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Review Article

A Review on Perfumery

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ABSTRACT

Perfumes is a mixture of fragrant essential oils or aroma compounds, fixatives, solvents used to give the human body, animals, food objectives & living spaces an agreeable scent in this review includes introduction, notes, classification of perfumes, chemistry of perfumes, manufacturing techniques, pharmaceutical Application of perfumes are explained brief.

Keywords: Perfumery notes, chemistry of perfumes, manufacturing process, applications

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INTRODUCTION

is a mixture of fragrant essential oils or aroma compounds, fixatives and solvents, used to give the human body, animals, food, objects, and living-spaces an agreeable scent It is usually in liquid form and used to give a pleasant scent to a person's body It has been used for centuries by mankind perfumes are supposed to released a continuous pleasant fragrance that will provide a long lasting feeling of freshness initially it was only used for religious purpose but now it has become an ornament of sophistication for both men and women

HISTORY

The word perfume derived from the Latin perfumer meaning to smoke through perfumery as the art of making perfumes began in ancient mesopotania and Egypt was further refined by the Romans and Arabs The Egyptians were the first who used perfume for personal enjoyment but the production of perfume was reserved for the priests and they used it in religious purpose The world's first recorded chemist is considered a women named Tapputi perfume maker mentioned in a uniform from the 2nd millennium bc in Mesopotamia In the 9th century the Arab chemist Al kindi wrote the book of the chemistry of perfume and distillations which contained more than a hundred recipes for fragrant oils, slaves, aromatic water and substitutes of costly drugs. The Book also described 107 methods and recipes for perfume making equipment such as the alembic described by synesius in 4th Century.

The Persian chemist Ibn sina also known as Avicenna Introduced the process of extracting oils from flowers by means of distillation the first experimented with the rose until his discovery ,liquid perfumes consists of mixtures of oils & crushed herbs or petals which made a strong blend rose water was more delicate and immediately became popular as recreated for the Greek national archaeological museums anniversary show countless aspects of beauty allowing visitors to approach antiquity through their olfaction receptors

Distilled flower oils & calamus with other aromatic. The art of perfumery was known in western Europe from 1221 taking into account the monks recopies of santa maria delle vigne or santa maria novella of Florence Italy is the east the Hungarians produced in 1370 a perfume made of scented oils blended in an alcohol soln best know as Hungary water at the behest of Queen Elizabeth of Hungary.

The art of perfumery prospered in renaissance Italy and in the 16th century the personal perfumer to Catherine de media (1519-1589) René the fioretine took Italian refinements to France became one of the European centres of perfume and cosmetics manufacture perfumes were used primarily by the wealth to mask body odours in frequently at the time of 16th-17th centuries partly due to patronage the perfume in 1693 Italian barber Giovanni pado femines created a perfume water called as aqua admirabilis today best known as eau de cologne By the 18th century the grasse region of france sicily & calabria were growing aromatic plants to provide the growing perfume industry with raw materials even today Italy & France remain the centre of European perfume design and trade England & Germany also contributed a lot in modernization of perfumery in India perfume and perfumery existed in the Indus civilization (300-1300 bc) one of the earliest distillations of Ittar was mentioned in the Hinde Ayurvedic test charaka samhita & sushrutha samhitha.

The perfumes dates back more than 4000 years they were discovered in an ancient perfumery a 300 square meter (3230sqft) factory housing at least 60 stills, mixing bowls, funnels & perfumes bottles.

In ancient times peoples use herbs & spices such as almonds, coriander, myrtte, conifer resin & the bergamot as well as the flowers. In may 2018 an ancient perfume rodo (rose) was recreated then filtered & put then back in the still several times

COMPOSITION OF PERFUMES

Perfumes are mainly composed of
1) Essential Oils: Derived from natural aromatic plant extracts and or synthetic aromatic chemicals. **Examples**: Limonene, linalool, geraniol, citral

2) Fixatives: Natural or synthetic substances used to reduce the evaporation rate. **Examples:** Benzyl benzoate, benzyl alcohol

Notes in Perfumes: Perfume is described in a musical metaphor as having three sets of notes making the harmonious scent accord. These notes are created carefully with knowledge of the evaporation process of the perfume.

They are three types of notes

1) **Top Notes**: They are generally the lightest of all notes and recognized immediately after application top notes consists of small light molecules with high volatibiliy that evaporate quickly common fragrance of top notes includes citrus (lemon, orange, zest) light fruits (grape, berries) & herbs (clary, sage, lavender).

2) **Middle Notes:** The middle notes or the heart notes make an appearance once the top notes evaporate the middle notes compounds from the heart or main body of a perfume and act to mask the often unpleasant initial impression of base notes which become more pleasant with time common fragrances of middle notes include rose lemon ylang, lavender, nutmeg & jasmine. These notes are usually mellower & can appear in the smell somewhere between two minutes and one hour after the perfume is applied.

3) **Base Notes:** Base notes or bottom or dry notes appear while middle notes are fading the base and middle notes together are the main theme of a perfume base notes bring depth and solidity to a perfume common fragrances of base notes include sandal wood vanilla & musk myrrh, frankincense, ginger, clove.

These are the aromas that will last for several hours. Top notes are bergamot, juniper, cedarwood, lavender, geranium and gardenia. Middle notes are clove, ylang-ylang, lavender, jasmine, rose and geranium.

Table 1: Perfumery Notes Classification of Perfumes Based on Duration of Fragances

S.NO	ESSENTIAL OIL	PERFUMERY NOTE	FAMILY
01	BASIL	TOP	HERBAL
02	BENZOIN	BASE	RESIN/SWEET
03	BERGAMOL	TOP	CITRUS
04	CAMPHOR	MIDDLE	MINTY/HERBAL
05	CARDAMON	MIDDLE	SPICY
06	CARROT WOOD	MIDDLE	SWEET
07	CEDAR WOOD ATLAS	BASE	WOODY
08	CHAMOMILE GERMAN	MIDDLE	FLORAL
09	CHAMOMILE ROMAN	MIDDLE	FLORAL
10	CINNAMON	MIDDLE	FLORAL

Table 2: Perfumes are classified into five major groups on the basis of concentration of fragrance and duration of lasting

SNO	CLASS	% OF AROMATIC COMPOUND	DURATION
01	PERFUME	20 - 30	6 - 8
02	EAU DE PARFUME	15 - 20	4 - 5
03	EAU DE TOILETTE	5 - 15	2 - 3
04	EAU DE COLOGNE	2 - 4	2
05	EAU DE FRAICHE	1 - 3	2

CHEMISTRY OF PERFUMES

CHEMISTRY OF ESSENTIAL OILS

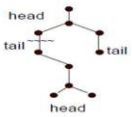
Isoprene Rule: All the terpenoids are derived from one monomeric structural unit called isoprene hence they are referred as isoprenoids. The isoprene rule states that the skeleton structures of all naturally occurring terpenoids are built up of isoprene units. These are some violations of the isoprene rule.

Examples: Cryptone a natural terpenoid contains only 9 carbons atoms instead of 10 and hence isoprene rule cannot be applied.

SPECIAL ISOPRENE RULE

A part from the presence of isoprene units in terpenoids in nearby all the terpenoids a special type of arrangement is found to be present this observation lead to propose another rule called as special isoprene rule states that the isoprene units un terpenoids are usually joined in head to tail linkages or 1,4 linkage

Examples: In a terpenoid of the formula C10H16
The isoprene units are linked in the following manner
H=HEAD T= TAIL



THE CHEMISTRY OF PERFUME

The history of perfumes goes back 5000 years to the ancient Egyptians who originally used them to religious ceremonies perfumes have the tools in scented gums such as frankincense and myrrh which were used as incense during religious rituals Egyptians also used perfumes during the embalming process

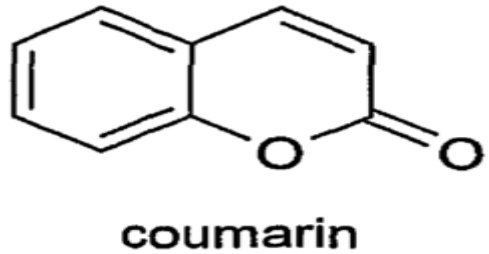
OLFACTORY STRUCTURE

Most perfumes are composed of a three part structure the head also referred to as the top note is the first olfactory impression the perfume imparts. The second is the heart note which is the main fragrance that lasts for several hours. The last is the base note the fragrance and is comprised of the least volatile chemicals

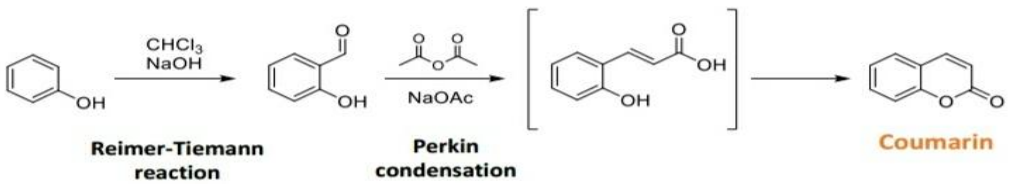
THE BEGINNING OF THE MODERN PERFUMES

COUMARIN

1856 :- Isolation by extraction of Tonka beans with 80% ethanol (F.WOHLER) *Dipteryx odorata*



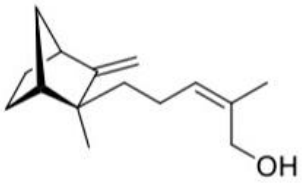
1868 :- First formal synthesis (W.H. PERKIN)



1884:- First synthetic molecule to be used in a perfume

FRANGANCE AND CHEMISTRY FOR MORE SUSTAINABILITY

Preservation of natural resource: the sandalwood oil. One of the oldest perfumery ingredients (used since 4,000 years). Obtained by steam distillation of +30-y.o. wood (yield: 6 %) Overharvesting endangered the sandal tree (2004 IUCN Red List).High need for synthetic substitute ingredients.



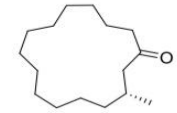
(-)-(*Z*)-β-santalol
20-25 % oil weight

PROTECTING ENDANGERED WILD LIFE: THE TONKIN MUSK

One of the priciest perfumery ingredients (60,000 €/kg). Illegally extracted from the musk deer pods (poaching) Base note with excellent fixative properties Provides warmth, sensuality and tail to perfumes

Smells woody, camphoraceous, oceanic, musky One of the most expensive and rarest perfumery ingredients (50,000€/kg). Excellent fixative properties (last several months on a blotter Results from from digestive pathology of sperm whales (c.a. 1 %). A "whale vomit" that turns into "floating gold.

DEVELOPING SUBSTITUE FOR EXTREMELY RARE



(-)-(*R*)-Muscone

MANUFACTURING PROCESS

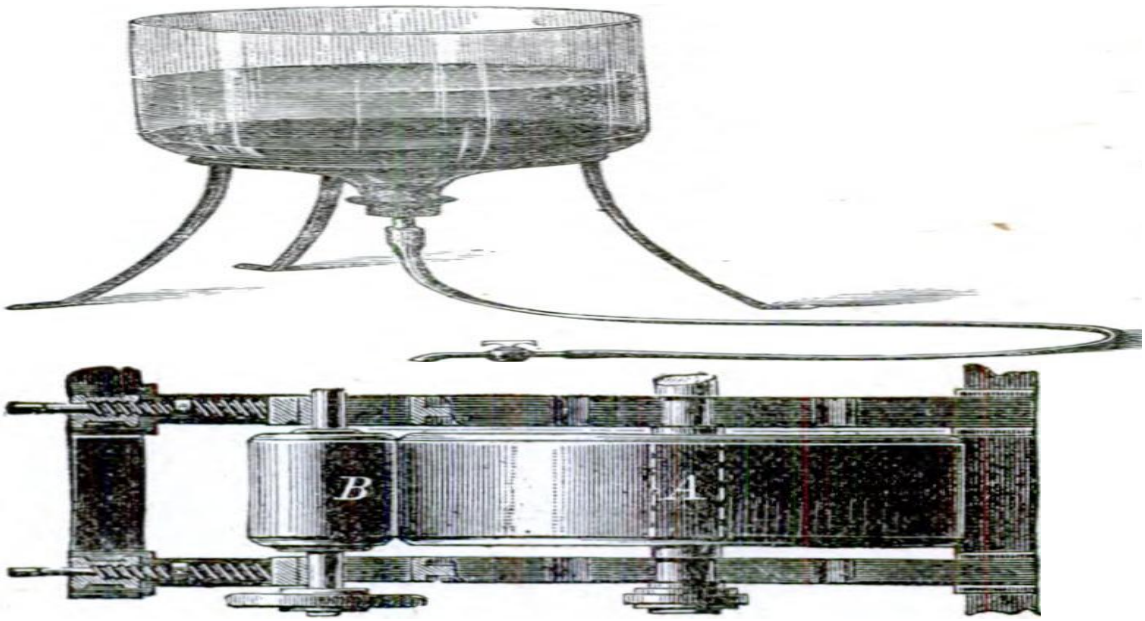
1) Ancient technique - Manufacturing technique used for extraction of odors

Excepting the articles made in turkey and India (especially oil of rose) most of the aromatic substances are manufactured in southern France and the adjoining regions of Italy, while a few oils of peppermint and lavender are produced in England a few also oils of peppermint, spearmint, winter green, sassafras etc in the united states The methods by which the odors can be extracted from the plants differ according to physical properties of the raw material and the chemical composition of aromatic substances

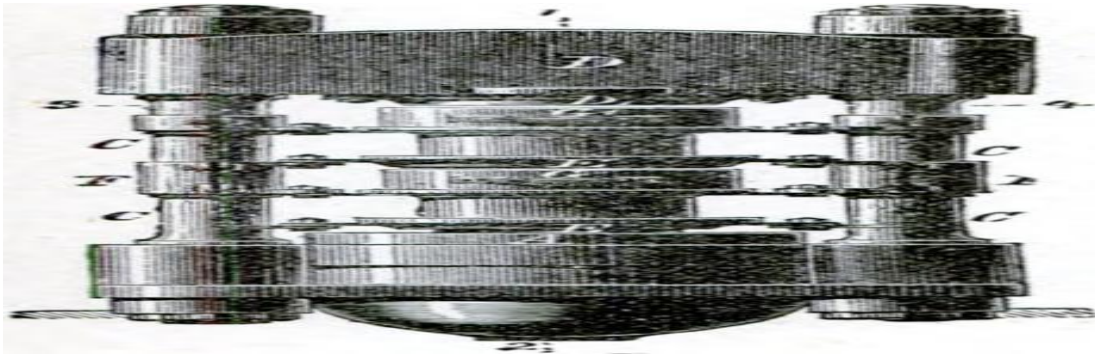
PRESSURE

Certain aromatic substances that occurs in large amount in some plants of obtained by pressure. The force is usually applied through a screw with a stout iron splindle the vegetables substances being inclosed in strong linen or horse hair cloths placed between iron plates and subject to gradually increasing pressure. The oil is generally extracted by pressure a hydraulic press is preferable.

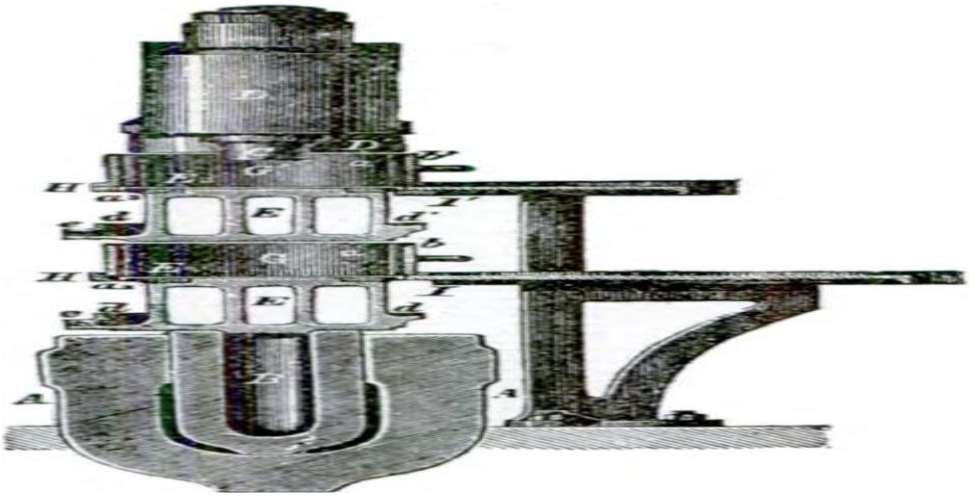
The later is separated and finally purified by filtration through a double paper come in a funnel covered with glass plate.



The material is placed into through F containing a feeding roller moved by the belt p. The scrappers FF pressed against the cyclinders by means of weighted levers free the rollers from adhering piece.

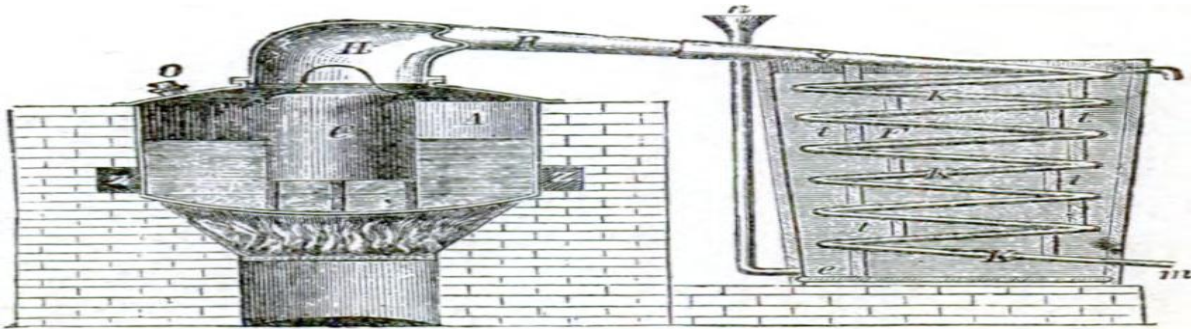


As the piston rises the troughs E sink into the pots the escaping oil collects in the gutters d and then passes into a receptable. After pressing the piston allowed to sink back the pots G are drawn a side so these drop pressures are suitable for the extraction of all fixed oils & volatile oils present in orange and lemon peel.



DISTILLATION

Most of the volatile oils obtained by the distillation process such as the essential oils present in cumin, anise, lavender, fennel, mace, nut meg. For extraction of odors different apparatus are used For the manufactures who run without steam and are obliged to use a naked flame it consists of a copper boiler A the still set in a brick furnace.



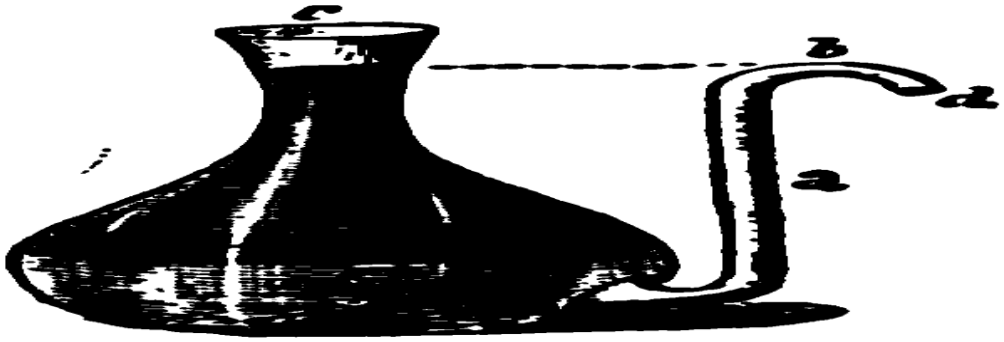
The later is constructed that the in condescent gases strike not only the curved bottom of the still but also its sides through the flues Z left side in the brick work. In a placed of basket c the apparatus can also be provided with an additional vessel containing material to be distilled

FLORETINE FLASK

Floretine flask as a receptable for the separation of oil and water. It consists of glass bottle from the bottom of which ascends a tube curved above. During the distillation flask become filled with water on which floats on the larger of oil The excess of water escapes through a at d until the flask finally contains more oil and a very little water. When producing essential oils on large scale instead of frail floretine flask it is advisable to use separators.

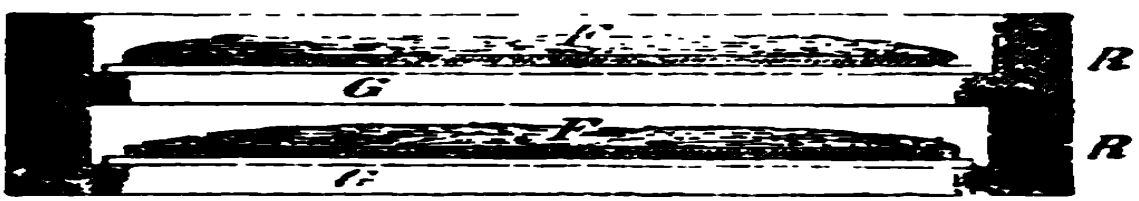
The vapours rising from the still D through helm C and tube A into worm K the fluid condensed in the latter drops into the tin floretine flask F the aromatic water flowing from the latter passes into the still D through the welter funnel T and is distilled over. The contents of the Floretine Flask are poured into funnel which is covered with glass plate and allowed to stand at rest.

By carefully opening the water is to escapes and oil is immediately filled into bottles which are closed air tight and preserved in a cool and dark place.



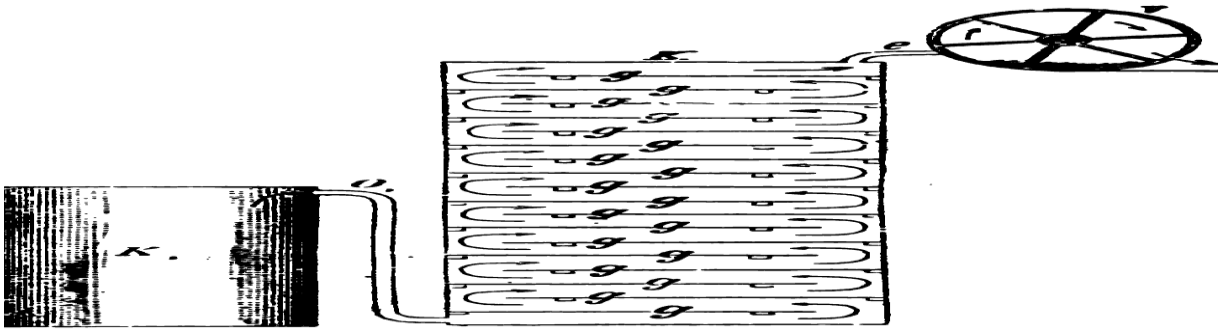
ABSORPTION OR ENFLURAGE

In this method the absorbing power of fat is used for retaining odors but the flowers are treated with fat at ordinary temperature the fat is spread to a thickness of about one quarter inch glass plates G. The frames are super imposed & left for from one to three days when fresh flowers are substituted for the wilted ones and so on until the pamade has attained the desired strength.



This procedure is tedious therefore better modified in a air tight box we place a large number of glass plates g covered with lard dracon into fine threads by means of a syringe. This is box is commented with small one K which is filled with flowers and provided with openings O and latter by a tube with box K.

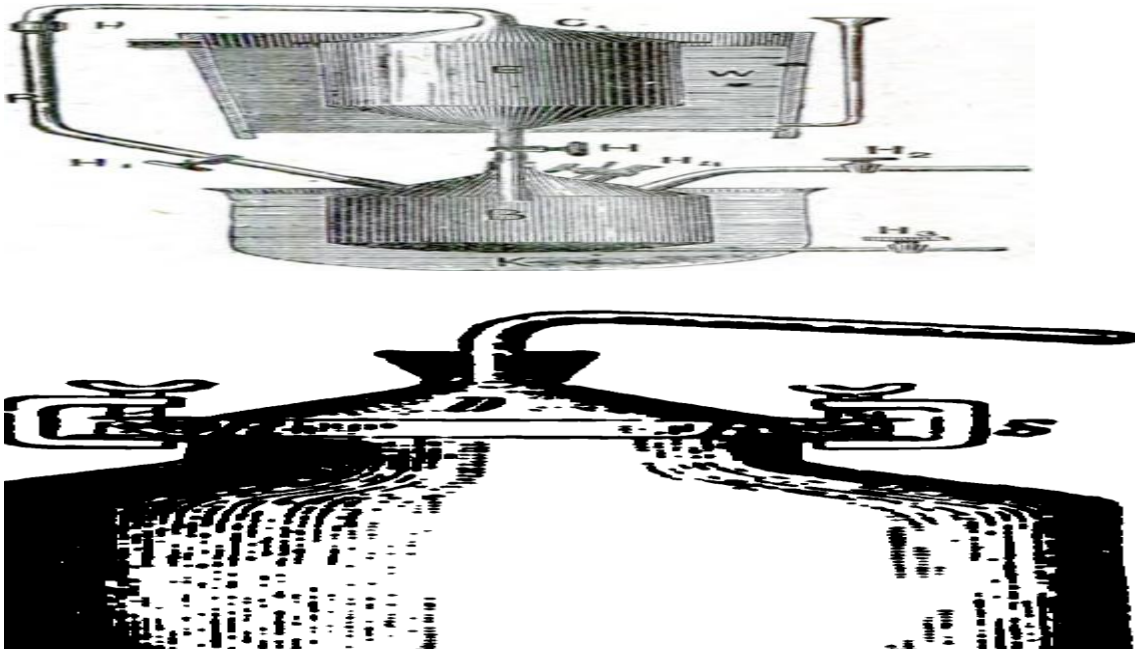
The air drawn from k is laden with odour and in passing over the fat as shown by arrows gives them up completely to the fat. The use of this apparatus is advantagible because it influences the rapid absorption and flowers do not come in contact with fat therefore can take up nothing but the odours.



EXTRACTION

This method is based on the fact that some volatile liquids such as ether choloroform, petroleum ether, bisulphide of carbon carbon possess the property of rapidly extracting the aromatic substances from flowers. The apparatus which is used for this purpose is illustrated it consists of cyclinder made of tinned iron which is provided above circular gutter R terminating in a stop cock h and which can be closed by a lid D bearing a stop cock O

A tube b with a stop cock a enters the bottom of the cyclinder later it is filled with flower the volatile liquid is poured over then. The lid is put on and the gutter R filled with the water there by scaling the contents of vessel hermetically.



The solution of aromatic substances are evaporated in apparatus and at the lowest possible temperature the solvent being condensed and used over again. The heat required for ether about 36`C (97`F) for cholroform about 65`C (149`F) for petroleum ether about 56`C (133`F) & bisulphides of carbon about 45`C (118`F)

If it is desired to obtain the aromatic substances pure from an alcoholic.

MODERN TECHNIQUES
DEG BHABKA SYSTEM

STEAM / HYDRO DISTILLATION

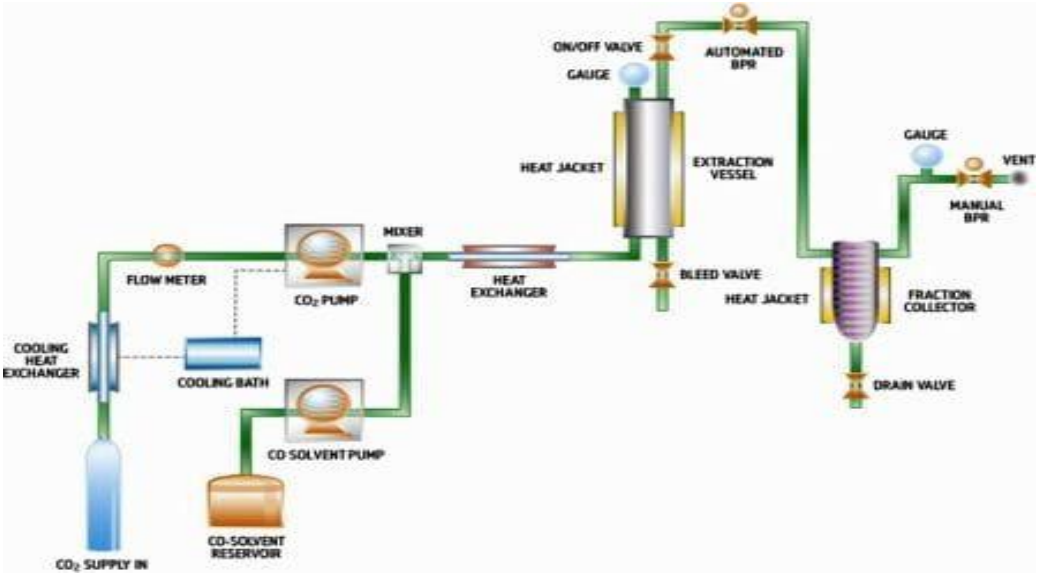
Process of obtaining essential oils at temp ranging from 100 to 110`C. Plant material disintegrated and loaded in the distillation still on a perforated plate. Dry saturated steam passed below the perforated plate. Travel of essential oils along with the steam in vapour form exiting from the still Mixture of steam & vapour passing through the condensor resulting condensation. Condensate collected in an oil separator allowing separation of water & oil. 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.

SOLVENT EXTRACTION

Process to isolate essential oils along with oleoresin present in the plant material 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. Residual obtained is the oleoresin a viscous mass at room temperature. 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.

SUPER CRITICAL EXTRACTION

Product produced almost natural. No damage caused to be product due to heat no residual solvents. Herbage brought in contact with carbondioxide 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. Batch size seldom more than a few 100 kilos. Perfumes seldom use concrete in formulation owing to waxes present in them. Isolation of alcohol from the extract by distillation in a thin film evaporator.

MANUFACTURING PROCESS

Perfumes can be manufactured by following steps:

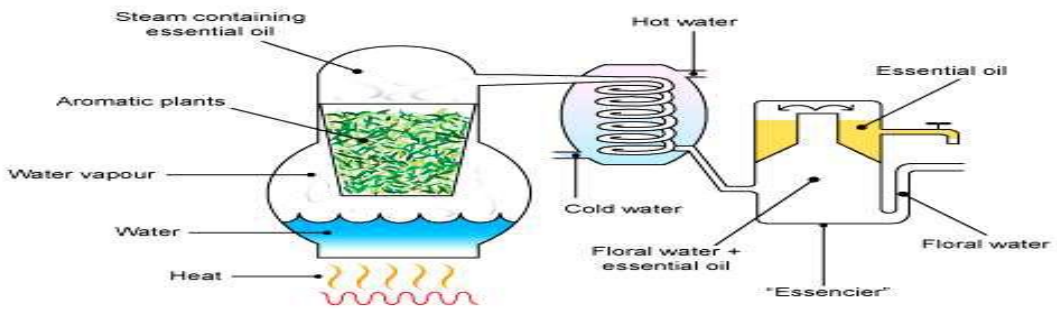
Collection: Before manufacturing process begins the sources of suitable fragrances are collected in the manufacturing centre.

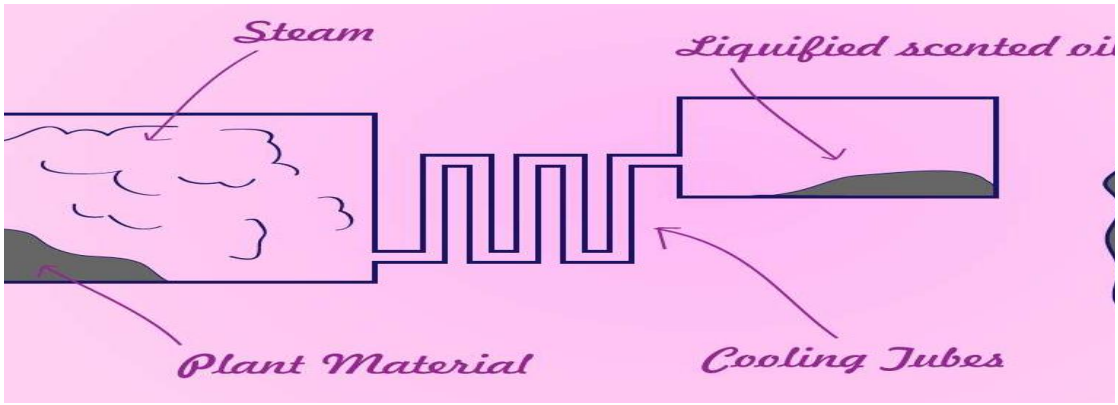
Extraction: Oils are extracted from plants and other substances by several methods like

- **Steam distillation**
- **Solvent extraction**
- **Enflurage**
- **Expression**

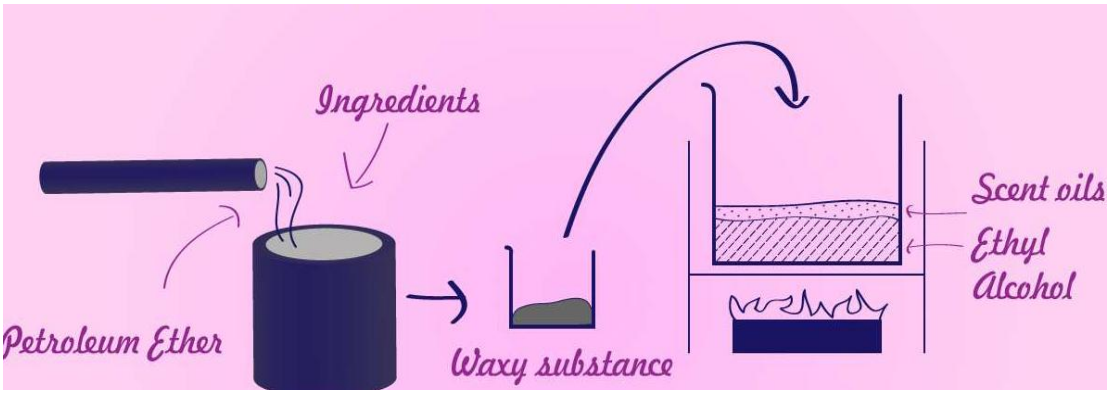
Steam Distillation: Steam is passed through plant materials held in a still where by the essential oils turns to gas this gas is then passed through tubes cooled liquified and collected.

Extraction: Solvent vaporises the scent oil into glasses which passes through cooling tubes to be extracted as liquids.





Solvent Extraction
The flower parts are dissolved in benzene or petrolatum that a result retains the fragrance of the flower alcohol is used to dissolve the fragrance and heated to obtain it after evaporation of alcohol.



Ingredients mixed with ethers in rotating drum produce waxy substance which is heated with ethyl alcohol to separate the oils

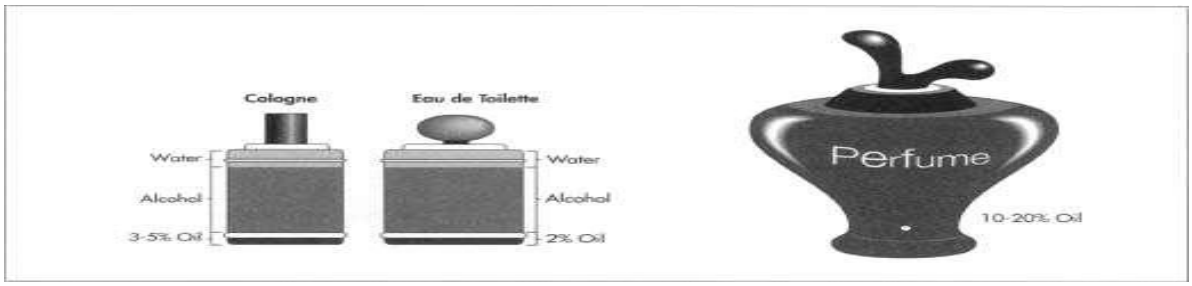
Enflurage: Flowers are kept in glass sheet with grease that absorb the fragrance flowers.

Extraction: Enflurage
Cold Enflurage:
Ingredients mixed with the animal fat on glass plate for 2 – 3 days until scent oil is achieved in the fat.

Hot Enflurage: Ingerdients stirred in hot animal fat until desired oils achieved.

Expression: The citrus fruits or plants are manually or mechanically pressed until all the oil is sequeezed.
Steel pick expression
Through sponge expression.

Blending: Once the perfume oil is collected they are ready to be blended together according to a formula determined by a master in the field. Mixing of the components according to the specific recepie.



Aging: The perfume when are made they are kept for a few years or more in the shelves. The nose tests whether the perfume has the specific smell or not.

Blending and Aging

PHARMACEUTICAL APPLICATIONS OF PERFUMES

Aromatheraphy smelling oils & fragrances to cure physical and emotional problems is being revived to help balance hormonal and body energy smelling sweet smell also effects ones mood and can be used as form of a psychotheraphy Like aromatheraphy more reseach is being conducted to synthesise human perfume that is the body scents Humans like other mammals release pheromones to attract opposite ones New perfumes have being created to effect of pheromones and stimulate the arousal receptors in the brain

HYGIENIC AND COSMETIC PERFUMERY

Hygienic perfumery has to deal with such substances as have really a favourable effect on health soaps promotes cleanliness next to soap in hygienic perfumery so called creams which are useful for the skin and pertain domain of the

perfumer. Skin contains various depressions namely sudoriporous glands which excretes sweat of covering the skin with fat and thereby keep it soft glossy and supple. The main object of hygienic perfumery with reference to the skin is to keep the glandular organs in health & activity it affects by various remedies improves appearance of skin. According to the preparation belonging under this head will be divided into three groups those for skin, hair & the mouth

PREPARATIONS FOR THE CARE OF THE SKIN

GLYCERIN: Pure glycerine is a substance that has a powerful beautifying effect on the skin by rendering it while supple soft & glossy on other remedy will clear a sun burnt skin in short time as glycerine. An extract wash may be made by perfumer by mixing equal parts of glycerine & orange flower water some other aromatic water with fine odor possibly giving it a rose color by addition of small amounts of fuschine

CONCLUSION

Perfumes has made or significant impact on the society during past and present it was surprised to know that some ingredients were from plants and animals this turn out to be the makeup of most of the fragances that men & women use today in their colonges and perfumes.

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