary in the near future.
4. Training and study tour shall be organised for PPDC management in the area of marketing and promotion of fragrances and flavour compounds.
5. The marketing group shall also observe market products and analyze possibilities of replacement of competitive compounds with their own.
6. Collection of perfumed products available on the market shall be made available to the perfumery and application laboratories.
7. Formulae of fragrance compounds shall be kept strictly confidential as the most valuable treasures of the company.
8. A computer shall be purchased for files on raw materials, formulae, customers etc.
9. A production unit for small scale fragrance blending should be designed and built.



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION De Silva/jbg
6 April 1995

JOB DESCRIPTION

DP/IND/89/133/11-54

Process and Product Development Centre for Essential Oils, Kannauj (U.P.)

Post Title: Perfume Blending Consultant

Duration: 1.0 m/m

Date Required: ASAP

Duty Station: Kannauj (Uttar Pradesh) and Delhi with travel within the country

Purpose of Project: The project seeks to establish a Process and Product Development Centre (PDDC) for servicing, sustaining and upgrading the essential oils and perfumery industry at Kannauj which in many aspects is unique in India for the production of its special "attars".

Duties:

The expert will work in collaboration with the National Project Director, Director of PPDC and counterpart staff to carry out the following:

- Develop a training course on sensory evaluation and the fragrance formulation.
- Train counterpart staff in fragrance formulation using as many indigenous raw materials as possible.
- Train counterpart staff in sensory evaluation techniques.
- Recommend the aroma chemicals that could be prepared using indigenous essential oils.
- Develop perfume formulations for new product applications.
- Recommend suitable packaging for presentation of products.
- Recommend a full programme for the improvement of the perfume product development capability of PPDC and possible new formulations that could be developed.

Applications and communications regarding this Job Description should be sent to.

The expert will furnish a complete and fully processed technical report at the completion of his mission outlining the findings of his mission and his recommendations for follow up action.

Qualifications: A senior technologist with post graduate qualifications in perfumery with considerable and relevant R & D experience, an international reputation in Fragrance Chemistry and practical experience in the complete range of perfumery including creations, fine perfumery, cosmetics, toiletries and use of essential oils and then isolates in blending fragrance materials. Proven ability in training perfumers, and blending chemists. Previous work in an International setting an added advantage.

Language: English

Background Information:

Programmes, directed to the technological upgrading of traditional agrobased industries and the improvement of the lot of small scale farmers, industrialists and entrepreneurs have high priority within India's development policies. Kannauj is famous throughout the world for the very special "Attars" and perfumery ingredients that is processes their albeit still with very traditional processes and equipment. A UNIDO mission recommended to government the creation of a PPDC to sustain the Kannauj industry's R&D requirements and to provide inter alia the following:

- Analytical services and modern quality control methodology
- Modern blending techniques for perfumery products
- Improve equipment designs and process technology
- Install a modern pilot plant facility for trials by local industrialists
- Render Agrotechnological assistance
- Provide information and consultancy services.

The present project supported by UNDP and executed by UNIDO seeks to fulfil their needs.

PERSONS AND INSTITUTIONS CONTACTED

1. **Ministry of Industry, Government of India:**
 - Mr. S.R. Singh - Industrial Adviser NPD/PPDC

2. **UNDP, New Delhi:**
 - Ms. V. Peris - Programme Assistant

3. **PPDC Kannauj:**
 - Mr. D.P. Singh - Director
 - Mr. K.N. Dwivedi - Processing Manager
 - Mr. S.V. Shukla - Fragrances
 - Mr. B.V. Shukla - Fractionation
 - Dr. A. Lehri - Quality Control

PROBABLE USES OF INDIAN ATTARS AND OILS IN MODERN FRAGRANCES

a) for coolers:

Green apple
Jasmine
Vetiver
Lemon
Tuberose
Rose

b) for jute fibres: two fantasy fragrances

c) for leather: two fantasy fragrances

Following formulations were attempted with raw - materials purchased:

ROSE

Citrinellal
Geraniol
Nerol
Phenylethyl alcohol
Esters of the foregoing "rose alcohols"
Alcohols and acetates C8 to C12
Aldehydes C8 to C11
Rhocdinol
Geranium oil
Palmarosa oil
Benzyl acetate
Benzophenone
Rose oil
Attar rose
Linalool
Cinnamic alcohol
Cinnamyl acetate
Eugenol
Nagar mota
Rose oxides

beta-Damascenone
 Jasmine absolute
 Tuberose absolute

TUBEROSE

Tuberose absolute
 Benzyl acetate
 Benzyl alcohol
 Methyl anthranilate
 gamma nonyl Lactone
 Hydroxycitronellal
 Benzyl benzoate
 Methyl salicylate
 Ionone alpha
 Aldehyde C12 lauric
 Heliotropin
 Ylang-ylang oil
 Geraniol
 alpha-amyl cinnamic aldehyde
 Musk cetone
 Linalool
 Rhodinyl isobutyrate
 Labdanum absolute
 Attar rose

JASMINE

Benzyl acetate
 Alpha-amyl cinnamic aldehyde
 Phenyl ethyl alcohol
 Attar Motia
 Benzyl alcohol
 Hedion
 Indole
 Linalool
 Boise do rose oil
 Methyl anthranilate
 Anisic aldehyde
 Cinnamic alcohol
 Cinnamic aldehyde 10% sol.
 Aldehydes C8, C10

Mimosa absolute
Ylang-ylang oil
Alpha- hexyl cinnamic aldehyde
Geranium oil
Civet tincture (or artificial)
Benzoe absolute or resinoid
Hydroxycitronellal
Jasmone, iso-jasmone

LEMON

Lemon oil
Lemongrass oil
Green acetate
Dihydromircenol
Dipentene extra
Limonene pure
Linalyl acetate
Citronella oil
Styrallyl acetate
Lemon terpenes
Citral
Litsea Cubeba oil
Terpinol
Aldehyde C10
Myrac aldehyde
Citronellol

VETIVER

Cedarwood oil Virginia
Sandalwood oil
Nopyl acetate
Timbaron (Pollena-Aroma)
Vertofix coeur (IFF)
Fir balsam olifac (IFF)
Benzoin resinoid
Galaxolide
Sandela (Roure-Givandam)
Benzyl salicylate
Methyl ionone
Vetiver oil

Violet paste
Vetiveryl acetate
Woodysool
Patchouli oil
Bergarom (Pollena-Aroma)
Olibanum resinoid

PERFUME CHECK LIST

1. For what product is the perfume to be created? (e.g. a shampoo, cream, toilet soap, scouring compound, etc.).
2. Is the product new, or is an existing one being revamped?
3. Is it a single product, or does it form part of a line?
4. Are unperfumed samples of the product available?
5. If not, please give the physico-chemical properties of the product, eg - is it solid, semi liquid, or liquid? If it is an emulsion, what type?
6. If the base contains essential ingredients which could influence the fragrance, please specify. In the case of lotions, is either ethanol or isopropanol employed? In what concentration? If an aerosol, what type propellant is used? Does the product contain chemically reactive ingredients? If so, what are they?
7. What is the pH of the product?
8. What is the colour of the product? (As some perfume ingredients can cause discoloration, it is important for the perfumer to be aware of how his ingredient selection can be limited by the possibility of affecting the appearance of the product).
9. What type packaging is employed?

Aerosol or non - aerosol?

Transparent or opaque?
10. Of what material is the package made?
11. Can samples of the packaging material be supplied?

MARKET PROFILE

12. In which area of the world will the product be marketed?
13. What is the attitude of consumers in this area towards this type of product? Is it regarded as a boon, or a necessary evil?
14. Has the general attitude towards the product type changed in recent years? If so, in a positive or negative way?
15. Does the attitude in the market area differ greatly from that in the surrounding areas? If so, why?
16. Describe the attitude among consumers in the target area by (a) age, (b) sex, (c) social status, (d) type apparatus that must be present in a household in which the product is to be used.
17. Who are your principal competitors?
18. What are (and were) their shares of the market? Yours?
19. What are the demographic positions of their products, and yours, in terms of the four factors mentioned in question 16?
20. List the strongest and weakest points of your own product and those of your competitors products.
21. What is your target group? Which consumer category is it your primary aim to reach?
22. How do you plan to position your product? In what senses must it distinguish itself from its competitors? If you are revamping an old product, in what senses must the new product distinguish itself from the existing one? Which properties will you call to the attention of potential buyers in your advertising.

PERFUME PROFILE

23. Describe the type fragrance desired, as compared with products now on the market.

24. Define the desired fragrance more closely.

| Fragrance Class | Examples |
|-----------------|--|
| Fresh | Menthol, Petitgrain, Citronella, Eucalyptus |
| Green | Liguster, Cucumber, Rummer Bean |
| Citrus | Bergamot, Lemon, Orange, Lime, Tangerine |
| Floral | Lily of the Valley, Lilac, Rose Hyacinth, Jasmine, |
| Carnation | |
| Herbal | Camomile, Sage |
| Lavender-like | Lavender, Rosemary, Spike Lavender |
| Fruity | Peach, Pineapple, Apple, Strawberry, Raspberry |
| Animal | Civet, Leather, Faeces, Amber, Musk |
| Spicy | Pepper, Mixed spices, Cinnamon, Clove, Nutmeg |
| Woody | Cedar, Sandalwood, Vetiver, Patchouli |
| Balsamic | Olibanum (incense), Opoponax, Labdanum |
| Coniferous | Pine, Juniper berry, Cypress |
| Mossy | Oak moss |

25. Again relate the fragrance you desire to those of the principal competitive products.
26. Does the perfume play an essential role in your marketing mix?
27. What is the proposed concentration of perfume?
28. What is the target price for the perfume?

PROCEDURAL PROFILE

29. How many perfume suggestions do you want submitted?
30. What procedures do you employ to test?
- Consumer appreciation of the perfume?
- The technical properties of the perfume?
31. What criteria do you employ for selection, and what is the relative importance of each?
32. Will your test results be available to us for examination and comment?

33. What is your schedule?

Date of briefing ...

Deadline for submission of suggestions ...

Deadline for screening test ...

Deadline for final choice ...

Many marketers of finished products make no attempt to "tell" the customer that she should find their fragrance beautiful. They depend on the prestige of their name, perhaps adding a slogan to a picture of their flacon. Sometimes, a few phrases are added to give the customer an image, more and more manufactures are describing their fragrance in terms of its ingredients. Some manufactures feel it would be a mistake to do this, on the premise that if a potential buyer did not happen to like lily of the valley or rose or carnation or whatever, she might not buy the fragrance. But, there are plus as well as minus factors in describing the ingredients of a fragrance. For one customer who might be lost, a dozen others could be gained. Perhaps the reluctance of some marketers to describe the nature and ingredients of the fragrances of their products needs to be re-examined.

LIST OF REPRESENTATIVE FLORAL COMPOSITIONS

The following list is representative of usage in floral compositions of mixed higher aldehydes. In this instance the quantities given are to be regarded as 10 per cent solutions in S.V.R while the totals indicate the maximum amount per cent to be used in the named compound .

Mimosa

Alcohol C10 2.0%

Aldehyde C10..... 0.5%

Alcohol C11 1.0%

Aldehyde C11 1.0%

4.5%

Rose (d'Orient)

Alcohol C9 3.0%

Aldehyde C11 1.0%

4.0%

Verbena

Aldehyde C8 1.0%

Aldehyde C10 9.0%

10.0%

Neroli

Alcohol C9 3.0%

Aldehyde C9 1.5%

Alcohol C12 3.0%

Aldehyde C12 1.5%

9.0%

Sweet Pea

Aldehyde C9 0.4%

Alcohol C10 2.0%

Aldehyde C10 0.2%

2.6%

Violet

Aldehyde C10 ... 0.5%

Alcohol C12 3.0%

Aldehyde C12 ... 0.5%

4.0%**Narcissus**

Alcohol C9 3.0%

Aldehyde C9 1.5%

4.5%**Tre'fle**

Aldehyde C9 0.3%

Aldehyde C11 ... 0.5%

Aldehyde C12 .. 0.3%

Aldehyde C16 .. 0.2%

1.3%**Violet (Blanche)**

Alcohol C12..... 2.0%

Aldehyde C12... 0.5%

2.5%**Violet (Parma)**

Alcohol C10 1.0%

Aldehyde C12 .. 1.0%

2.0%**Rose (Centifolia)**

Alcohol C9 3.0%

Aldehyde C9... 2.0%

Aldehyde C1... 0.5%

Aldehyde C16. 0.4%

5.9%

Rose (Blanche)

Alcohol C8 3.0%

Aldehyde C8.. 1.5%

4.5%**Rose (Rouge)**

Alcohol C9 4.0%

Aldehyde C11 1.0%

5.0%**or singly**

M.N.A. 5.0%

Tuberose(a)

Aldehyde C10 0.4%

Alcohol C10 4.0%

Aldehyde C12 0.6%

Alcohol C12 6.0%

11.0%**Tuberose (b)**

Aldehyde C10 0.4%

Alcohol C10 4.0%

Aldehyde C12 0.6%

Alcohol C12 6.0%

11.0%**Wallflower**

Alcohol C9 7.5%

Aldehyde C9 2.5%

10.0%**Wistaria**

Aldehyde C8 2.5%

Aldehyde C12 2.5%

Alcohol C10 5.0%

10.0%

Ylang

Aldehyde C9 2.5%

Alcohol C9 2.5%

5.0%**Acacia**

Alcohol C9 1.0%

Aldehyde C9 3.0%

Alcohol C10 1.0%

Aldehyde C10 0.5%

5.5%**Ambre**

Aldehyde C8 0.6%

Aldehyde C9 2.0%

Aldehyde C10 1.5%

4.1%**Bouvadia**

Alcohol C9 0.25%

Aldehyde C9 0.50%

Aldehyde C10 0.60%

Aldehyde C12 0.35%

1.70%**Carnation**

Aldehyde C8 0.5%

Alcohol C9 2.0%

Aldehyde C9 1.0%

3.5%**Cassie**

Aldehyde C8 0.8%

Aldehyde C9 0.8%

Aldehyde C10 0.6%

2.2%

or singly

Aldehyde C9 ... 2 to 5

Aldehyde C10 ... 1 to 2

Aldehyde C12 ... 2 to 5

Chypre (b)

Alcohol C8 1.0%

Aldehyde C8 1.0%

Alcohol C9 2.0%

Aldehyde C9 0.5%

Alcohol C10 2.0%

Aldehyde C10 0.5%

7.0%

Chypre (a)

Alcohol C8 1.0%

Aldehyde C8 1.0%

Aldehyde C9 0.5%

Aldehyde C16 2.0%

4.5%

Cyclamen

Alcohol C9 1.0%

Aldehyde C9 0.5%

Aldehyde C12 1.0%

2,5%

or singly

Aldehyde C10 2.0%

Fouge're (a)

Aldehyde C8 0.5%

Alcohol C9 1.5%

Aldehyde C9 0.5%

Aldehyde C10 0.5%

3.0%

Fouge're (b)

Alcohol C8 1.0%
 Alcohol C9 1.5%
 Aldehyde C11 5.0%
 M.N.A. 2.5%

 10.0%

Gardenia (a)

Aldehyde C8 0.5%
 Aldehyde C10 0.5%

 1.0%

Gardenia (b)

Aldehyde C12 1.0%
 Aldehyde C14 1.0%

 2.0%

Hawthorn

Alcohol C9 2.0%
 Aldehyde C9 0.5%
 Aldehyde C10 0.1%

 2.6%

Honeysuckle

Alcohol C9 0.5%
 Aldehyde C9 1.0%

 1.5%

or singly

M.N.A. 2.0%

Hyacinth

Alcohol C8 1.0%
 Aldehyde C8 0.5%
 Aldehyde C10 0.3%

 1.8%

Iris

Alcohol C9 1.0%
 Aldehyde C9 1.0%
 Alcohol C10 1.0%
 Aldehyde C10 0.5%
 Aldehyde C12 0.3%

 3.8%

Jasmine

Alcohol C10 2.5%
 Aldehyde C10 2.5%

 5.0%

or singly

Aldehyde C8 2 to 3
 Aldehyde C10 2 to 4

Lavender

Alcohol C9 2.0%
 Aldehyde C10 0.5%

 2.5%

Lilic

Alcohol C9 1.0%
 Aldehyde C9 0.5%

 1.5%

or singly

Aldehyde C10 3 to 5
 M.N.A. 2 to 3

Muguet (a)

Alcohol C9 0.50%
 Aldehyde C9 0.25%
 Alcohol C10 1.00%
 Aldehyde C10 0.25%
 Aldehyde C12 0.25%
 Aldehyde C16 0.75%

 3.00%

Muguet (b)

Alcohol C9 1.0%

Aldehyde C9 0.4%

Aldehyde C12 0.4%

Aldehyde C16 0.2%

2.0%**Mignonette**

Alcohol C9 10.0%

Aldehyde C12 2.0%

12.0%

Examples of Chypres**Chypre 1**

| | |
|----------------------------------|------|
| Rose fragrance | |
| Jasmine fragrance | |
| Oakmoss absolute | |
| Bergamot oil | |
| Geranium oil | |
| Methylionone | |
| Vetiver oil | |
| Sandalwood oil | |
| Linalool | |
| Eugenol | |
| Hydroxycitronellal | |
| Civet tincture | |
| Musk ketone | |
| Coumarin | |
| Vanilin | |
| Aldehyde C10 1% | 0.5% |
| Aldehyde C11 (undecylenic) 1% .. | 1.5% |
| Aldehyde C12 (MNA) 10% | 3.5% |

100.0

This example is a chypre perfume with animal note.

CHYPRE 2

| |
|---------------------------|
| Oakmoss absolute |
| Jasmine fragrance |
| Musc ketone |
| Ambergris tincture |
| Civet tincture |
| alpha-Methylionone |
| Sandalwood oil |
| Vetiver oil |
| Bergamot oil |
| Rose fragrance |
| Celery oil 10% |
| Cyclopentadecanolide 1% |
| Bouvardia (Firmenich) |
| Orange oil (deterpenless) |
| Angelica root oil |

The following formula is for a modified chypre perfume with a peach type of top note

CHYPRE 3

Jasmine fragrance
 Benzyl acetate
 Orange oil sweet
 Vetiveryl acetate
 Cedryl acetate
 Sandalwood oil Lavender oil
 iso-Eugenol
 Amyl salicylate
 Bergamot oil
 Lemon oil
 Methylionone
 Oakmoss absolute
 Patchouli oil
 Indole
 Aurantiol
 Dimethyl benzyl carbinol
 Coumarin
 Musk ketone
 Civet
 Aldehyde C18 (pseudo) 10% 0.5
 Aldehyde C16 (pseudo) 10% 0.2
 Aldehyde C14 ("peach") 0.5

100.0

THE WAY OF FRAGRANCES ELABORATION IN A FACTORY (POLLENA AROMA)