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PROCESSING OF AROMA CHEMICALS AND FRAGRANCE MATERIALS

DP/VIE/86/033/11-53

SOCIALIST REPUBLIC OF VIET NAM

Technical report: Utilization of indigenous essential oils to develop suitable fragrance materials and formulations for local industry as well as export*

Prepared for the Government
of the Socialist Republic of Viet Nam
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Industrial Development Programme

Based on the work of S. Jain
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* This document has not been edited.

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I N T R O D U C T I O N

The project DP/VIE/86/033, "Processing of Aroma Chemicals and Fragrance Materials" funded as part of an agreement between the Vietnamese Government and UNDP/UNIDO has enable The General Department of Chemistry through The South Vietnam Detergent Company (SVDC) to greatly by expand its activities and take up the manufacture of Aroma Chemicals and Fragrance Materials in addition to its present activities.

BACKGROUND INFORMATION

Vietnam has been a producer of Natural Essential oils but in recent times this industry has suffered through want of Research and Development backup and modern marketing initiatives. To remedy to situation the Government through the agency of UNDP and UNIDO has provided the industry with R&D back up in the form of a project titled "Processing of Vietnamese Essential Oils and Related Natural Products, DP/VIE/84/010. Since new prospective Essential Oils will soon become available and a dire need for Fragrance Materials exists, the Government again through the agency of UNDP-UNIDO, wishes to set up this second Project, directed towards fractionation of locally produced essential oils and production of a basic array of aroma chemicals in order to formulate and compound fragrance materials. These fragrance materials are to be produced first on a bench scale and once the technological problems are surmounted, produced on a pilot scale to serve the needs of an on going soap and toiletteries industry. Export possibilities will also be assessed to provide a potennial foreign exchange earning capacity.

PURPOSE OF THE PROJECT

Utilisation of indigenous essential oils to develop suitable fragrance materials and formulations for local industry as well as export.

Post title Perfumer/Fragrance Formulation Expert.

Duties.

The expert was expected to work under the direct supervision of the CTA and the NPD and was to be responsible for organising and setting up a sensory evaluation unit allied to the chemical and instrument analytical and research laboratories.

The expert was expected to train local personnel in sensory evaluation methods and in the formulation and compounding of fragrances for use in the local industries.

The expert singly was expected to conduct National Workshop in the creation and formulation of fragrances.

After completion of his mission, the expert was expected to forward to UNIDO a fully completed report outlining his findings and recommendations.

The mission of the expert covered the aforementioned activities and few other aspects of the project.

S U M M A R Y

The mission took place between 2nd June and 30th June 1991 during which time the expert was attached to the South Vietnam Detergent Company, situated near HoChiMinh City.

As per the terms of reference of the assignment the expert functioned under the direct supervision of the CTA and the NPD,namely Dr. C. K. Atal and Mr. Dinh Van Thin respectively.

The expert was located at the South Vietnam Detergent Company's Research and Development Centre - Vinarom dedicated to the development of production facilities for Aroma Chemicals and Fragrance Materials.

Under the guidence of the CTA and the NPD for the project, the expert carried out the following specific functions:-

1. Assisted in developing local expertise in Sensory Evaluation by conducting an in depth course at Vinarom.

2. Assisted in organising and setting up a Sensory Evaluation Unit at Vinarom.

3. Assisted in training local personnel in formulation and compounding of fragrances.

4. The sensory evaluation of raw materials and products especially indigenous Vietnamese Essential Oils and isolates and derivatives produced from the said essential oils was carried out in detail.

5. A National Workshop in Sensory Evaluation and Formulation and Compounding of Fragrances was conducted with candidates from all the major national centres taking part. The National Workshop laid special emphasis on the utilisation of the indigenous resources of Vietnam.

6. Formulated recommendations in regard to future needs with emphasis on strengthening The South Vietnam Detergent Company's facilities to enable Vietnam to achieve self-reliance and independence in the field of Aroma Chemicals and Fragrance Materials, Perfumery Compounds etc.
Additionally the following activities were performed:

1. The technical personnel of the SVDC were trained in evaluating Aroma Chemicals and Fragrance Materials by instrumental methods such as GLC.

2. The technical personnel of the SVDC were trained in proper fractionation and distillation methods.

3. Special fragrance formulations for use by the SVDC were created, which were of an International commercial standard.

4. The following topics were discussed and explained in detail:-

   i) Applications of Fragrances in Cosmetics and Toilet Preparations of methodology of selection of fragrances for such applications.

   ii) Nature of the international fragrance industry in terms of Commercial Aspects, Trading practices and Marketing techniques.

   iii) Standardisation, Quality Control and importance of Research of Development.

Adequate facilities were available at the SVDC, and with the help of the requisits samples of perfumery raw materials and finished fragrances arranged from India, 92 major perfumery raw material and 22 fragrance formulations were explained in detail. Demonstrations were made by means of practical examples to the technical personnel of SVDC and Vinarom in the Sensory Evaluation and Fragrance Formulation course conducted by the expert.

Ten technical personnel were put through the course on the development of local expertise in Sensory and Odour Evaluation and compounding of fragrances and were comprehensively introduced to the techniques involved.

As a result of the training imparted previously at Hanoi and now in HoChiMinh City, the local expertise was built up to an extent that 10 perfumery compounds were independently created by the technical personnel of Vinarom and the SVDC, in the presence of the expert, using the raw materials that the expert had brought with him from India. Thus, the basic capability to independently create fragrance compounds was created in the local personnel as a result of the training

course. These products were suitable for use in the local industry.

The course on the development of local expertise in Sensory and Odour Evaluation and compounding of fragrances was conducted for a period of 9 days and 72 hours of intensive tutorials (with practical demonstration) were taken. Due to the active participation by the technical personnel and authorities of SVDC, the participants were taken to the stage where they could do olfactory assessment independently, as also compound fragrances belonging to all the classes.

Modern trade and technical terminology used in the Perfumery Raw Materials field was explained to the participants of the course.

Methodology and equipment required for setting up a Sensory Evaluation Laboratory were finalised.

Methodology and equipment required for setting up a Fragrance Blending and compounding laboratory were finalised.

Nine technical personnel of Vietnam, coming from the major centres involved in fragrance related areas were put through an advanced National Workshop in Sensory Evaluation and Formulation and Compounding of Fragrances, with special emphasis on the utilisation of the indigenous resources of Vietnam including, essential oils, isolates, derivates, gums, resinoids etc.

Recommendations were formulated with regard to future needs with emphasis on strengthening SVDC's facilities to enable Vietnam to achieve self- reliance and independence in the field of Aroma Chemicals and Fragrance Materials, Perfumery Compounds etc.

Trained the technical personnel of SVDC in the instrumental evaluation (GLC) of Aroma Chemicals and Fragrance Chemicals.

Trained the technical personnel of the SVDC in proper distillation and fractionation methods.

Created special fragrance for use by the SVDC.

Findings, Observations and Work Performed.

1. It is the opinion of the expert than the project should be re-oriented or a new project initiated, which will consider as the final result not only the production of essential oils from indigenous plant sources, their isolates and derivatives and perfumery compounds or fragrances but also the export of such indigenous essential oils, their isolates and derivatives

particularly chemicals derived from Turpentine Oil of which there is an acute shortage at present, in the world market.

Further, in addition to the production of Aroma Chemicals, isolates and derivatives based upon purely indigenous raw materials, attention should also the given to the manufacture of Perfumery Compounds and Fragrances based on the import of key raw materials. This activity will result in the production of value added products of an international standard in the absence of which the import of perfumery compound with loss of foreign exchange will continue.

There are adequate facilities and qualified staff at Vinarom/SVDC and in co-operation with the Ministry of Heavy Industries/General Department of Chemistry, such a programme should be developed and introduced. Advanced and prolonged training of perfumers will the necessary alongwith two or three chemists in fragrance chemistry. An advanced and sophisticated sensory evaluation and fragrance creation laboratory will have to be created.

Equipment required for such a sensory evaluation and fragrance creation laboratory can be imported if necessary.

Several actions already taken by the Chief Technical Adviser are leading in the aforementioned direction.

i) Technical personnel of Vinarom/SVDC have been trained in the correct method of sensory and olfactory evaluation and assessment.

ii) The same people have been taken through a detailed and advanced course on Fragrance Blending and compounding techniques and introduced in depth to the intricacies of Fragrance Industry.

iii) Alongwith the aforementioned programme they have also been made familiar with quality control techniques in terms of sensory and olfactory evaluation.

iv) Pilot scale fractionation and reaction units have already been installed and commissioned. The personnel required to operate the said units have been trained. Additional equipment for a larger scale of production is also being installed.

Technology for the manufacture of a certain number of Aroma Chemicals, isolates and derivatives, primarily based on the locally produced Vietnamese Essential Oils is being introduced. These will be utilised for the production of fragrance materials on an import substitution basis.

However, to produce fragrances and perfumery compounds of an International Standard at least 500 - 600 basic raw materials are required, out of which technology for the manufacture of at least a 150 - 200 products is available. As such to ultimately become self-reliant, Self-sufficient and Independent, the scope of the extended project should cover the manufacture of all those aroma chemicals for which technogy is availabie, including the manufacture of Turpentine based chemicals which have a strong Export Potential.

2. Conduct of a Comprehensive Course for the Development of Local Expertise in Sensory Evaluation and Compounding of Fragrances (Annexure 2).

With the help of and on the basis of Fragrance Raw Materials samples and Fragrances samples arranged by the expert all the way from India entirely on his own expense, the course was initiated.

The Sensory Evaluation and Fragrance Blending course covered the following aspects:

i) Correct method of Sensory Evaluation of Raw Materials and Fragrance Materials.

ii) Definitions of Fragrances and Flavours (Industrial).

iii) Uses (of Industrial Fragrances).

iv) Classification of Fragrance Raw Materials and Terminology used in the Fragrance Raw Materials Trade.

v) Odour descriptions of commonly used Fragrance Raw Materials were discussed and each Raw Material discussed was physically shown to each participant.

vi) Workable and useable formulations utilising only the raw materials presented in the training course were exhaustively discussed, analysed and finalised, each representative of a well known class of fragrances.

For details, see annexure 2.

3. Training course on Sensory Evaluation and Blending of Fragrances.

3.1 Correct method of Sensory Evaluation of Raw Materials and Fragrances.

The participants of the training course were shown by practical examples, the correct technique involved in odour evaluation, taking within its ambit, the terminology used, avoidance of olfactory fatique, avoidance of bias, necessity to maintain freedom from contaminating odours, need to maintain a library of standard samples, preservation of smelling strips, importance of a clean environment, the separate procedures involved for liquid, semi-solid and solid samples and the general method for conducting the evaluation.

For details see Annexure 3.

Instead of lecturing, the expert adopted an attitude of talking to the participants and engaging them in a meaningful discussion, thus drawing them out and breaking down their inhibitions and ridding them of

any phobia that they might have had about this subject.

By directly encouraging each participant to freely comment and take part in the discussion,it was ensured that each person had actually understood the topic being discussed. Further by adopting this method the self-confidence of the participants was built up and interest in the subject awakened.

Since this approach was followed right through the training course for all the topics, this description of the expert's approach and method will not be repeated again and again.

3.2 Definitions of Fragrances and Flavours.

Since the training course was only concerned with fragrances destined for industrial use, the definition there of was given in detail by the expert.

3.3 Uses (Industrial) of Fragrances.

The extent and scope of the Industrial Fragrance Industry was explained to be participants by the expert and they were made to realise the very great extent to which modern mankind has become dependent on items of daily use in which industrial fragrances play a critical part.

3.4 Classification of fragrance Raw Materials and the Terminology used in the Fragrance Raw Materials trade.

The categories into which the 3000 fragrance raw materials currently in use in the industry, can be classified on the basis of being either natural or synthetic or their source or their method of production were explained in detail, with practical examples by the expert.

For details see Annexure 4.

3.5 Odour Descriptions of Commonly Used Fragrance Raw Materials.

82 individual commonly used raw materials were physically shown to each participant and the odour descriptions and olfactory characteristics of each one of them were explained in detail and discussed at length with each participant.

3.6 Fragrance Formulations.

Twenty two formulations based on the 82 raw materials presented, were given to the participants in the training course and discussed with them. The twenty two formulations represented all the major classes of modern fragrances and thus covered the entire spectrum of the perfumery field.

The participants were encouraged to understand, discuss, analyse and discover themselves the intricacies of the complex trade.

The techniques used by the expert enabled the participants to imbibe within the duration of the training course, sufficient expertise to independently formulate fragrances belonging to each major class and to clearly distinguish between different fragrance raw materials.

4. Setting up of a Sensory Evaluation and Fragrance Creation laboratory.

Detailed methodology for setting up a Sensory Evaluation Laboratory and a Fragrance creation laboratory was discussed and finalised including procedures and precautions involved, as well as the equipment required.

For details see Annexure 3.

5. Sensory Evaluation of Vietnamese Essential Oils.

The critical parameters which determine the qualities of essential oils produced by Vietnam were identified and explained to the participants of the course and the Quality Control Personnel.

6. Assessment of the Potential for Utilising Locally Produceable Raw Materials for the Production of Fragrance Materials.

i) The potential for optimum utilisation of the existing varieties of essential oils currently produced in the country was examined.

ii) The potential for diversifying the range of essential oils and Aroma Chemicals produced in the country was examined.

iii) Workable and useable Fragrance Formulations for use by the local industries were finalised, with emphasis on locally produceable raw materials.

iv) The future needs of the Vietnamese industry in terms of Aroma Chemicals and Fragrance materials were considered and suitable recommendations formulated

indicating the preferred directions that the industry should follow.

For details, see annexure 5 and annexure 8.

7. National Workshop on Sensory Evaluation and Formulation and Compounding of Fragrances.

The workshop was attended by 9 participants from all the major Vietnamese centres working on essential oil related projects. The following topics were covered:

i) Fragrance Blending and Compounding.

ii) Sensory Evaluation of Frangrances.

iii) Raw Materials in Fragrance Industry.

iv) Applications of Fragrances in Cosmetics and Toilet Preparations.

v) Nature of International Fragrance Industry.

- Commercial Aspects
- Trading Practices
- Marketing Techniques

vi) Quality Control

vii) Importance of Reaearch and Development.

For details see Annexure 6.

8. Instrumental Evaluation of Aroma Chemicals and Fragrance Materials.

The intricacies involved in evaluating an oil on the basis of GLC analysis were explained. Also the advantages and disadvantages of instrumental methods versus the wet methods were expalined.

9. Proper Fractionation and Distillation Methods.

Proper methods and the technology and techniques involved in fractionation and distilation procedures were explained and demonstrated.

10. Special Formulations for SVDC.

Exclusive formulations for use by SVDC in their detergent, soaps and toiletteries production were created.

For details, see annexure 7.

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS.

1. The correct method of Sensory Evaluation of Aroma Chemicals and Fragrance Materials as well as the training imparted in the Formulation and Compounding of Fragrances, as taught and explained to the participants taking part in the training course will now enable the following people to undertake Sensory/Olfactory Evaluation independently:-

   a) Vu Bao Dung — Vinarom
   b) Nguyen Quang Hien — Vinarom
   c) Luc Thi Van Hien — Vinarom
   d) Le Huy Hai — Vinarom

2. After the completion of the training course the candidates were tested and the following were found to be the best suited for further advanced training:-

   a) Vu Bao Dung
   b) Nguyen Quang Hien

   These people can already undertake independent creation of fragrances and with further advanced training can form the nucleus of an advanced and sophisticated, creative facility.

3. After the conclusion of the National Workshop, the candidates were tested again and from amongst the new participants, the following were found to be suitable for further advanced training:-

   a) Tran Khanh Ngoc — Enteroil

4. The project as in progress during the work of the expert will create in SVDC an Aroma Chemicals manufacturing facility and a Fragrance manufacturing facility backed by a Sensory Evaluation and Fragrance Creation Laboratory.

   However the scope of this project is limited to the production of aroma chemicals such as isolates and their derivatives from the indigenously produced Vietnamese essential oils.

This is will result in a restricted range of aroma chemicals which when combined with the locally produced essential oils will not provide a sufficient variety of raw materials required to produce fragrances of an international standard.

Thus, although the project as concieved at present will take the Vietnamese industry a step forward in the direction of indigenous production of Aroma Chemicals and Fragrances, it will not be able to establish a local industry strong enough to stand on its own in the face of international competition. Thus the quality of the cousumer goods perfumed with the Aroma Chemicals/Fragrances thus produced will be inferior to those perfumed with international fragrances, because the International Industry would have access to a much greater variety of raw materials.

The problem can be solved easily by initiating a simultaneous establishment of Aroma Chemicals Manufacturing Facility based NOT ONLY on Vietnamese Essential oils but also on other basic organic chemicals available world wide on a commodity basis so that the facility produces not only isolates and derivatives but also synthetic aroma chemicals.

If this is done, the Fragrance Manufacturing Facility will automatically have access to a much greater variety of raw materials.

This range of Aroma Chemicals should be supplemented with imports of those widely used aroma chemicals for which technology is not available at present but which are nevertheless important for Fragrance Blending.

These along with those essential oils which are now produced in Vietnam, will together provide a raw material base on which a Fragrance Industry of an international status can be built.

The Project as currently concieved is technically and commerically incomplete without further steps in the direction of manufacturing a much wider range of aromatic chemicals as discussed above as also Fragrances and Perfumery Compounds based not only on the indigenously produced/produceable essential oils and aroma chemicals, isolates and derivatives based thereupon, but also upon other standard and widely used aroma chemicals and other synthetic and natural raw materials which are essential for the creation of the modern style of fragrances.

Quick development and the dyanamic economy in Vietnam, seen every where as intense activity amongst the people, will result in a growing demand for detergents, soaps, cosmetics, toiletteries, perfumes etc.

This will encourage greater production of these goods which will immediately create a market for fragrance compounds. SVDC and Vinarom have sufficiently well qualified personnel who can be picked up for appropriate training.

5. The project as existing on the date of the mission, can be taken to its logical and fruitful conclusion if the need to have technical personnel trained fully in olfactury techniques is realised and the requisite number of such personnel are properly trained for an extended period of time and then appointed to fill the following posts:

i) Quality Control Perfumer
ii) Manufacturing Perfumer
iii) Creative Perfumer

The sequential order for the achievement of this target should be as under:

i) Establishment of the Sensory Evaluation and Fragrance Creation Laboratory.

ii) Introduction of rigid quality control based on Olfactory/Sensory Evaluation coupled with the usual wet chemical methods and GLC analysis.

iii) Selection from amongst the Odour Evaluation Panel of the person with an aptitude for Fragrance Technology in all aspects and the training of such an individual so as to enable hir/her to eventually manage an Integrated Fragrance Facility capable of quality control, routine manufacturing and creative blending.

B. <u>RECOMMENDATIONS</u>.

1. SVDC/Vinarom and UNDP/UNIDO should consider extension of the scope of the project or its 2nd phase so as to create the following facilities:-

a) A Sensory Evaluation Laboratory properly equipped with standard samples for reference and also the required equipment, should be established immediately with the active involvement of the people trained by the Expert who at the moment, are the only people in

Vinarom/SVDC with any grounding in the scientific methods of odour evaluation. This laboratory should be entrusted with the task of Olfactory Quality Control of the Essential Oils and Aroma Chemicals produced by Vinarom/SVDC.

b) Odour Evaluation and Olfactory Quality Control methods should be immediately introduced in Vinarom/SVDC to ensure that the essential oils and Aroma Chemicals produced by it are of an Olfactory acceptable International Quality so as to enable the Vietnamese Industry to face the International competition.

c) This laboratory should in turn be expanded into a Fragrance Creation Laboratory, after the staff have undergone systematic Advanced Training, preferabely in Vietnam itself with the help of the expert, as commercial companies abroad generally will not impart useful training to a budding competitor.

d) The Fragrance Creation Laboratory should actively co-operate with the Raw Materials Production Division and based on the Locally Produced Raw Materials such as essential oils and Aroma Chemicals, help to create Fragrances for consumption by Vietnamese Companies manufacturing consumer goods incorporating fragrances.

e) The production of commonly used Aroma Chemicals, other then those based strictly on locally available essential oils, should be immediately established so as to provide a larger variety of raw materials for the Fragrance Creation Division.

f) The essential oil bearing plants/trees, flowers, spices herbs, etc. already being grown in the country, should be taken up for distillation, so as to diversify the existing range of production and the variety of raw materials required for the Fragrance Creation Division.

g) Based on the help provided by the expert and the subsequent work done by the Fragrance Creation Laboratory, a Fragrance Manufacturing facility should be established.

h) The Technical Personnel required to fulfill the aforementioned tasks should be trained in Vietnam and be only sent abroad for Exposure Training. It should be borne in mind that no meaningful training can be provided to a potential competitor in any commercial organisation.

i) An exhaustive Survey of the requirements and needs of the Fragrance Industry of Vietnam should be made so as to enable Vinarom/SVDC to develop its facilities accordingly.

ANNEXURE 1

PROGRAMME OF THE TRAINING COURSE ON FRAGRANCE FORMULATION AND ODOUR EVELUATION AT VINAROM CENTER-PROJECT VIE/86/033

03 June 91	Introduction to Fragrance Industry, Definitions.
04 June 91	Raw Materials used in the industry.
05 June 91	Sensory Evaluation, its importance, setting up of a laboratory.
06 June 91	Using the laboratory for quality control.
07 June 91	Creation of Fragrance - Elementary.
08 June 91	Creation of Frangrances.
09 June 91	Sunday
10 June 91	Creation of Fragrances.
11 June 91	Creation of Fragrances.
12 June 91	Beginning of the advanced course.
13 June 91	Sophisticated Fragrance Formulation.
14 June 91	Sophisticated Fragrance Formulation.
15 June 91	Sophisticated Fragrance Formulation.
16 June 91	Sunday
17 June 91	Sophisticated Fragrance Formulation.
18 June 91	Sophisticated Fragrance Formulation.
19 June 91	Applications of Fragrances.
20 June 91	Nature of International Fragrance Industry.
21 June 91	Quality Control.
22 June 91	Research - Development.
23 June 91	Sunday
24 June 91	Summary - Resume.
25 June 91	Testing/Evaluation of Participants.
26 June 91	Submission of Report and Debriefing by BSO

ANNEXURE 1A

LIST OF PARTICIPANTS IN THE TRAINING COURSE ON FRAGRANCE FORMULATION AND ODOUR EVALUATION AT VINAROM CENTER IN JUNE 1991
PROJECT VIE/86/033

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1. Le Huy Hai
2. Vu Bao Dung
3. Nguyen Quang Hien
4. Luc Thi Van Hien
5. Nguyen Thi Nga
6. Trinh Bich Thuy
7. Truong Thi Phuong
8. Nguyen Minh Hung
9. Nguyen Van Quy
10. Do Lenh Cuong

ANNEXURE 2

TRAINING COURSE ON THE DEVELOPMENT OF LOCAL EXPERTISE IN THE COMPOUNDING OF FRAGRANCE MATERIALS AND ORGANOLEPTIC/SENSORY EVALUATION OF RAW MATERIALS AND RELATED PRODUCTS.

In consultation with and under the direct guidance of Dr. C. K. Atal, CTA and National Project Director,and with the copoperation of the entire staff of Vinarom/SVDC, a detailed programme was implemented relating to the titled subject.

The programme of the training course was initiated by the elaborating on some of the theoretical aspects of olfaction and odour quality evaluation.

The salient points of the training course were as follows:

Theoretical:

1. Human and Animal Senses.

2. Structure of Human Sense of Smell.
   a) Anatomy.
   b) Receptors-structure and position.
   c) Olfactory bulb, axons, nerves and grain.

3. Odour Perception Mechanisms.
   a) Molecular structure of receptors (Alpha-helix).
   b) Ofaction theories.

4. Sensitivity of Odour Perception, Minimum perceptible.
   a) Odour threshholds.
   b) Just noticable difference.

5. Personal Abilities of Human Olfaction Sense.
   a) Sensitivity.
   b) Odour memory.
   c) Odour association.
   d) Odour differenciation.
   e) Influence of personal condition(health,mood) on above abilities.

6. Odour Description and Odour Classification.
   a) History of odour description methods.
   b) Methods of classification.
   c) Primary odours.
   d) Odour profiles.

7. Odour Quality Evaluation.
   a) Direct comparision.
   b) triangle method.
   c) duo-trio method.
   d) quality comparative scale.

After establishing in short, the theoretical background of the subject on the basis of the topics elaborated above, the practical side of the training was initiated by the expert on the basis detailed below:

1) **Fragrance-Industrial.**

a) Definition: Any mixture of two or more odoriferous substances, of a type used in industry.

i) of a type used in food	FLAVOUR
II) all others	FRAGRANCES

Thus it was explained that for the purposes of the programme which was mainly concerned with the industrial use of fragrances and/or use of industrial fragrances, it was necessary to abide by the aformentioned definition which is now used internationally as per the Brussels Trade Nomenclature.

b) Uses: since the programme was concerned with the use of industrial fragrances, the possible use of such products were explained and are listed below:

i) <u>Household Products</u>

Soaps and Detergents
Cleansers
Disinfectants
Polishes
Paints
Adhesives
Air Freshners

ii) <u>Personal Products</u>

Cosmetics: Make-up Products
Toilet and Beauty Preparations
Perfumes and Toilet Waters

iii) <u>Industrial Products</u>

Dry Cleaning
Leather and Rubber Articles
Artificial Leather
Linoleum
Plastics
Printing Inks, Perfumed Board and Paper

Textiles

iv) Agricultural Products

Insecticides
Insect and Animal Repellants
Animal Baits and Attractants
Veterinary Products
Cattle Feeds

After detailing the uses of various fragrances, the major classes/categories into which fragrances can be divided were described and the same are detailed below:

1. Green
2. Fruity
3. Floral
4. Aldehydic
5. Leather
6. Woody
7. Chypre
8. Oriental
9. Citrus
10. Fougere

To explain the characteristic of each type of fragrance listed above, a set of commonly used raw materials was prepared and presented in the programme with detailed explanation of the odour picture of each item. The raw materials used are listed below:

1. amyl Cinnamic Aldehyde
2. Aldehyde C-8
3. Aldehyde C-9
4. Aldehyde C-10
5. Aldehyde C-11
6. Aldehye C-12 Lauric
7. Aldehyde C-12 MNA
8. Anisic Aldehyde
9. Aurantine Extra
10. Anisyl Acetate
11. Aldehyde C-16
12. Aldehyde C-14
13. Aldehyde C-18
14. Aldehyde C-19
15. Aldehyde C-20
16. Benzyl Acetate
17. Benzyl Propionate
18. Benzyl Salicylate
19. Bergamot oil Italian
20. Cyclaman Aldehyde
21. Cinnamic Alcohol
22. Citralva
23. Citronellyl Acetate
24. Citronellyl Formate

25. Clove oil Rectified
26. Citronellol
27. Dihydro Myrcenol
28. Dimethyl Octanol
29. Eugenol
30. Freskomenthe
31. Galbanum Oil
32. Geraneol
33. Geranium oil chinese
34. Geranyl Acetate
35. Galaxolide 50
36. Hydroxy Citronellal
37. Hexenol-cis
38. Geranyl Formate
39. Hedione
40. Ionone Alpha
41. Iso Butyl Quinoline
42. Iso Eugenol
43. Lyral
44. Lillial
45. Lemon oil Italian
46. Lavendin oil super
47. Lavender oil Bulgarian
48. Linalyl Acetate
49. Lavendin Absolute
50. Resinoid Benzoin
51. Resincid Oakmoss
52. Resinoid Castoreum
53. Resinoid Labdanum
54. Styrallyl Acetate
55. Iso Bornyl Cyclo Hexanol (SANDELA)
56. Sandalore
57. Sendalwood oil
58. Terpeneol
59. Phenyl Acetaldehyde Dimethyl Acetal
60. Methyl Ionone
61. Methyl Eugenol
62. Nerol
63. Orange oil, Brazillian
64. Phenyl Acetaldehyde 50%
65. Petitgrain oil
66. Phenyl Propyl Aldehyde
67. Phenyl Ethyl Methyl Ether
68. Patchouli oil, Indonesian
69. PTBCHA
70. Acetyl Isoeugenol
71. Coumarin
72. Ethyl Vanillin
73. Fixolide
74. Heliotropin
75. Indole
76. Musk ketone
77. Musk Ambrette

78. Phenyl Acetic Acid
79. Vanillin
80. Methyl Heptin Carbonate
81. Vetivert oil

Unsing only this basic set of raw materials, the aforementioned fragrance categories were discussed and explained in detail.

AGAIN USING THE SAME RAW MATERIALS AND ON THE STRENGTH OF THE TRAINING IMPARTED BY THE EXPERT, THE PERSONNEL ATTENDING THE TRAINING COURSE, THEMSELVES CREATED THE FOLLOWING FORMULATIONS, UNDER THE GUIDANCE OF THE EXPERT:

1. CITRUS ACCORD NO. 1

LEMON OIL	30
ORANGE OIL	15
BERGAMOT OIL	20
PETITGRAIN OIL	30
PHENYL ACETALDEHYDE	5
DIMETHYL ACETAL	
	100

2. CITRUS ACCORD NO.2

LEMON OIL	40
ORANGE OIL	25
BERGAMOT OIL	20
PETITGRAIN OIL	10
PHENYL ACETALDEHYDE	5
DIMETHYL ACETAL	
	100

3. GREEN ACCORD NO.1

CITRUS ACCORD NO. 1	40
HYDROXYCITRONELLAL	30
PHENYL ACETALDEHYDE 50%	10
GERANYL FORMATE	20
CYCLAMEN ALDEHYDE	10
	110

4. FLORAL ACCORD NO. 1

LYRAL	20
LILIAL	20
METHYL IONONE	5
ALPHA-IONONE	2,5
BENZYL ACETATE	20
GERANIOL	15
NEROL	15
GREEN ACCORD NO. 1	15
	112,5

5.	ALDEHYDE ACCORD NO. 1	
	FLORAL ACCORD NO.1	40
	LYRAL	10
	LILLIAL	10
	HYDROXY CITRONELLAL	20
	PHENYL ACETALDEHYDE 50%	5
	CYCLAMEN ALDEHYDE	5
	AID. C.9	1
	ALD. C.10	1
	ALD. C.11	1
	ALD C.12	2
	ALD. C.12 MNA	3
		98
6.	FRUITY ACCORD NO.1	
	ALDEHYDIC NO.1	40
	ALD. C.14	2
	ALD. C.16	2
	ALD. C.18	1
	ALD. C.19	1
	ALD C.20	2
	ALPHA IONONE	5
	VANILLIN	7
	ETHYL VANILLIN	3
		63
7.	ORIENTAL ACCORD NO. 1	
	FRUITY ACCORD NO. 1	30
	VETIVERT OIL	10
	LAVENDER OIL	10
	DIHYDRO MYRCENOL	10
	SANDAL WOOD OIL	10
	PATCHOULI OIL	10
	MUSK AMBRETTE	5
	MUSK KETONE	5
	FIXOLIDE	7
	RES. LABDANUM	3
	COUMARIN	4
	RES. BENZOIN	5
	GERANIUM OIL	7
	BERGAMOT OIL	10
	LAVENDIN ABSOLUTE	7
		135
8.	FOUGERE	
	ORIENTAL ACCORD NO. 1	50
	GERANIOL	5
	CITRONELLOL	10
	DIMETHYL OCTANOL	5
	CITRONELLYL ACETATE	10
	VANILLIN	10
	COUMARIN	10

ETHYL VANILLIN	5
RES. OAKMOSS	10
BERGAMOT OIL	10
LAVENDER OIL	8
LAVENDIN OIL	7
LAVENDIN ABS.	5
	145

9. CHYPRE NO.1

ORIENTAL ACCORD NO. 1	40
BENZYL ACETATE	10
AMYL CINNAMIC ALD.	5
BENZYL PROPIONATE	15
INDOLE	5
RES. BENZOIN	5
RES. LABDANUM	8
RES. CASTOREUM	2
VETIVERT OIL	5
COUMARIN	3
RES. OAKMOSS	4
PATCHOULI OIL	5
FIXOLIDE	7
BERGAMOT OIL	16
	130

WOODY ACCORD NO. 1

ORIENTAL ACCORD NO.1	5
BERGAMOT OIL	5
VETIVERT OIL	10
GERANIUM OIL	10
SANDALWOOD OIL	20
PATCHOULI OIL	15
FIXOLIDE	15
ALPHA-IONONE	10
METHYL IONONE	10
	100

WOODY Accord no. 2

ORIENTAL NO. 1	5
SANDELA	50
GERANIUM OIL CHINESE	5
LILLIAL	5
LAVENDIN OIL	5
METHYL IONONE	10
PATCHOULI OIL	5
VETIVERT OIL	5
FIXOLIDE	10
	100

ANNEXURE 3

METHOD FOR CREATION OF AN OLFACTORY ASSESSMENT AND SENSORY EVALUATION LABORATOY FOR NATURAL SYNTHETIC PERFUMERY MATERIALS.

Background:

1. Natural and synthetic perfumery materials such as essential oils, aromatic chemicals, etc, are used primarly for their odour appeal. Although the analytical characteristics which are commonly determined may provide some assurance regarding the chemical purity of an odoriferous substance, they do not necessarily indicate the "purity" of odour. Hence, olfactory evaluation has been practised for centuries and, in the perfumery trade, it has formed the basis of acceptance or rejection of odoriferous materials.

This methodology has been formulated with a view to introduce standard methods of testing for olfactory assessment of natural and synthetic perfumery materials.

2. Olfactory assessment has been the target of some criticism as it is a subjective test. Numerous attempts on basic odour research and, more particularly, on objective measurement techniques have been made from time to time but none of these has so far wide acceptence. Whereas objective methods are the goal of all odour research, there is, at present, no technique which may replace sensory detection and evaluation of odours.

Terminology

1. **Top note:** The initial and primary odour effect perceived by the olfactory nerves on smelling a strip freshly impregnated with the material being tested. The top note(s) is (are) usually of a short duriation and may or may not be coperceived along with the middle note.

2. **Middle note:** The secondary overall odour effect experienced by the olfactory nerves on smelling a strip impregnated with the material after the initial top note has evaporated. It lasts for a longer time on the strip than the top note.

3. **Residual note (Dry-out Note):** The tertiary odour effect experienced by olfactory nerves on smelling a strip impregnated with a material after the top and the middle notes have disappeared. Besides indicating the lasting character and strength of the material, it may also reveal the nature of the lesser volatile materials.

4. **By note:** An odour effect, additional to the normal pattern of odours associated with the material, experienced by olfactory nerves on smelling an impregnated strip during any stage of evaporation. It is generally regarded as an index of foreign odour and/or undesirable adulterant and alien.

5. **Odour Description:** Due to the absence of precise terms, descriptive words which are subjective in nature are commonly used to express the odour sensations perceived in the top, middle, residual and by-notes. Some of these terms are given below but the list is not intended to be exhaustive:

acid
acrid
aldehydic
amber
animal
balsamic
bitter
burnt
camphoraceous
choking
citrus
cloying
cool
dry
dull
earthy
exalting
faecal
fatty
fishy
floral
fungal
fresh
fruity
goaty
grassy
green
heavy
herbal
honey
intense
leafy
leathery
minty
mossy
mushroomy
musky
musty
nauseating
nutty
oriental
peppery
persistent

phenolic
piney
powdery
pungent
refreshing
sappy
sharp
sickly
smokey
sour
spicy
stemlike
still odour
sulphuraceous
sultry
sweet
tarry
tart
woody

Requirements

General Requirements: The following general precautions are required to be noted.

Selection and Training:Better results are obtained if individuals with a keen sense of smell and ability to distinguish between different odours are selected for training in olfactory assessment.

Fatigue: Continuous smelling causes olfactory fatigue and decreases critical odour perception. To avoid this, the number of samples assessed during a session should be limited as far as is practical. Further, during smelling, the body should be relaxed. Resting for an interval between smelling different samples is also advantageous. If the number of samples to be tested is fairly large, it is advisable to examine last those materials which are known to be pungent or strong in odour.

It should be borne in mind that inability to correctly identify certain odours may arise from natural deficiencies such as specific anosmia. For instance, some people are unable to perceive musky odour.

Bias: The necessity of minimizing all differences between samples other than that of odour in order to prevent the prejudicing of results is stressed. 'Blind' tests should be conducted by ensuring that the markings on the smelling strip do not disclose the origin of the samples.

Time of Olfactory Assessment: The evidence relating to the most favourable time for conducting olfactory assessment is somewhat conflicting. However, the morning appears to be generally favoured. In general, olfactory assessment should be done after a reasonable interval of time has elapsed after a meal or a beverage has been taken.

Freedom from Contaminating Odours: It is necessary to ensure that the hands, nose and smelling strips are free from contaminating odours as these are likely to vitiate the results. It is recommended that the individual responsible for assessing odour should wash his/her hands several times during a smelling session as well as clear his /her nose.

Material Requirements: The following materials, apparatus and environmental conditions are required.

Library of Standard Samples: For each essential oil, aromatic chemical or other perfumery material, there shall be a standard sample of approved odour value.

The standard samples shall be kept in well-stoppered, air-tight, neutral amber-coloured glass bottles and when not in use, they shall be stored in a refrigerator at about 5°C.

The odour characteristics of standard samples are likely to change over a period of time however well they may be stored. Some materials improve in odour as a result of maturing while others deteriorate because of minute oxidative changes. An alteration in the odour characteristics of standard samples is not desirable and, in such cases, fresh standards should be adapted. Generally, all perfumery materials recommended shelf life and the sample should be changed thereafter.

Ethyl alcohol: Perfumery grade.

Diethyl Phthalate: Perfumery grade.

Smelling strips: These shall preferably be 1 cm wide and 15 cm long. They shall be made from odourless, thin, absorbent paper and shall be sufficiently stiff so that the strips do not bend under their own weight when held in a horizontal position.

Absorbent paper of substance ranging from 100 to 280 g/m^2 is commonly used. Paper is made entirely from the best cotton material, and is usually in the form of cotton or linnen fibre or a mixture of both. It should be free from any trace of chemicals. Also the water used in making such paper should be pure and completely free from odours, chemicals or salts. The paper should be neutral and should have been kept away from odorous materials and environment all the time. These considerations should be useful in evaluating the quality of the paper used for preparing smelling strips.

Smelling strips shall be packed in air-tight, odour-free containers and stored in a clean odour-free room. Those intended for daily use shall preferably be kept in a wide-mouthed glass bottle covered by a beaker.

Strips Stand: A cruciform patterned 3-clip stand, approximately 21 cm high, or any other suitable device, to hold impregnated smelling strips.

Environment: A well-ventilated room, as free as possible from all outside disturbances. Ideally, the temperature and humidity suited are about 20°C and 80 percent RH (Relative Humidity), respectively. The colouring of the room shall be sober and the furnishing restricted. The general environment shall have a restful rather than a distracting effect.

Procedure

One end of each smelling strip shall be clearly marked before use. Dip the unmarked end of one strip (about 0.5 to 1.0 cm) in the material under examination and of another strip to the same depth in the standard sample after it has attained room temperature. For certain perfumery materials, such as fatty aldehydes, absolutes and solids, use 1 to 10 percent solutions in ethyl alcohol or diethyl phthalate for olfactory assessment.

For semi-solids, solids and strong-smelling substances, use the procedure as given below.

For semi-solid materials: The odour of semi-solid materials such as guaiacwood oil, oakmoss resinoid and absolute, labdanum resinoid and absolute, etc, should be taken on smelling strips but only after melting the contents completely under controlled temperature below 100°C preferably on water-bath.

For strong smelling materials: In order to have a better perception, strong smelling substances irrespective of their physical appearance may also be smelt after dilution to about 1 to 10 percent such as indole, fatty aldehydes, etc, using ethanol or diethylphthalate as a diluent.

Hold the strip impregnated with the standard sample at such a distance from the nose that there is incipent yet distinct perception of odour. While smelling, concentrate wholly on the sensations received and make mental observations. Repeat the procedure with the strip impregnated with the test sample. After about a minute's rest, repeat the comparison reversing the order of smelling the two strips. Finally, compare the two strips for their odour in a "blind" test. If a difference in odour is observed, repeat the "blind" test on the two strips five times. Record the observations of each "blind" test.

It is important to note that although the room shall be well-ventilated, the strips kept under examination should not be exposed to a direct draught.

After this initial assessment for top notes, fix the two strips on a stand keeping them sufficiently apart to avoid inter-contamination. Examine the strips periodically by the "blind" test and note the changes in quality and intensity of odour. Continue in this manner as long as the odour on each strip remains perceptible.

Report

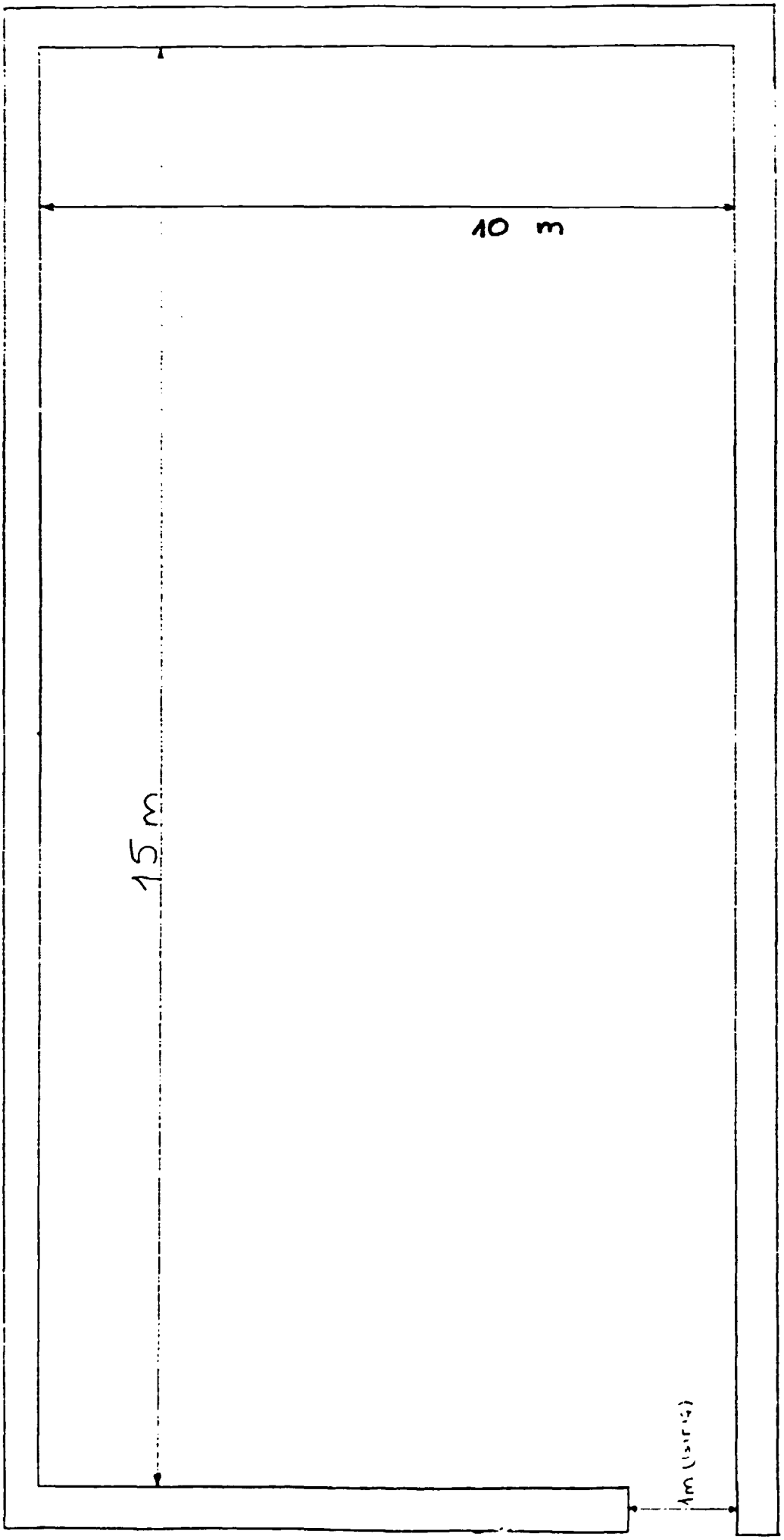
Report the top, middle and residual odour assessment of the test sample as compared with the odour of the standard sample at corresponding stages of assessment.

Criterion for Judgement of Quality: The odour of the material under examination shall correspond to that of the standard at all stages of assessment. If it does not and the pattern of odour is considered to be inferior to that of the standard, the quality of the material shall be regarded as not satisfactory.

Referee Test: In case of dispute, present the individual assessing odour with three suitable coded smelling strips, two of which have been dipped in the material under examination and the remaining one in the standard sample (or *vice-versa*). If the 'odd' sample is consistently picked five times in a 'blind' test, the material shall be deemed to have a pattern of odour different from that of the standard sample.

DETAILS OF FACILITIES REQUIRED IN THE SENSORY EVALUATION AND FRAGRANCE CREATION LABORATORY

1. Refrigerated storage of standard samples of raw materials and finished products.
2. Samples of raw materials in bottles of proper design for daily working.
3. Weighing balances of accuracy to third decimal place.
4. Magnetic stirrer and heater.
5. Water bath
6. Working tables with shelves up the eye level.
7. Efficient exhaust and ventilation system
8. Wash basin
9. Conical flasks, beakers, pipettes, droppers, funnels and aluminium foil.
10. Detached smelling room free from all odours for odour evaluation fitted with an efficient exhaust and filtered air inlet system.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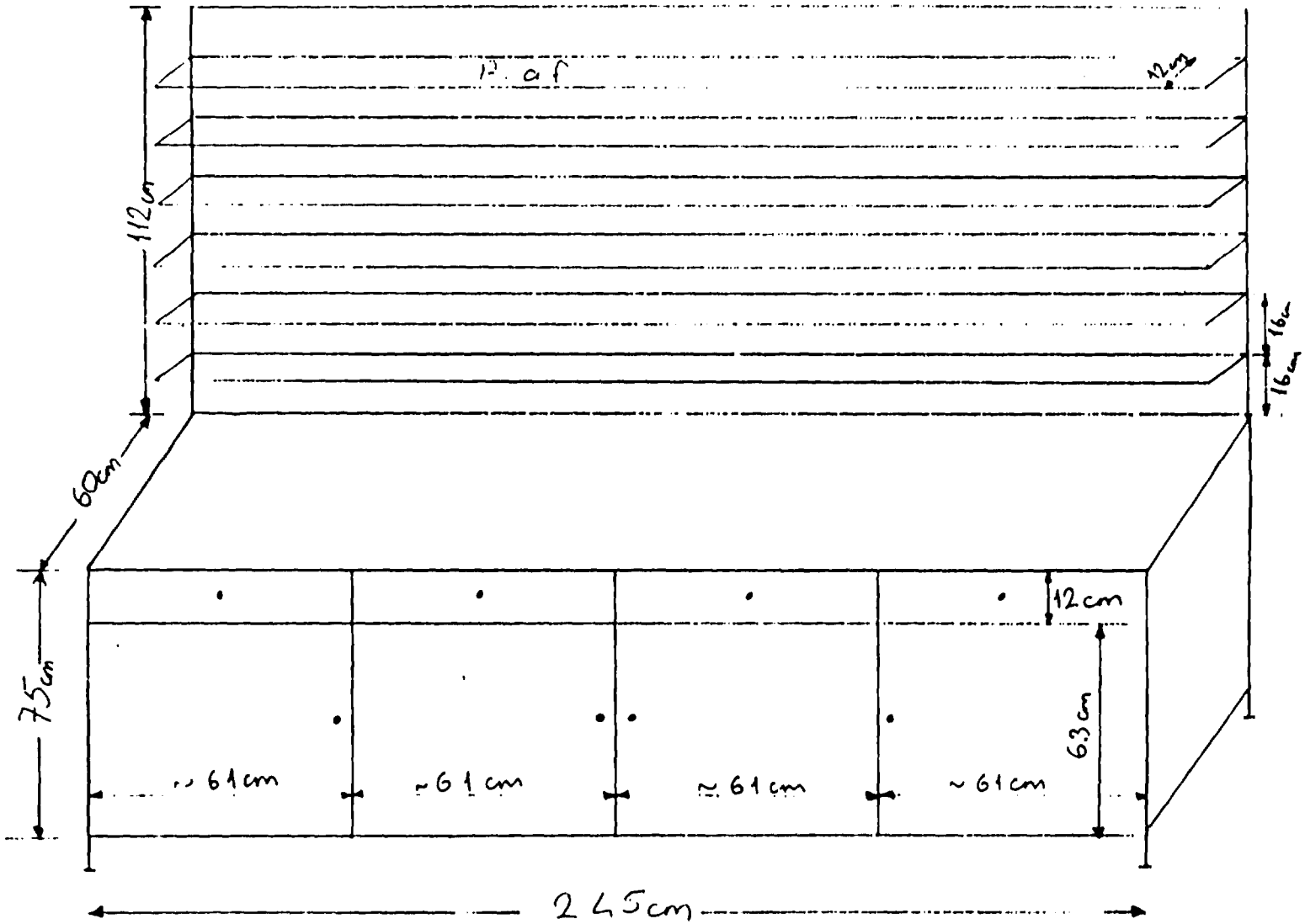

Yapım malzemesi: Sunta (Fildisi formika kaplanmış)

ANNEXURE 4

GLOSSARY OF TERMS RELATING TO NATURAL AND SYNTHETIC PERFUMERY MATERIALS

In the preparation of this glossary, most of the terms currently in use in natural and synthetic perfumery trade and industry together with their synonyms and more common terms in vogue internally and also in other countries have been included.

Terminology

1. **Absolutes:** An ethanolic extract of a concrete or a resinoid which contains the maximum concentration of odoriferous components and is free from natural waxes and/or any solvent used in the processing.
2. **Acid Value:** It is numeric value equivalent to the number of milligrams of potassium hydroxide required to neutralize the free acids present in 1 g of the material.
3. **Alcohol Perfumery Grade, Denaturated:** Rectified ethyl alcohol, specially denatured for perfumery industry, and by the addition of denaturants it thus not at any undesirable by-odours to it.
4. **Aldehydic Blend:** See 13
5. **Amber Note:** A heavy full-bodied warm ambergriss like note.
6. **Animal Note:** Odours or notes with a sensuous character.
7. **Aromatic Chemicals/Aroma Chemicals:** Organic chemicals derived by organic synthesis or as isolate from natural essential oils possessing distinct aroma. Used as raw material for the preparation of perfumery blends or flavours.
8. **Aromatic Plants:** See 92
9. **Aromatic Water:** Aqueous odoriferous condensate of hydro-distilled and/or steam-distilled material of vegetable origin containing fully dispersed essential oil.
10. **Attar (Indian):** A perfume concentrate characteristic of single flower or a mixture of flowers and/or other materials of plant or animal origin with oil of sandalwood as the base.
11. **Balsam:** An odoriferous exudate from plants/trees which flows naturally or is artificially induced by incision.
12. **Blend:** Harmonious combination of two or more odouriferous materials.
13. **Blend Aldehydic:** Blend deriving their unique character from the predominance of aldehydic notes.
14. **Blend,Cologne:** Any harmonious combination of fragrances, the main characteristics of which are derived from citrus oils.
15. **Blend, Oriental:** A blend with heavy, full-bodied sweet balsamic and animal note.
16. **Blend, Spicy:** Any fragrance combination having spicy overtone.
17. **Blend,Woody:** Any fragrance dominated by a woody character.

18. **Body:** Main fragrance theme.
19. **Boiling Range:** See 40
20. **Bouquet:** Generally a harmonius combination of two or floral notes.
21. **By-Note:** A temporary or permanent odour effect additional to the main pattern of odour effect additional to the main pattern of odour associated with the material.
22. **Carbonyl Value:** It is numerically equivalent to the number of milligrams of potassium hydroxide, that is, equivalent to the amount of hydroxylamine required to oximate the carbonyl compounds present in 1 g of material.
23. **Cell:** A unit of the plant tissue
24. **Cellular:** Composed of cells.
25. **Chypre:** A mossy-woody fragrance, complex with a characteristic sweet citrus top note, frequently encompassing some floral tones.
26. **Citrus:** Odours reminiscent of citrus fruits, such as orange, lemon, bergamot, grapefruit, etc.
27. **Cologne:** Name used traditionally for solution of citrus perfume blends in aqueous ethanol (also see 113).
28. **Cologne Blend:** See 14
29. **Concentration:** See 94
30. **Concentrated Perfume:** See 86
31. **Concrete:** A material derived from a single source of vegetable or animal origin by extraction with a suitable solvent. It generally contains non-odouriferous constituents, such as waxes, coloring matter etc, in addition to odoriferous components and is free from any solvent used in the process.
32. **Condensate:** Vapours that have been condensed .
33. **Conderser:** Part of distillation apparatus where the hot vapours are cooled and condensed for recovery.
34. **Congealing Point:** It is the maximum constant temperature at which liquefied solid resolidifies.
35. **Deterpenized Oil:** Natural essential oils which are free from terpenes and/or sesquiterpenes.
36. **Diffusion:** The ability of a fragrance to radiate and permeate the environment.
37. **Distillation:** A process of evaporation and recondensation used for purifying liquids.
38. **Distillation, Dry:** Distillation of semi-solid and solid materials in the absence of steam, water, or any other solvent.
39. **Distillation, Hydro:** Distillation of a substance carried out by indirect contact with boiling water.
40. **Distillation Range:** It is the range of temperature within which a specified percentage of the material distils.
41. **Distillation Steam:** Distillation of a substance by passing steam through it.
42. **Distillation, Vacuum:** Distillation of a substance under reduced pressure.
43. **Distillation, Water:** See 39.

44. **Dry Distillation:** See 38.
45. **Dry Out:** Final phase of the main fragrance after the main volatile constituents have evaporated.
46. **Enfleurage:** Process of extracting fragrance of fresh flowers by intimate contact with mixture of purified fats preferably at low temperatures.
47. **Essential Oil:** It is volatile perfumery material derived from a single source of vegetable or animal origin by a process, such as hydrodistillation, steam distillation, dry distillation or expression.
48. **Essential Oil, Synthetic:** It is a composition generally consisting of natural essential oils, aromatic chemicals, resinoids, concretes, absolutes, etc, but exluding animal or vegetable non-essential oils and not having a non volatile residue in excess of 10 percent by mass. It is so composed that it bears a close resemblance primarily in odour to a naturally occurring essential oil.
49. **Ester Value:** It is numerically equivalent to the number of milligram of potassium hydroxide required to neutralize the acids liberated by the hydrolysis of the esters present in 1 g of the material. It represents the difference between the saponification value and the acid value of the material.
50. **Ester Value After Acetylation:** It is numerically equivalent to the number of milligrams of potassium hydroxide required to neutralize the the acids liberated by the hydrolysis of 1 g of acetylated material.
51. **Evaporation Residue:** Represents the percentage of perfumery material which is not volatile when heated on a steam-bath under specified conditions.
52. **Expression:** The process of extracting essential oil from the plant cells by application of mechanical pressure.
53. **Extract:** A concentrated product obtained by treating a natural perfumery material with a solvent which is subsequently evaporated.
54. **Extraction:** The process of isolating essential oil with the help of a volatile solvent.
55. **Extrait, Alcoholic:** A French word, now universally used in perfumery, meaning an alcoholic extract of odorous parts of a pomade. It is generally used to mean alcoholic solution of a perfume concentrate.
56. **Fixative:** A substance which is compatible with and provides body and substantivity and rounds off a perfume composition by regulating the rate of evaporation of its volatile constituents.
57. **Flavour:** A combined organoleptic sensation of aroma and taste in a flavouring material is also called a flavour.
58. **Floral:** The fragrance characteristic of an existing known flower type.
59. **Fore Runnings:** Initial fractions of the distillate obtained during a distillation process.
60. **Fougere:** Perfume composition having a citrus/lavender top note with sweet powder rosaceous body with mossy/woody background.

61. **Fractionation:** The process of distillation by which an essential oil is separated into various fractions.
62. **Fruit Flavour/Essence:** Suitably blended mixtures of flavouring materials, permitted chemicals and food colours, in a solvent medium of either ethanol or the permitted non-alcoholic solvents.
63. **Fruity Note:** The impression of fruit odours within the fragrance theme.
64. **Full Bodied:** A well-rounded-out fragrance that possess depth and substantivity.
65. **Green Note:** Notes that recall fresh-cut grass, leaves and stems or other parts of plants.
66. **Gum:** A natural water soluble anionic material, often of glycoside-like structure and of high molecular mass which collects in or exudes from certain plants. It forms neutral or slightly acidic solution or a sol with water and has a typical mild odour.
67. **Gum Resin:** Natural exudation from plants and trees consisting of gums and resin with very small amounts of essential oils.
68. **Harmonius:** Order, accord and symphony in a fragrance.
69. **Heavy:** Oriental balsamic as against floral/green.
70. **Hydro Distillation:** See 39
71. **Infusion:** A process of treating a substance with water or organic solvvent
72. **Isolate:** Either a single constituent or a multi-component fraction or a composited fraction, rich in dezired odoriferous components and derived from a natiral perfumery material.
73. **Lasting Qualities:** The ability of a fragrance to retain its character over a given period of time.
74. **Leathery Note:** Any fragrance conveying the dominant characteristic of tanned leather.
75. **Melting Point:** The temperature at which the material melts and becomes liquid throughout as shown by the formation of a definite meniscus.
76. **Melting Range:** The range between temperatures at which the material begins to form droplets and at which it becomes liquid throughout.
77. **Middle Note:** The main overall odour effect experienced by olfactory nerves on smelling a strip impregnated with a material and exposed to the atmosphere for some time.
78. **Mossy Note:** The notes that recall to mind moist dark forest having moss on the trees.
79. **Natural Perfumery Materials:** Perfumery materials of natural origin.
80. **Odour:** That property of a substance which stimulates and is perceived by the olfactory sense.
81. **Oleoresin:** Exudations from tree trunks or barks of trees and are characterized by the fact that these consist of entirely or mainly resin accompanied with an essential oil in varying percentages, soluble in organic solvents.
82. **Oleoresin Gum:** An exudation from plants mainly consisting of essential oil, resin and gum.

83. **Oleoresin, Spice:** Extractables of spice having resin and essential oil obtained by solvent extraction.
84. **Oriental Blend:** See 15.
85. **Perfume:** A solution of perfumery compound/compounds in ethanol or other suitable solvents meant for use as a personal adornment. Here ethanol or other suitable odourless solvents are used as carriers for the fragrances.
86. **Perfume Concentrate:** A non-alcoholic concentrated perfume blend.
87. **Perfumery Compound:** A concentrated base which is further diluted with or without toning and further modifications to suit various end-uses.
88. **Perfumery Grade Alcohol:** See 3
89. **Perfumery Material:** A naturally occurring substance, or a derived material, or a preparation obtained by physical and/or chemical means, which diffuses or imparts an odour or a flavour.
90. **Perfumery Materials, Natural:** See 79.
91. **Perfumery Materials, Synthetic:** See 107.
92. **Plant, Aromatic:** Plant bearing a characteristic aroma.
93. **Pomade:** Refined and deodorized animal fat (s) saturated with volatile oils present in and exhaled from the flowers especially the rose and the jasmine.
94. **Rectification:** Method of separation of undesirable substance to improve the quality of the materials.
95. **Relative Density:** The ratio of density of material at 27°C to that of distilled water at 27°C or 4°C when all masses are made in air is called relative density at 27°C or 4°C. Originally, it was known as specific gravity.
96. **Residual Note (Dry Out Note):** An odour effect experienced by olfactory nerves on smelling a strip impregnated with a material and exposed to the atmosphere for a period of time when the top and the middle notes have disappeared.
97. **Resin:** Solid or semi-solid translucent exudation from trees of plants. These are soluble in organic solvents.
98. **Resinoid:** A semi-fluid or a solid material obtained from a single resinous source of vegetable or animal origin by extraction with a suitable solvent and is free from solvent used in the process.
99. **Saponification Value:** It is numerically equivalent to the number of miligrams of potassium hydroxide required to neutralize the free acids liberated by hydrolysis of the esters present in 1 g of the material. It represents the sum of acid value and ester value.
100. **Saponification Value After Acetylation:** It is numerically equivalent to the number of milligrams of potassium hydroxide required to neutralize the free acid and the acids liberated by hydrolysis of the esters present in 1 g of the acetylated product.
101. **Sesquiterpene:** Term denoting a hydrocarbon composed of one-and-a-half terpene units, a single terpene unit being equal to two isoprene units.

102.Sesquiterpeneless Oil: An isolate obtained by suitably removing the sesquiterpenes ($O_{15}H_{24}$) from an essential oil.

103.Specific Gravity: See 95.

104.Spice Oleoresin: See 83.

105.Spicy Blend: See 16.

106.Steam Distillation: See 41

107.Synthetic Perfumery Materials: Man-made single perfumery materials, by chemical processes.

108.Tail Running: The last fraction of distillate obtained in a distillation process.

109.Terpeneless Oil: An isolate obtained by removing almost all monoterpenes ($C_{10}H_{16}$) from an essential oil.

110.Thin: The lack of body, richness and substantivity.

111.Tincture: A cold alcoholic extract of the soluble part of a natural fragrant material of vegetable or animal origin, the solvent being left in the extraction as a diluent.

112.Tissue: Plant structure composed of cells.

113.Toilet Water: See 27.

114.Top Note: The first odour effect experienced by olfactory nerves on smelling a strip freshly impregnated with a perfumery material.

115.Vacuum Distillation: See 42.

116.Vacuum Distillation Residue: It is the percentage of material left behind undistilled when a known quantity of the material is distilled in vacuum at specified temperature and pressure.

117.Volatile: A material is said to be volatile when it has the property of evaporating at room temperature when exposed to atmosphere.

118.Water Distillation: See 39.

119.Woody Blend: See17.

120.Woody Note: The impression of wood or woody odours within the fragrance theme.

ANNEXURE 5

LIST OF THE VARIETY OF RAW MATERIALS THAT CAN BE PRODUCED IN VIETNAM.

For fragrances

1. citronellal
2. citronellol
3. dimethyl octanol
4. citronellyl acetate
5. citroneilyl butyrate
6. citronellyl formate
7. citronellyl valerate
8. geraniol
9. geranyl acetate
10. geranyl butyrate
11. geranyl formate
12. geranyl propionate
13. geranyl valerate
14. citral
15. α-ionone
16. ionone pure
17. methyl ionone
18. menthol
19. eugenol
20. isoeugenol
21. acetyl isoeugenol
22. linalol
23. linalyl acetate
24. terpineol
25. terpenyl acetate
26. isobornyl acetate
27. isoborneol
28. camphor
29. borneol
30. isobornyl cyclohexanol
31. hydroxycitronellal
32. para cresyl acetate
33. para cresyl methyl ether
34. para cresyl phenyl acetate
35. aldehyde C-16

For flavours

1. ethyl acetate
2. ethyl formate
3. ethyl propionate
4. ethyl butyrate
5. ethyl valerate
6. ethyl caproate
7. ethyl heptoate
8. ethyl caprylate
9. ethyl pelargonate
10. isopropyl cinnamate
11. isobutyl acetate
12. allyl caproate
13. allyl caprylate
14. aldehyde C-20
15. amyl formate
16. amyl acetate
17. amyl butyrate
18. amyl alcohol
19. isobutyl valerate
20. amyl valerate
21. ethyl salicylate
22. ethyl benzoate
23. isopropyl valerate
24. amyl propionate

36. aldehyde C-14
37. yara yara
38. nerolin bromelia
39. rose crystals
40. α-amyl cinnamic aldehyde
41. α-hexyl cinnamic aldehyde
42. cinnamic aldehyde
43. cinnamic alcohol
44. phenyl propyl alcohol
45. benzyl acetate
46. benzyl formate
47. benzyl propionate
48. benzyl butyrate
49. benzyl salicyate
50. benzyl benzoate
51. benzyl phenyl acetate
52. benzaldehyde
53. phenyl acetic acid
54. amyl phenyl acetate
55. isobutyl phenyl acetate
56. ethyl phenyl acetate
57. methyl phenyl acetate
58. styrallyl alcohol
59. styrallyl acetate
60. phenyl ethyl alcohol
61. phenyl ethyl acetate
62. phenyl ethyl formate
63. phenyl ethyl isobutyrate
64. acetyl longifolene
65. isolongifolene ketone
66. methyl cinnamate
67. methyl salicylate
68. amyl salicylate
69. isobutyl salicylate
70. nerol

Since these chemicals from the greater part of any fragrance or flavour compositions, the start up of indigenous manufacture of these chemicals will immediately satisfy more than 50% of the demand for raw materials by the Vietnamese Industry.

ANNEXURE 6

DETAILS OF NATIONAL WORKSHOP IN PERFUMERY FOR VIETNAMESE TECHNICIANS FROM THE ESSENTIAL OILS, AROMA CHEMICALS AND FRAGRANCE FLAVOURS COSMETICS AND TOILETTERIES SECTOR

The national workshop was attended by the following representatives of the Vietnamese industry:-

LIST OF PARTICIPANTS IN THE NATIONAL WORKSHOP ON FRAGRANCE FORMULATION AND ODOUR EVALUATION AT VINAROM CENTRE IN JUNE 1991 PROJECT VIE/86/033

1. Le Huy Hai
2. Vu Bao Dung
3. Nguyen Quang Hien
4. Luc Thi Van Hien
5. Do Lenh Cuong
6. Luong Si Binh
7. Tran Khanh Ngoc
8. Le Phuong Thao
9. Nguyen Nha Duc

The details of the topics covered were as follows:

1. Fragrance blending and compounding:

   The modern classifications of fragrances and methodology of compounding and blending and the principles involved therein were explained in detail.

2. Sensory evaluation of fragrances:

   The importance of precise and correct sensory evaluation in industry was discussed in detail. The importance thereof in industry from the technical as well as the commercial points of view was explained.

3. Raw materials in fragrance industry:

   The variety of raw materials used in the fragrance industry was discussed and diversity of sources from which these raw materials orignate was discussed and explained. The technical classification of raw materials was also explained and discussed.

4. Applications of fragrances in cosmetics and toilet preparations:

   The variety of products in which fragrances are used was explained.

The methodology of selection of a fragrance for any particular application and the technical and commercial considerations involved were explained.

5. Nature of international fragrance industry:

- commercial aspects
- trading practices
- marketing techniques

were discussed in detail and the Vietnamese personnel were made aware of the complex nature of international trade in the fragrance industry.

Concepts of standardisation as well as custom production were explained.

The goods and services available in the international market of the fragrance industry were explained in detail.

6. Quality Control

Olfactory assessment and instrumental quality control methods and their technical and commercial importance were explained.

7. Importance of Research and Development

The importance of building up in house facilities was explained as well as benefits accruing therefrom.

DETAILS OF THE FORMULATIONS CREATED BY THE EXPERT AND PRESENTED DURING THE NATIONAL WORKSHOP CONDUCTED BY THE EXPERT SETTING OUT THE BASIS FOR ADVANCED CREATIVE WORK.

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1. <u>GREEN FRESH</u>

1.	Hydroxy citronellal	10
2.	Lyral	10
3.	Lillial	20
4.	Cyclamen Aldehyde	10
5.	Benzyl Acetate	30
6.	Benzyl Propionate	15
7.	Amyl Cinnamic Aldehyde	10
8.	Styrallyl Acetate	10
9.	Phenyl Acetadehyde 50%	10
10.	Phenyl Acetaldehyde Dimethyl Acetal	5
11.	Petitgrain oil	15
12.	Galbanum oil	2
13.	Dihydromyrcenol	20
14.	Hexenol-cis 1%	10
15.	Methyl Heptin Carbonate 1%	10
		187

2. **GREEN-BALSAMIC**

i)	Green-Fresh	50
ii)	Cinnamic Alcohol	2
iii)	Resinoid Benzoin 50%	3
iv)	Phenyl Propyl Aldehyde 10%	5
		60

3. **FRUITY-FRESH**

i)	Orange oil	20
ii)	Lemon oil	10
iii)	Petitgrain oil	10
iv)	Citralva	5
v)	Hydroxycitronellal	20
vi)	Lyral	20
vii)	Hedione	5
viii)	Lavendin oil	5
ix)	Aldehyde C-12 MNA	2
x)	Aldehyde C-16	3
xi)	Aldehyde C-14	2
xii)	Aldehyde C-18	3
xiii)	Aldehyde C-19	2
xiv)	Aldehyde C-20	3
xv)	Citronellol	20
		110

4. **FLORAL-FRESH**

Lyral	20
Lillial	10
Hydroxy citronellial	10
Citronellol	40
Dimethyl Octanol	10
Geraneol	10
Benzyl Acetate	30
Benzyl Propionate	10
Hedione	3
Aldehyde C-9	1
Aldehyde C-11	2
Aldehyde C-12	2
Aldehyde C-12 MNA	1
Geranium oil Chinese	20
Lavender oil	15
Dihydromyrcenol	20
	204

5.(a) **FLORAL-ROSE**

Citronellol	40	Terpeneol	10
Dimethyl Octanol	20	Dihydromyrcenol	20
Geraneol	15	Benzyl Acetate	5
Citronellyl Acetate	3	Amyl Cinnamic Aldehyde	3
Citronellyl Formate	2	Ionone Alpha	5
Geranyl Acetate	2	Sandela	5
Geranyl Formate	3	Phenyl Ethyl Methyl Ether	2
Nerol	10		145

5.(b) **JASMINE**

Benzyl Acetate	50
Benzyl Propionate	20
Amyl Cinnamic Aldehyde	20
Hedione	5
Hydroxycitronellal	20
Lillial	10
Linalyl Acetate	10
Dihydromyrcenol	15
Indole	5
Phenyl Acetic Acid	10
Methyl Heptine Carbonate 1%	15
Nerol	5
Aldehyde C-10	1
Aldehyde C-9	1
Aldehyde C-14	3
	190

6. **FLORAL-SWEET (LILAC)**

Rose	50
Jasmine	50
HydroxyCitronellal	20
Lyral	20
Lillial	20
Methyl Ionone	15
Benzyl Salicylate	30
Musk Ketone	10
Dihydromyrcenol	10
Sandalore	5
Vanillin	2
Coumarin	2
Heliotropin	1
Anisaldehyde	1
Anisyl Acetate	3
Phenyl Ethyl Methyl Ether	1
	220

7. **ALDEHYDIC-FLORAL**

Aldehyde C-14	2	Aldehyde C-12 Lauric	2
Hydroxy citronellal	20	Aldehyde C-12 MNA	1
Lyral	30	Dyhidromyrcenol	20
Lillial	20	Lavendin oil	5
Cyclamen Aldehyde	10	Geranium oil	5
Aldehyde C-8 10%	5	Citronellol	10
Aldehyde C-9	1	Benzyl Acetate	5
Aldehyde C-10	1	Sandalwood oil	5
Aldehyde C-11	2	Aldehyde C-18	1
			145

8. **ALDEHYDIC-FLORAL-WOODY-POWDERY**

Aldehydic-Floral	50	Methyl Ionone	15
Sandela	5	Benzyl Salicylate	20
Sandalore	5	Musk Ketone	10
Ionone Alpha	1	Fixolide	5
Vetiver oil	1	Geranium oil	3
Patchouli oil	1	Lavendin oil	2
PTBCHA	2		120

9. **FRESH-MOSSY-ALDEHYDIC (CHYPRE)**

Floral-Fresh	30
Aldehydic-Floral	20
Res. Oakmoss 50%	5
Coumarin	5
Vanillin	2
Lavendin Absolute	8
Bergamot oil	10
	80

10. **FLORAL-MOSSY-ANIMALIC (CHYPRE)**

Fresh-Mossy-Aldehydic	50
Indole	2
Phenyl Acetic Acid	5
Galaxolide 50	5
Bergamot oil	8
Lavender oil	2
Res. Labdanum 50%	5
	77

11. **MOSSY-FRUITY (CHYPRE)**

Fresh-Mossy-Aldehydic	50
Res. Oakmoss 50%	10
Res. Labdanum 50%	10
Aldehyde C-16	5
Aldehyde C-14	3
Aldehyde C-20	2
Bergamot oil	5
	85

12. **ORIENTAL.**

Galaxolide 50	15	Coumarin	7
Fixolide	10	Res. Labdanum 50%	5
Musk Ambrette	5	Res. Benzoin 50%	5
Musk Ketone	3	Bergamot oil	10
Sandalwood oil	10	Lavender oil	5
Lillial	15	Geranium oil	5

Vanillin	10	Jasmine	5
Ethyl Vanillin	3	Rose	5
			118

13. **LEATHER**

Res. Labdanum 50%	20
Res. Castoreum 50%	5
Iso Butyl Quinoline	5
	30

14. **FOUGERE**

Rose	50	Geranium oil	5
Jasmine	20	Res. Oakmoss 50%	15
Lavender oil	30	Res. Labdanum 50%	5
Lavendin oil	10	Methyl Ionone	5
Vanillin	10	Dihydromyrcenol	10
Coumarin	15	Lavendin Absolute	5
Sandalwood oil	10	Vetiver oil	5
Bergamot	10		205

15.(a)**CITRUS-CLASSIC**

Orange oil	50	Aldehyde C-8	2
Lemon oil	30	Aldehyde C-10	3
Petitgrain oil	20	Citralva	5
Aurantine Extra	20	Hedione	5
Lavender oil	10	Lyral	5
			150

15(b)**CITRUS-FIXED**

Citrus classic	50
Geranyl Acetate	5
Citronellyl Formate	5
Lyral	5
Musk Ambrette	5
Methyl Ionone	3
Musk Ketone	2
Benzyl Salicylate	5
	80

15(c) **COOL-FLORAL**

Citrus Fixed	50
Hydroxy Citronellal	10
Nerol	5
Citronellol	5
Freskomenthe	5
	75

16. **LAVENDER NOTES**

Lavender oil	50	Coumarin	10
Lavendin oil	25	Vanillin	5
Lavendin Absolute	10	Galaxolide 50	15
Res. Oakmoss 50%	10	Sandalore	5
			130

17. **SPICY NOTES**

Aldehyde-Floral-Woody-Powdery	50
Eugenol	5
Isoeugenol	5
Methyl Eugenol	1
Acetyl isoeugenol	2
Clove oil rectified	2
	65

18. **WOODY**

Sandalwood oil	10	Ionone Alpha	5
Sandela	20	Methyl Ionone	10
Sandalore	10	Geranium oil	10
Vetiver oil	5	Lavendin oil	10
Patchouli oil	5	Aldehyde C-11	5
PTBCHA	20	Galaxolide 50	10
Fixolide	10		130

19. **MUSK NOTES**

Musk Ambrette	10
Musk Ketone	10
Fixolide	30
Galaxolide 50	30
Sandalwood oil	15
Sandalore	10
Geranium oil	10
Lavender oil	10
Eugenol	5
	130

ANNEXURE 7

SPECIAL FORMULATIONS FOR VINAROM/SVDC

At the very special request of the Project authorities, exclusive formulations of an International Standard, for the commercial industrial use of Vinarom/SVDC, were created by expert. This work, although beyond the scope of the job description of the expert, was done because of the request made by Vinarom/SVDC.

These formulations, which have been handed over to the project authorities are listed below:-

COMMERCIAL FORMULAE

1. GREEN-FRESH

Hydroxy Citronellal	10
Lyral	10
Cyclamen Ald.	10
Benzyl Acetate	30
Benzyl Propionate	15
Amyl Cinnamic Ald.	10
Hexyl Cinnamic Ald.	10
Styrallyl Acetate	10
Styrallyl Alcohol	5
Phenyl Acetaldehyde 50%	10
PADMA	5
Hydratropic Ald.	5
Petitgrain oil	15
Herone	5
Res. Galbanum	5
Galbanum oil	2
Galbex	2
Dihydro myrcenol	20
Linalool	10
Hexenol cis 1%	10
Cis. hexanyl Acetate 10%	10
Cis. hexanyl Salicylate	5
HHC 1%	10
Methyl Octine Carbonate 1%	10
Solvent as required.	

2. GREEN-BALSAMIC

Green fresh	50
Cinnamic alcohol	2
Res. Benzoin	3
Phenyl Propyl Ald. 10%	5
Res. Balsam Tolu	5
Res. Balsam Peru	5
Cinnamic Acetate	10

3. FRUITY-FRESH

Orange oil	20	Triplal	10
Mandarin oil	10	Ald. C.16	3
Tangerine oil	5	Ald. C.14	2
Bergamot oil	10	Ald. C.18	3
Lemon oil	10	Ald. C.19	2
Petitgrain oil	10	Ald. C.20	3
Citralva	10	Raspberry ketone	15
Aurantine extra	10	Citronellol	20
Hydroxy Citronellal	20	Citronellyl Formate	5
Lyral	20	Musk Xylol	25
Lillial	30	Aldron	5
Mayol	5	Solvent as required	
Hedione	5		
Lavendin oil	10		
Spike lavender oil	5		
Myrac ald.	10		

4. FLORAL-ROSE

Geranium oil Bourbon	20	Citronellyl Acetate	3
Geranium oil Chinese	10	Citronellyl Formate	2
Phenyl Ethyl Alcohol	30	Citronellyl Butyrate	1
Diphenyl oxide	5	Benzyl Acetate	2
Citronellol	40	Geranyl Formate	3
Dimethyl Octanol	20	Geranyl Butyrate	1
Geraneol	15	Nerol	15
Folrosia	15	Neryl Acetate	5
Rosalva	20	Terpeneol	15

Linalol	15
Bromostyrol	5
Ald. C.9	2
Ald. C.11	2
Dihydro myrcenol	20
Rose crystals	10
BenzoPhenone	5
Benzyl Acetate	15
ACA	5
Ionone Alpha	7
Sandela	5
Dacdanol	5
PEHE	3
Solvent as required	

5. FLORAL-JASMINE

Benzyl Acetate	50
Benzyl Propionate	20
Benzyl Formate	5
Benzyl Butyrate	5
Benzyl Valerate	2
ACA	20
Hexyl Cinnamic Ald.	10
Hedione	5
Dihydro Iso Jasmone	3
Jasmonyl	5
Hydroxy Citronellal	20
Lyral	10
Lillial	10
Citronellyl oxy Acetaldehyde	5
Linalol	15
Linalyl Acetate	10
Terpenyl acetate	10
Dihydro myrcenol	15
Dihydro linalol	5
Linalol oxide	1
Indole	5
Skatole	1
Res. Civet	2
Jasmine absolute	2
Phenyl Acetic Acid	10
Paracresyl valerate	1
HHC 1%	15
Methyl Nonyl Ketone	1
Methyl Octine Carbonate 1%	5
Nerol	5
Ald. C.9	1
Ald. C.10	1
Ald. C.11	5
Solvent as required	

6. FLORAL-FRESH

Lyral	20
Lillial	10
Hydroxy Citronellal	10
Cyclamen Ald.	5
Citronellyl Oxy Acetaldehyde	10
Mayol	10
Muget Alcohol	5
Citronellol	40
Dimethyl Octanol	10
Geraniol	10
Citronellyl Formate	5
Benzyl Acetate	30
Benzyl Propionate	10
Hedione	3

Dimenthyl Benzyl Carbinol	5	Ambersage	5
Dimethyl Benzyl Carbinyl Acetate	10	Geranium oil Chinese	20
Cyclal C 1%	10	Geranium oil Bourbon	5
Ald. C.9	1	Freskomenthe	5
Ald. C.11	2	Lavender oil	15
Ald. C.12	2	Lavendin oil	5
Ald. C.12 MNA	2	Dihydro myrcenol	20
Ald. iso C.11	2	Dihydro linalol	5
Dimethyl Octenone	2	Ethyl Citral	5
		Solvent as required	

7. FLORAL-SWEET

Rose	50	Tetra hydrolinalol	5
Jasmine	30	Sandalore mysore core	2
Rose absolute	1	Brahamanol	3
Jasmine abs.	2	Vanillin	2
Hydroxy Citronellal	20	Ethyl Vanillin	1
Lyral	20	Coumarin	2
Lillial	20	Methyl Coumarin	1
Methyl Ionone	15	Heliotropin	1
Cetone V	5	Anisaldehyde	1
Ionone Alpha	5	Anisyl Acetate	3
Benzyl salicylate	30	Helional	2
Musk ketone	10	PEA	1
Celestolide	10	Trimethyl Undecylenic ald.	1
Crysolide	5	Solvent as required.	
Phantolide	5		
Rose axide 10%	10		
Dihydro myrcenol	10		
Terpeneol	10		
Linalol	10		

8. ALDEHYDIC-FLORAL

Ald. C.14	2	Cyclamen ald.	10
Decalactone	2	Muget alcohol	10
Hydroxy Citrollal	20	Ald. C.8 10%	5
Lyral	30	Ald. C.9	1
Lillial	20	Ald. C.10	1

Ald. C.11	2	Lavendin oil	5
Ald. Iso C.11	1	Geranium oil Chinese	5
Trimethyl undecylenic Ald.	1	Geranium oil Bourbon	1
Ald. C.12	2	Citronellol	10
Ald. C.12 MNA	1	Rose crystals	5
Triplal	1	Benzyl acetate	5
Myrac ald.	2	Allyl Cyclo hexanyl propionate	2
Dihydro myrcenol	20	Myraldyl acetate	3
Lavender oil	10	Sandalwood oil	5
Lavender abs.	1	Bacdanol	3
Linalol	10	Solvent as required	

9. ALDEHYDIC-FLORAL-WOODY-POWDERY

Aldehyde Floral(commercial)	50	Methyl Ionone	15
Sandela	5	Benzyl Salicylate	20
Sandalore	5	Musk ketone	10
Sandal mysore core	5	Allyl Ionone	5
Ionone Alpha	1	Fixolide	5
Ionone Beta	1	Galaxolide	5
Vetivert oil	1	Geranium oil Chinese	3
Vetiveryl Acetate	1	Geranium oil Bourbon	1
Patchouli oil	1	Lavendin oil	2
Guaiacwood oil	1	Eugenol	3
Cedrol	1	Solvent as required	
ITRCHA	2		

10. CITRUS-CLASSIC

Orange oil	100	Orange flower Abs.	5
Mandarin oil	20	Aurantine	20
Tangerine oil	10	Lavender oil	10
Bitter Orange oil	5	Ald. C.8	4
Lemon oil	30	Ald. C.10	6
Limette oil	30	Citralva	5
Petitgrain oil	20	Neocyclo citral	1
Neroli oil	5	Hedione	5
		Lyral	5
		Linalyl Propionate	5
		Solvent as required	

11. CITRUS-FIXED

Citrus classic (commercial)	50	Musk ketone	2
Geranyl acetate	5	Methyl Ionone	5
Citronellyl formate	5	Benzyl salicylate	5
Lyral	5	Allyl Ionone	5
Dihydro myrcenol	5	Ironal	2
Musk Ambrette	5	Linalol	5
Musk Xylol	10	Methyl heptenone	1
Musk CPD	5	Methyl Anthranilate	5
Lime oxide	5	Methyl Beta naphthyl ketone	1
		Solvent as required	

12.(a) COOL FLORAL (Detergent Compound)

Citrus -fixed (commercial)	100	Terpeneol Pharma grade	10
Hydroxy Citronellal Technical Quality	10	Iso borneol	5
Cyclamen ald. Technical	10	Dipentene	10
Citral Nitrile	10	Pinneedle oil	10
Nerol	10	Verdyl Acetate	10
Myrac Ald. 10%	20	Floro cyclene	5
Citronellol Technical	5	Diphenyl oxide	10
Geraneol Technical	5	Solvent as required	

12(b) COOL-FLORAL (Soap compound)

Citrus fixed (commercial)	100	Phenyl Ethyl Alcohol	10
Lyral	10	Iso borneol	5
Lillial	10	Pinneedle oil	20
Triplal 10%	10	Diphenyl oxide	20
Cyclamen ald. technical	10	Phantolide	10
Citral nitrite	10	Iso nonyl Acetate	10
Nerol	10	Verdyl Acetate	10
Myrac ald. 10%	20	PTBCHA	5
Citronellol tech.	5	Florocyclene	5
Geraneol tech.	5	Cedarwood oil	10
Terpeneol Pharma grade	10	Ald iso C.11 10%	20
Rose crystals	10	Solvent as required	

12 (c) COOL-FLORAL (Shampoo compound)

Citrus fixed (commercial)	100	Iso borneol	5
Lyral	10	Firneedle oil	20
Lillial	10	Diphenyl oxide	5
Triplal 10%	10	Phantolide	15
Cyclamen ald. tech.	10	Iso nonyl Acetate	10
Citral-nitrile	10	Verdyl Acetate	10
Nerol	10	PTBCHA	5
Myrac ald. 10%	20	Floro cyclene	5
Citronellol	5	Methyl cedryl ketone	10
Geraneol	5	Ald. Iso C.11 10%	20
Terpeneol Pharma grade	10	Allyl Amyl glycolate	5
Freskomenthe	10	Solvent as required.	
Rose crystals	15		
Phenyl Ethyl Alcohol	10		

13. LAVENDER NOTES

(a) Soap/Shampoo Compound

Linalyl Acetate	50	Propenyl guaethol	5
Terpenyl Acetate	100	Galaxolide	100
Levendulyl Acetate	50	Musk xylol	50
Geranyl Acetate	15	Musk ketone	30
Spike Lavender oil	50	Musk Ambrette	15
Lavendin oil	100	Musk Moskene	15
Res. Oakmoss	100	Sandela	50
Res. Labdanum	20	Bramamanol	15
Coumarin	50	Timberol	15
Dimethyl hydroquinone	40	Floral Sweet (commercial)	70
Methyl Coumarin	10	Solvent as required	
Vanillin	30		
Ethyl Vanillin	10		

(b) Cosmetics compound

Linalyl Acetate	50	Spike Lavender oil	50
Lavender oil	100	Lavendin oil	100
Lavendulyl Acetate	50	Res. Oakmoss	100
Geranyl Acetate	15	Res. Labdanum	20

Coumarin	50	Fixolide	25
Dimethyl hydroquinone	40	Musk ketone	30
Methyl Coumarin	10	Musk ambrette	15
Vanillin	30	Musk moskene	15
Ethyl Vanillin	10	Sandela	50
Methyl Ionone	30	Dramamanol	15
Benzyl Salicylate	60	Timberol	15
Dihydro Myrcenol	50	Floral-Sweet (com.)	70
Propenyl guaethol	5	Ald. Iso C.11	10
Galaxolide	100	Sandalwood oil	20
Celestolide	25	Solvent as required.	

c) Fragrance compound

The same as the cosmetics compound, but with the addition of:-

Lavender abs.	30
Levendin abs.	20

14. SPICY-NOTES

Aldehydic Floral Woody

Powdery (commercial)	100	Sandalore	5
Eugenol	10	Levendin oil	5
Iso Eugenol	10	Nutmeg oil	1
Methyl Eugenol	1	Ginger oil	5
Acetyl Iso eugenol	1	Celery seed oil	1
Clove Bud oil	2	Rosemary oil	10
Clove stem oil	5	Estragon oil	5
Cassia bark oil	2	Solvent as required	
Cinnamon leaf oil	1		

15. WOODY NOTES

(a) Soap Compound

Sandela	50	Cashmeran	5
Sandalore	20	Phantolid	15
Bacdamol	20	Tonalid	10
Vetivert oil	5	Fixolide	10
Patchouli	5	Lillial	50
PTRCHA	40	Cyclamen ald.	10
Bois Ambreine Forte	5	Ionone Alpha	5
Ald. C 13-13	15	Ionone Beta	5
Ald. C 11-11	5	Methyl Ionone	15
Galaxolide	10	Musk ketone	15

Benzyl salicylate	50
Floral Sweet (commercial)	70
Geranium oil	15
Lavendin oil	15
Ald. C.11	10
Interleven Ald.	5
Solvent as required	

(b) Cosmetics compound

Sandalwood oil	15	Lillial	50
Sandela	50	Cyclamen ald	10
Sandalore	20	Rosalva	15
Bacdanol	20	Alph-Ionone	5
Vetivert oil	5	Ethyl Vanillin	10
Patchouli oil	5	Methyl Ionone	15
Methyl Cedryl ketone	40	Musk ketone	15
Bois Ambreine	5	Benzyl salicylate	50
Ald C.13-13	15	Floral-Sweet(commercial)	70
Ald. C.11-11	5	Geranium oil	15
Galaxolide	10	Lavendin oil	10
Cashmeran	5	Ald C.11	10
Exaltolide	5	Interleven ald.	5
Tonalid	10		
Fixolide	10	Solvent as required	
Allyl Ionone	5		

16. MUSKY NOTES

Cosmetic/Fragrance compound

Musk Ambrette	10	Ethylene Brasylate	10
Ambrettolide	2	Sandalwood oil	30
Thibetolide	3	Sandalore	20
Musk ketone	10	Brahamanol	10
Musk xylol	20	Timberol	10
Tonalid	10	Mahogonate	5
Phantolid	5	Geranium oil Chinese	20
Celestolide	10	Lavendin oil	10
Fixolide	30	Lavender oil	15
Galaxolide	30	Lavender abs.	10

Linalyl acetate	10
Dimethyl Octenone	5
Eugenol	5
Clove bud oil	10
Floral Sweet	40
Solvent as required	

17. CHYPRE

Fresh-Mossy-Aldehydic

Floral Fresh (commercial)	30
Aldehydic-Floral(commercial)	20
Jasmin absolute	3
Fleuramone	1
Cis-Jasmone	1
Hedione	1
Res. Oakmoss	5
Res. Labdanum	5
Evernyl	5
Orcinyl-3	2
Coumarin	5
Methyl Coumarin	2
Dimethyl Hydroquinone	3
Vanillin	2
Ethyl Vanillin	1
Lavender abs.	2
Lavendin abs.	8
Bergamot oil	10
Linalyl acetate	10
Dihydro myrcenyl acetate	5
Linalol	5
Solvent as required	

18. CHYPRE-FLORAL

MOSSY - ANIMALIC

Chypre-fresh-Mossy	
Aldehydic (commercial)	100
Floral-Jasmin	10
Indole	2
Skatole 1%	5
Phenyl Acetic Acid	5
Civet abs.	1
Ambroxan 1%	2
Galaxolide	10
Musk T	5
Thibetolide	1
Bergamot oil	15
Tangerine oil	5
Lavender oil	5
Res. Castoreum	2
Res. Labdanum	10
Methyl Ionone	5
Benzyl Salicylate	15
Musk ketone	5
Iso E Super	5
Solvent as required	

19. CHYPRE-MOSSY-FRUITY

Floral-Ald.Mossy(commercial)	100
Floral Sweet	15
Evernyl	5
Res. Flouve	1
Res. Boldo	1
Lavendin abs.	5
Res. Labdanum	10
Iso butyl cinnamate	10
Methyl cinnamate	5
Ald C.16	5
Strawberry Furanone 1%	5
Ald C.14	3
Decalactone	2
Ald C.20	2
Raspberry ketone	2
Bergamot oil	5
Linalyl Formate	1
Linalyl Acetate	5
Linalyl Propionate	5
Allyl Amyl Glycolate	5
Solvent as required	

20. ORIENTAL

Galaxolide	15
Fixolide	10
Tonalid	5
Celestdide	10
Crysolide	5
Ethylene Brassylate	15
Musk Ambrette	15
Musk ketone	10
Benzyl Salicylate	30
Methyl Ionone	10
Ionone Alpha	5
Sandalwood oil	10
Sandalore	10
Sandal Mysore core	10
Lillial	50
Hayol	10
Citronellyl Oxy Acetald.	10
Dihydro linalol	10
Dihydro myrcenol	10
Ald. Iso C.11	5
Myrac ald.	5
Vanillin	20
Ethyl Vanillin	10
Coumarin	20
Tonka beans abs	5
Cistus oil	5
Ambroxan 1%	5
Res. Labdanum	5
Res. Benzoin	5
Cinnamyl Acetate	5
Cinnamyl cinnamate	5
Bergamot oil	30
Lavender oil	10
Lavender abs.	5
Geranuim oil	15
Aldron	15
Dimethyl Octenone 10%	10
Jasmine	15
Rose	15
Jasmine abs.	5
Rose abs.	5
Solvent as required	

21. FOUGERE

Rose	50	Eugenol	5
Jasmine	20	Vetivert oil	5
Lavender oil	50	Vetiveryl Acetate	5
Lavendin oil	10	Bergamot oil	10
Lavendin abs.	15	Linalool	5
Lavender abs.	5	Linalyl acetate	5
Vanillin	10	Geranuim oil	5
Ethyl Vanillin	3	Rose oxide 1%	5
Methyl Coumarin	7	Dihydro rose oxide 10%	5
Coumarin	10	Res. Oakmoss	15
Ocimum Basilicum	5	Evernyl	2
Sandalwood oil	10	Res. Labdanum	5
Bacdanol	5	Methyl Ionone	5
Ald C.11	5	Benzyl Salicylate	10
		Musk ketone	5
		Exalxolide	5
		Dihydro myrcenol	10
		Solvent as required	

ANNEXURE 8

DETAILS OF THE RECOMMENDATIONS MADE BY THE EXPERT

1. Establishment of a fragrance research and development laboratory specialising in both quality control as well as creative perfumery.

   The expert has conducted an introductory short course and an advanced National Workshop encompassing a fraction of the perfumery materials currently available in the world market.

   This has to be followed by a series of more advanced courses leading to the establishment of a fully fledged fragrance creation laboratory.

   The objective of such fragrance technology courses should be to train the local technicians to gain further experience in product development and creation of value added products.

   The topics required to be covered in detail are as under:

   1. Odours and sense of smell. Odour description and classification.
   2. Aromatic materials from natural sources
   3. Aroma chemicals
   4. Derivatives of essential oils and aromatic specialities
   5. The historical development of perfumery
   6. Extrait perfumes and toilet waters
   7. Perfume briefing. Perfune creation and compounding
   8. Application of perfumes
   9. Quality control and quality assurance
   10. The perfume industry

2. Establisment of a properly equipped facility for the production of fragrances and flavours.

   Currently the major requirements of the Vietnamese industry are met by multi-national companies.

   The Vietnamese Companies in this industry have to be encouraged and provided with the necessary technical inputs to enable them to establish modern manufacturing facilities and follow the trends in modern creative perfumery. Vertical integration, by way of fragrance manufacturers establishing captive aroma chemicals and other raw materials manufacturing facilities, has to be encouraged, to enable them to be more independent and have access to, sometimes, vital by-products.

Equipment required for the establishment of a fragrance production facility.

a) Containers for raw materials storage
b) Containers for finished goods storage
c) Mixing vessels with heating and stirring arrangement
d) Blending vessels with heating and stirring arrangement
e) Beakers, jugs, tubs and trays
f) Weighing balances
g) Packaging and labelling equipment

3. Establishment of applications laboratories for cosmetics soaps and related products.

As per the existing world wide practice, the vietnamese fragrance industries have to back their customers by providing to them, the latest applications technology to help new customers to enter the market and thus expand the same.

Thus applications laboratories are required to be set up where practical and industrially feasible procedures for the manufacture of products such as soaps, cosmetics, detergents, cleaners, aerosols and toilet preparations will be demonstrated to Vietnamese entrepreneures thus enabling them to manufacture the latest consumer products.

4. Establishment of courses for Vietnamese technicians and entrepreneurs to absorb, assimilate and use the essential oils, aroma chemicals, fragrances and applications technologies.

These should be held on a regular basis after the necessary infra-structure has been established, to enable smooth transfer of technology from the Experts to the Vietnamese industry.

5. Development of a complimentary course to aquaint the Vietnamese Companies with the latest international trends and trading and marketing practices.

Again after the creation of the necessary infra-structure, such courses should be conducted to regularly provide up to date commercial information to help the industry retain its competitive edge.

One of the most important commercial aspects to be borne in mind with reference to trading and marketing is COSTING. The commercial and industrial costing of every product made should be done keeping the availability of local resources in mind, such that the cost of the locally manufactured product should not under any circumstances exceed the cost of that material in the open world market. The National Project staff should keep this particular

point in mind and decide upon the mix of products to be made only after a thorough costing has been done, such that a net saving in foreign exchange accrues to the nation. Very obviously, there is no point in manufacturing a product using imported inputs if the cost of the finished product manufactured locally is going to be more than the landed cost of the imported product.

Related benefits likely to accrue to Vietnam due to the establishment of the aforementioned facilities:

i) Establishment of new pionering industries directly leading to the introduction of new technologies.

ii) Generation of new employment opportunities in both industrial as well as the agricultural sectors.

iii) Production of Import Substitution items.

iv) Expansion of the industrial base of the country leading to greater domestic consumption of locally produced raw materials in addition to exports.

ANNEXURE 10

EVALUATION OF PARTICIPANTS

i) The personnel of VINAROIL and DETERGENT COMPANY OF SOUTH VIETNAM, HCM CITY, attending the Training Course were evaluated and the order of merit was found to be as under:-

1. VU BAO DUNG
2. NGUYEN QUANG HIEN
3. NGUYEN MINH HUNG
4. LE HUY HAI
5. LUC THI VAN HIEN
6. NGUYEN THI NGA
7. TRUONG THI PHUONG
8. NGUYEN QUI KHAN
9. TRIEN BICH THUY

ii) The personnel of VINAROIL, DETERGENT COMPANY OF SOUTH VIETNAM, HCM CITY and PETROVIETNAM, HANOI attending the National Workshop were also evaluated and the order of merit was found to be as under:-

1. VU BAO DUNG
2. TRAN KHANH NGOC
3. NGUYEN QUANG HIEN
4. LUC THI VAN HIEN
5. LE HUY HAI
6. NGUYEN QUI KHAN
7. LUONG SI BIEN
8. LE PHUONG THAO

Backstopping Officer Technical Comments on
Technical Report by Mr. Sudhir Jain
DP/VIE/86/033

The report describes in detail the activities of the expert who has performed extremely well. Mr. Jain has kept to his reputation as an expert perfumer and carried out more activities than envisaged in the job description. He has upgraded both the theoretical and practical knowledge of prospective perfumers in Vietnam. He has also shared valuable and protected information about recipes for blends. The contents covered at the Workshop he has held have widen the knowledge of the counterparts and should be helpful to them to be useful and self reliant professionals. The recommendations made by the expert include the specifications and details for setting up a sensory evaluation laboratory and a perfume blending laboratory. Some of these would be implemented during the duration of the project and others should be followed up by the counterparts in order to be a fully operational institution.