INTRODUCTION TO FRAGRANCES FLAVOURS INGREDIENTS AND PRODUCTION
INTRODUCTION:

- Integral part of day to day life. Almost present in every commodity.

- Fragrances used for external applications such as spray perfumes, body care, home care, cosmetics, soaps & detergents and incense. These are non-consumables.
- Flavours provide interesting taste & aroma to consumables such as savouries, confectionaries, dairy products, beverages, etc.

- Dosage of fragrance & flavours limited to not more than 1% for most products.

- Dosages of fragrances can be as high as 10% in case of fine fragrances (spray perfumes) and incense (agarbatties).
- Flavour & Fragrance, a judicious combination of various odoriferous or aroma providing substances.

- Perfumers & Flavorists combine their art and knowledge of science (of the ingredients used).

- Standards set for quality ingredients by recognized international institutions.

- Flavours & Fragrances produced in accordance with international regulations.
TYPES OF ACCORDS OR ODORS

Woody

Amber

Animalic

Floral

Citrus

Green
TYPES OF ACCORDS OR ODORS

Fruity

Powdery

Musky

Spice

Oceanic

Fresh Mint
TYPES OF FLAVOURS

Fruity

Vanilla

Spicy

Nutty

Minty
The accords & aromas are provided by combination of natural extracts, essential oils, isolates, certain synthetic or semi-synthetic ingredients.

Ingredients used by Flavorists & Perfumers can be broadly placed in 2 categories viz.;

- Natural Ingredients.
- Synthetic / Semi Synthetic Ingredients.

Ingredients synthetically made are also present in naturally occurring materials.
B. Natural ingredients

Isolates obtained in pure / concentrated forms from

Plants  Herbs  Seeds  Gums

Fruits  Twigs  Stems  Roots
Process of obtaining natural isolates is mostly physical where the aroma bearing herbage is subjected to;

- Steam / Hydro Distillation
- Solvent Extraction
- Super Critical Extraction
DEG - BHABKA SYSTEM
A. **Steam / Hydro Distillation**

- Process of obtaining essential oil at temp. ranging from 100 to 110 deg.C.

- Plant material disintegrated and loaded in the distillation still on a perforated plate.

- Dry saturated steam passed below the perforated plate.

- Travel of essential oil along with the steam in vapour form exiting from the still.

- Mixture of steam & vapour passing through the condensor resulting condensation.

- Condensate collected in an oil separator allowing separation of water & oil.
Steam / Hydro Distillation

- Depending upon the density of oil, decantation is carried out from the bottom or top of the separator.

- Filtration and removal of moisture from the oil by using dehydrating agent.

- Oil sent for quality control.

- Wastage herbage burnt as fuel in the boiler for steam generation thus economizing the cost.

- Certain herbage dried and preserved for deriving Oleoresin.

- Isolation of Oleoresin from herbage by Solvent / Super Critical extraction or Chromatographic Separation.
A. **Steam / Hydro Distillation**
a. **Steam / Hydro Distillation**
B. **Solvent extraction**

- Process to isolate essential oil along with oleoresin present in the plant material.

- Penetration of suitable solvent through the cells facilitating soluble material in solvent phase known as ‘Miscella’.

- Miscella decanted out from the herbage bed through filter.

- Isolation of solvent from Miscella by distillation in a Solvent Recovery unit.

- Solvent condensed, rectified and stored for the next batch.

- Residual solvent freed from residue at moderate temp., reduced pressure and at elongated time.

- Residue obtained is the Oleoresin, a viscous mass at room temperature.
B. **Solvent extraction**

- Removal of Oleoresin in the form of paste after cooling or withdrawn warm as an oily mass later offered to perfumers & flavourists.

- In case of flowers, oleoresin obtained is known as ‘Concrete’.
B. SOLVENT EXTRACTION
B. **SOLVENT EXTRACTION (PILOT SCALE)**
B. SOLVENT EXTRACTION (COMMERCIAL SCALE)
C. **Super critical extraction**

- Product produced almost natural.

- No damage caused to the product due to heat, no residual solvents.

- Herbage brought in contact with Carbon Dioxide gas at high pressure.

- Gas in this case is the solvent penetrating the cells facilitating out the oleoresin embedded in the plant material.

- Extract obtained isolated from the plant material.

- Total escape of gas from the extract once brought at atmospheric pressure.

- Extract obtained truly natural, gas recycled for next batch.
C. **Super critical extraction**

- Equipment is capital intensive and is exorbitantly priced.
- Batch size seldom more than a few 100 kilos.
- Perfumers seldom use concretes in formulation owing to waxes present in them.
- Congealing process for removal of waxes from the concretes by its dispersion in alcohol.
- Cold mass filtered and freed from the waxes.
- Isolation of alcohol from the extract by distillation in a Thin Film Evaporator.
- Product free from alcohol called as ‘Absolute’ offered to perfumers.
C. **Super critical extraction**
PURIFICATION AND SEPARATION OF INGREDIENTS FROM NATURAL ESSENTIAL OIL BY FRACTIONAL DISTILLATION

FRACTIONATION” A TECHNIQUE TO SEPARATE THE RIGHT QUALITY & QUANTITY OF THE COMPONENTS FROM THE ORGANIC MIXTURE. BY-

A- MOLECULAR DISTILLATION UNIT

B - FRACTIONAL DISTILLATION UNIT
MOLECULAR DISTILLATION UNIT

- For separating the volatile from non-volatiles at high vacuum, low pressure and low temperature.

- The separation is important to safeguard and maintain the vital properties of the product.

- For refining the crude essential oils, oleoresins and resinoids.

- The oil can be dehydrated and decolorized without disturbing the basic characteristics of the product.
MOLECULAR DISTILLATION UNIT STAGE - 1
FRACTIONATING COLUMN
FRACTIONATING COLUMN
A. **Synthetic ingredients**

- Aroma chemicals having characteristic odors as per molecular structures.

- Produced by reaction of two or more synthetic or naturally occurring chemicals under specific temperatures and pressure conditions.

- Use of catalyst is done to bring about reactivity between the molecules.

- Unreacted material & by-products formed are separated from the main product by various physical processes, thus giving the main product in the pure form.

- Main product kept for maturation before being offered to a perfumer or flavorist.
Process Equipment for Synthetic / Semi synthetic Aroma Ingredients (Liquids).

- Reaction kettles with accessories.
- Wash vessels.
- Flash distillation units with accessories.
- Fractionating column.
- Product Maturation Tank.
- Solvent Storage Tanks & Transfer Pumps.
GLASS LINED REACTION VESSEL WITH ACCESSORIES
Process Equipment for Synthetic / Semi synthetic Aroma Ingredients (Solids or Powders).

- Solution making tanks with stirrers.
- Filter with Pumps.
- Crystallizer.
- Centrifuge.
- Solvent Recovery system.
- Dryers.
- Multi mill.
- Sifter.
- Double Cone / Octagonal blender are required.
Utilities & Services:

- Steam Generator / Boiler.
- Cooling Tower.
- Water Circulation Pump.
- Chilling Plant.
- Vacuum Pump.
- Nitrogen Supply Station or PSA System.
- Electrical Systems.
- Instrumentation.
- Equipped Testing Laboratory.
- Effluent Treatment Plant.
- Water Reservoir & Pump.
- Fire Fighting equipment & Safety devices.
- Material Handling equipment.
CONCLUSION

▪ Availability of various raw materials, both natural & synthetic.

▪ Skilled man power required for production.

▪ Economic viability depends on scale of operation and procurement of raw material.

▪ Products produced with rigid quality control and offered at competitive prices prevail with good demand.

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THANK YOU ALL.

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