

INDUSTRIAL CHEMISTRY
CHAPTER- CHEMISTRY OF
PERFUMES

ONLINE LECTURE

NO. 1

DATE:- 28, APRIL 2021

TIME: (4.00P.M.)

INTRODUCTION: - Since the beginning of recorded history, humans have attempted to mask or enhance their own odour by using perfume, which reproduce nature's pleasant smells. Many natural and man-made materials have been used to make perfume to apply to the skin and clothing, to put in cleaners and cosmetics, or to scent the air. It is usually in liquid form and used to give a pleasant and desirable scent to a person's body, typically with the aim of increasing self-appeal and self – confidence. Scents are reported to enhance health and well-being by improving mood, reducing anxiety and stress, increasing intellectual function and improving sleep. Perfumes are supposed to release 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. Because of differences in body chemistry, temperature, and body odours, no perfume will smell exactly the same on any two people.

But long exposure to fragrance chemicals can cause many health problems like headaches, eye, nose and throat irritation, nausea, forgetfulness, loss of coordination and other respiratory and neurotoxic symptoms. Thus, aromatherapy is one of the treatments in various disorders of physiological systems in humans.

HISTORY: - The word perfume is derived from the Latin word “Perfumare” meaning “to smoke through”. 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 early Egyptians also perfumed their dead and often assigned specific fragrances to god. Their word for perfume has been translated as "fragrance of the gods." It is said that the Moslem prophet Mohammed wrote, "Perfumes are foods that reawaken the spirit." The world’s first recorded chemist is considered a woman named Tapputi perfume maker mentioned in a uniform from in Mesopotamia. She distilled flowers, oil, and calamus (sweet flag) with other aromatics, then filtered and put them back in the still several times.

Perfumery as the art of making perfumes began in ancient Mesopotamia and Egypt was further refined by the Romans and Arabs.

In ancient times people used herbs and spices, such as almond, coriander, myrtle (flowering plant), conifer resin, and bergamot (like sandalwood), as well as flowers. 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.

The Persian chemist Ibn sina also known as Avicenna introduced the process of extracting oils from flowers by means of distillation. He first experimented with the rose. Until his discovery, liquid perfumes consist of mixtures of oils & crushed herbs or petals which made a strong blend. Europeans discovered the healing properties of fragrance during the 17th century. Doctors treating plague victims covered their mouths and noses with leather pouches holding pungent cloves, cinnamon, and spices which they thought would protect them from disease.

Many ancient perfumes were made by extracting natural oils from plants through pressing and steaming. The oil was then burned to scent the air. While fragrant liquids used for the body are often considered perfume. It was not until the late 1800s, when synthetic chemicals were used, that perfumes could be mass marketed. The first synthetic perfume was nitrobenzene, made from nitric acid and benzene, which gave off an almond smell and was often used to scent soaps. Today, most perfume is used to scent bar soaps. Some products are even perfumed with industrial odorants to mask unpleasant smells or to appear "unscented."

Definition of Perfume: -

“A perfume is a substance that emits and diffuses a fragrant odour”. Or “It 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”.

Or “A substance that emits a pleasant odour especially a fluid preparation of natural essences (as from plants or animals) or synthetics and a fixative used for scenting”.

It is a distilled flower oils & calamus (Plant) with other aromatics.

COMPOSITION OF PERFUMES: - Perfumes are mainly composed of

1) Essential Oils: - Essential oils are volatile and liquid aroma compounds obtained from plants. These are derived from natural aromatic plant extracts and or synthetic aromatic chemicals. Major constituents of essential oils are terpenoids and phenylpropanoids which are responsible for specific aroma and properties. These oils are generally containing specific goodness i.e. 'essence' of the plant, hence called as 'essential oils.' Examples: Limonene, linalool, geraniol, citral etc.

2) Fixatives: - A fixative is used to equalize the vapour pressures, and thus the volatilities, of the raw materials in a perfume oil, as well as to increase the tenacity. These are the natural or synthetic substances used to reduce the evaporation rate.

Examples: Natural fixatives are resinoids (Benzoin, labdanum, myrrh, olibanum, storax, tolu balsam) or the molecules ambroxide, civetone and muscone, which were originally obtained from animals. Synthetic fixatives include substances of low volatility (diphenylmethane, cyclopentadecanolide, ambroxide, benzyl salicylate) and virtually odorless solvents with very low vapor pressures (benzyl benzoate, diethyl phthalate, triethyl citrate) etc.

Properties of essential oils: -

- 1) These are extracted from plants.
- 2) These are volatile organic compounds.
- 3) These are water insoluble.
- 4) Terpenes are major constituents of essential oils.
- 5) These have lower boiling points.
- 6) These oils show preservative properties.
- 7) Essential oils are rich sources of biologically active compounds.
- 8) They have longer shelf life and can be stored for several years.

Uses of essential oils: -

- 1) Essential oils are used externally in the aromatherapy.
- 2) They are used to treat stress, headache, migraine, sleep disorders, skin disorders.
- 3) These oils are applied to the skin for the treatment of pain, inflammation, acne, fungus.
- 4) Essential oils have antifungal, antibacterial, anti-inflammatory properties.
- 5) Essential oils influence the nervous system on inhalation.
- 6) Inhalation of these oils enhances brain capacity.
- 7) These oils relaxes and improves mood.
- 8) These are also used as perfume and room freshener.
- 9) These are highly concentrated, hence used after dilution in some suitable carrier oil e.g. almond oil, sesame oil, etc.

INDUSTRIAL CHEMISTRY
CHAPTER- CHEMISTRY OF
PERFUMES

ONLINE LECTURE

NO. 2

DATE:- 29, APRIL 2021

TIME: (10.00A.M.)

Definition of Perfume: -

“A perfume is a substance that emits and diffuses a fragrant odour”. Or “It 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”.

Or “A substance that emits a pleasant odour especially a fluid preparation of natural essences (as from plants or animals) or synthetics and a fixative used for scenting”.

It is a distilled flower oils & calamus (Plant) with other aromatics.

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. Notes in perfumery are descriptors of scents that can be sensed upon the application of a perfume. These notes denote groups of scents which can be sensed with respect to the time after the application of a perfume. Scents are classified as notes based on their olfactory character. A perfume is a unique mixture of top, middle, and base notes designed to give a particular harmony of scents”. Fragrant materials are listed by Poucher in order of volatility and are grouped under respective evaporation coefficients (perfume notes) that range from 1 to 100.

Note	Evaporation coefficient
Top Notes	1 to 14 (most volatile)
Middle Notes	15 to 60
Base Notes	61 to 100 (least volatile)



There are three types of notes: -

1) Top Notes: - These are perceived immediately upon application of a perfume. Top notes consist of small, light molecules that evaporate quickly. They are generally the lightest of all notes. Common fragrance of top notes includes citrus (lemon, orange, zest), light fruits (grape, berries) & herbs (clary, sage, lavender).

2) Middle Notes: - The middle notes are the scent of a perfume that emerges just before the top notes evaporate. The middle note compounds form the "heart" or main body of a perfume and emerge in the middle of the perfume's dispersion process. They serve to mask the often unpleasant initial impression of base notes, which become more pleasant with time. Not surprisingly, the scent of middle note compounds is usually more mellow and "rounded". Scents from this note class disappear anywhere from twenty minutes to one hour after the application of a perfume. Common fragrances of middle notes include clove, geranium, rose, lavender, ylang, nutmeg & jasmine.

3) Base Notes: - The scent of a perfume that appears close to the departure of the middle notes. The base and middle notes together are the main theme of a perfume. Base notes bring depth and solidity to a perfume. Compounds of this class are often the fixatives used to hold and boost the strength of the lighter top and middle notes. Consisting of large, heavy molecules that evaporate slowly, compounds of this class of scents are typically rich and "deep" and are usually not perceived until 30 minutes after the application of the perfume or during the period of perfume dry-down. Some base notes can still be detectable in excess of twenty-four hours after application, particularly the animalic and musk notes. Common fragrances of base notes include sandal wood, vanilla, bergamot, lavender, benzoin, vetiver, neroli, patchouli, myrrh, pine, cinnamon, musk myrrh, frankincense and ginger.

Olfactory Structure (relating to the sense of smell): -

Olfactory system is the bodily structure that serves the sense of smell. The olfactory system, or sense of smell, is the sensory system used for smelling (olfaction). 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.

Chemistry of Perfumes Chemistry of Essential Oils: -

Isoprene Rule: - All the terpenoids are derived from one monomeric structural unit called isoprene (C_5H_8); hence they are referred as isoprenoids. The isoprene rule states that, “The skeleton structures of all naturally occurring terpenoids are built up of two or more isoprene units.” There 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.

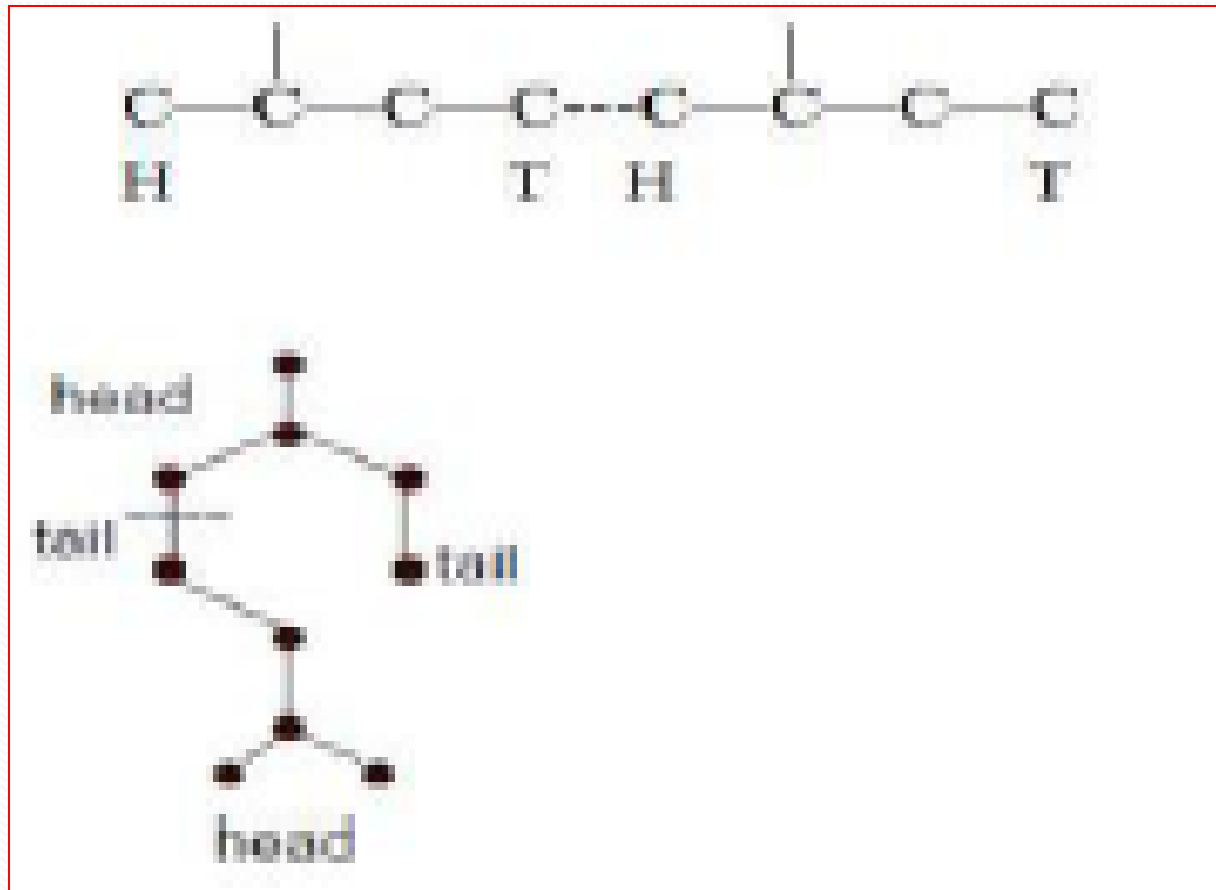
Special Isoprene Rule: -

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 in terpenoids are usually joined in head to tail linkages or 1, 4 linkage.”

Examples: In a terpenoid of the formula $C_{10}H_{16}$. The isoprene units are linked in the following manner

H=HEAD

T= TAIL



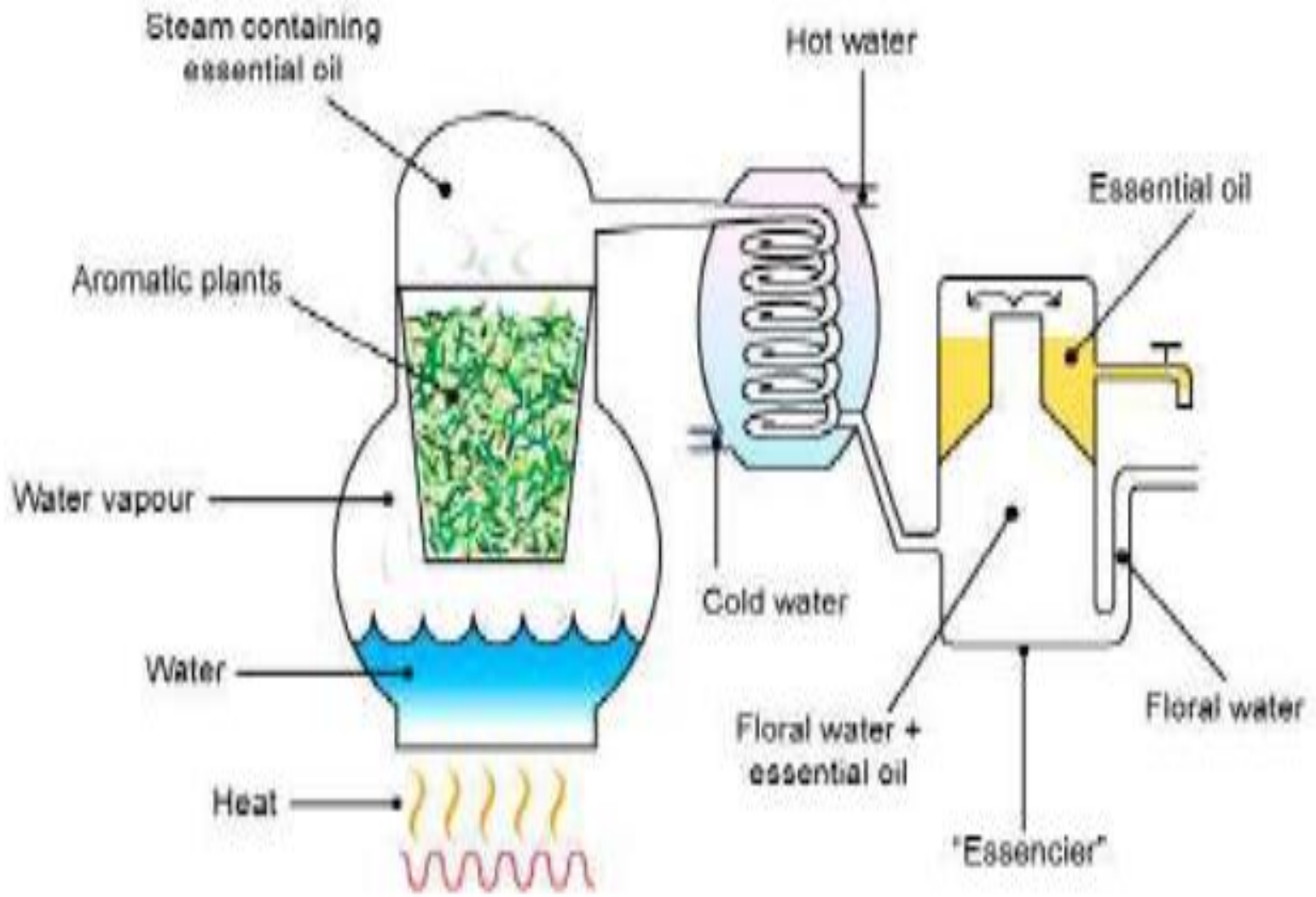
Manufacturing Process: -

Making a perfume involves number of steps as collecting ingredients, extracting oils, blending, aging and quality control.

1. Collection: - Before manufacturing process begins the sources of suitable fragrances are collected in the manufacturing centre. These ingredients can include various plants, fruits, woods and even animal secretions.

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

A] Steam Distillation: - Steam is passed through plant material held in a still, whereby the essential oils turns to gas. This gas is then passed through tubes, cooled liquified and collected. Oils can also be extracted by boiling plant substances like flower petals in water instead of steaming them.



INDUSTRIAL CHEMISTRY

CHAPTER- CHEMISTRY OF PERFUMES

ONLINE LECTURE

NO. 3

DATE:- 1, MAY 2021

TIME: (10.00A.M.)

B] Solvent Extraction: - Flowers are put into large rotating tanks or drums and benzene or petroleum ether solvent is poured over the flowers, extracting the essential oils. The flower parts dissolve in the solvents and leave a waxy material that contains the oil, which is then placed in ethyl alcohol. The oil dissolves in the alcohol and rises. Heat is used to evaporate the alcohol, which once fully burned off leaves a higher concentration of the perfume oil on the bottom.

C] Enfleurage (Absorption): -

Flowers are spread on glass sheets coated with grease. The glass sheets are placed between wooden frames in tiers. Then the flowers are removed by hand and changed until the grease has absorbed their fragrance.

Extraction: Enfleurage: - It is the process, in which absorption of aroma materials into solid fat or wax to capture the fragrant compounds exuded by plants occurs and then extraction of odorous oils with ethyl alcohol is carried out. The process can be "cold" enfleurage or "hot" enfleurage.

Cold Enfleurage:

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

Hot Enfleurage:

Ingredients stirred in hot animal fat until desired oils achieved

D] Expression: -

The citrus fruits or plants are manually or mechanically pressed until all the oil is squeezed. Expression is also known as the "expeller-pressed" or "cold-pressed" method of extraction since no heat is needed to extract the essential oil. It is mostly used to extract citrus essential oils. In this process, the peels are pricked (hole) in order to puncture the cells containing the oils

a) Steel pick expression

b) Through sponge expression.

3. Blending and Aging: -

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 is carried out according to the specific recipe.

Aging: - High quality and pure perfumes are often aged for months or potentially even years after the scent has been blended. This is done to ensure that the proper scent has been created. Aging allows the different scents, or notes, to really blend together. The nose tests whether the perfume has the specific smell or not.

4) Quality Control: -

Quality control is a vital aspect of the perfume manufacturing process. It ensures that the finished perfume doesn't contain any harmful or undesired products, some of which could even be banned.

Pharmaceutical Applications of Perfumes: -

Aromatherapy smelling of oils & fragrances to cure physical and emotional problems is being regenerated to help balance hormonal and body energy. Smelling sweet smell also affects ones mood and can be used as form of a psychotherapy. Like aromatherapy more research 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 excitement receptors in the brain.

In pharmacy, oils are mostly applied as combined preparations like bath salts (a kind of synthetic drug with mood-altering and stimulant properties, typically in the form of crystals and containing mephedrone), embrocations (ointment), and inhalants; another application is external antiseptics. Examples of oils used for pharmaceutical use include eucalyptus oil (and its main component, cineol), peppermint oil, and menthol.

Hygienic and Cosmetic Perfumery: -

Hygienic perfumery has to deal with such substances as have really a favourable effect on health. Soaps promote cleanliness, next to soap in hygienic perfumery so called creams which are useful for the skin and similarly the perfumes also. Skin contains various depressions namely sudoriporous glands which excretes sweat of covering the skin with fat and thereby keep it soft glossy and flexible. 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.

INDUSTRIAL CHEMISTRY
CHAPTER- CHEMISTRY OF
PERFUMES

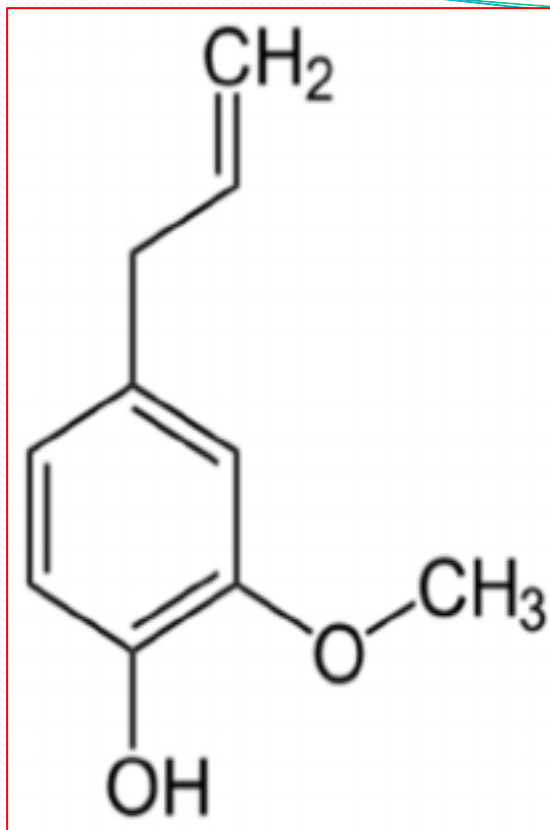
ONLINE LECTURE

NO. 4

DATE:-3 , MAY 2021

TIME: (9.00A.M.)

1) Eugenol: - (C₁₀H₁₂O₂)



Structure

Name: - 1-Allyl-4-hydroxy-3-methoxy benzene [Its Benzene Derivative]

Or 4-Allyl-2-methoxy Phenol [Its Phenol Derivative]

Or 2-Hydroxy-5-allyl Anisole [Its Anisole Derivative]

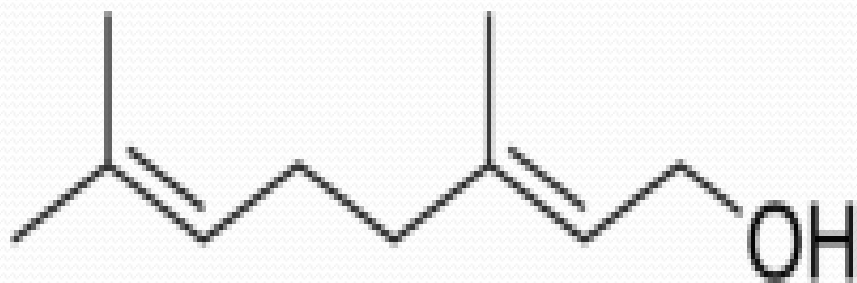
Properties: - Eugenol, a naturally occurring substance found in many plants. Eugenol is a member of the allylbenzene class of chemical compounds. It is a colorless to pale yellow, aromatic oily liquid extracted from certain essential oils especially from clove oil, nutmeg, cinnamon, basil and bay leaf. It is present in concentrations of 80–90% in clove bud oil and at 82–88% in clove leaf oil. Eugenol has a pleasant, spicy, clove-like scent. The name is derived from *Eugenia caryophyllata*, the former Linnean nomenclature term for cloves. (The currently accepted name is *Syzygium aromaticum*). It is used to make fragrances and flavours.

Uses and Importance's in Cosmetics: -

Eugenol is used in perfumes, flavorings, and essential oils. In cosmetics and personal care products, Eugenol is used in the formulation of aftershave lotions, bath products, bubble baths, fragrances, hair care products, moisturizers, shampoos and skin care products.

It is also used as a local antiseptic and anaesthetics.

2) Geraniol: - (C₁₀H₁₈O)



Structure

Name: (2*E*)-3, 7-Dimethyl-2, 6-octadien-1-ol

Properties: -

Geraniol is a monoterpenoid and an alcohol. It is the primary component of rose oil, palmarosa oil, and citronella oil. It is colorless oil, although commercial samples can appear yellow. It has low solubility in water, but it is soluble in common organic solvents.

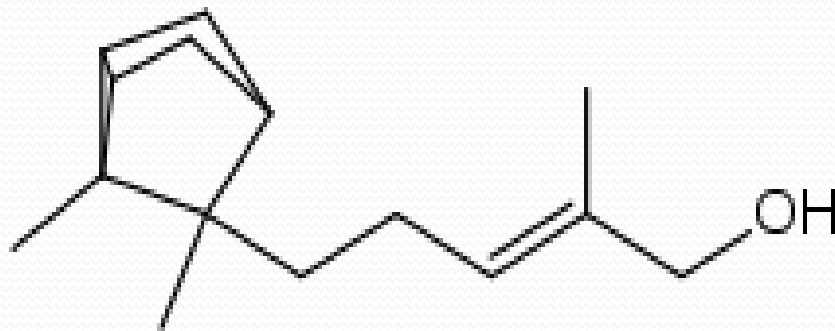
Uses and Importance's in Cosmetics: - In addition to rose oil, palmarosa oil, and citronella oil, it also occurs in small quantities in geranium, lemon, and many other essential oils. With a rose-like scent, it is commonly used in perfumes. It is used in flavors such as peach, raspberry, grapefruit, red apple, plum, lime, orange, lemon, watermelon, pineapple, and blueberry.

Geraniol is produced by the scent glands of honeybees to mark nectar-bearing flowers and locate the entrances to their hives. It is also commonly used as an insect repellent, especially for mosquitoes.

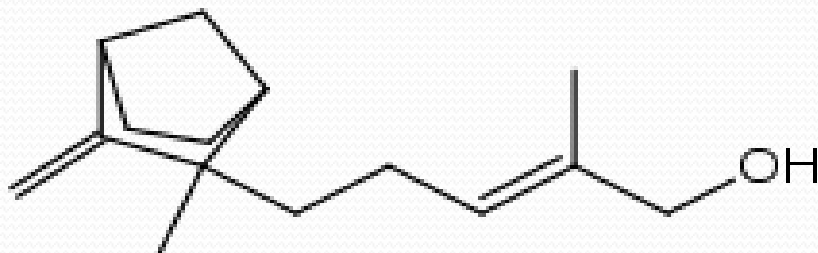
It is a byproduct of the metabolism of sorbate and, thus, is a very unpleasant contaminant of wine if bacteria are allowed to grow in it.

In cosmetics and personal care products, Geraniol is used in the formulation of aftershave lotions, bath products, bubble baths, hair products, lipsticks, moisturizers, perfumes and colognes, skin care products and suntan products. Geraniol functions as a fragrance ingredient.

3) Sandalwood: - Sandalwood oil ($C_{30}H_{48}O_2$): -



α -Santalol [(Z)-5-(2,3-Dimethyltricyclo[2.2.1.0^{2,6}]hept-3-yl)-2-methylpent-2-en-1-ol]



and β -santalol [(2Z)-2-Methyl-5-[2-methyl-3-methylene-bicyclo[2.2.1]hept-2-yl]pent-2-en-1-ol]

Sandalwood is an evergreen tree native to India and Indonesia and grows to 8 to 12 m in height and 2.5 m in girth. The bark is smooth and gray-brown in color, and the small flowers have numerous short stalks.

Scientific Name(s)

Santalum album

Common Name(s)

Sandalwood is also known as santal oil, white saunders oil, white or yellow sandalwood oil, and East Indian sandalwood oil.

Properties: -

Sandalwood oil contains more than 90% sesquiterpenic alcohols of which 50-60% is the tricyclic α -santalol. β -Santalol comprises 20-25% along with album oil.

α -Santalol and β -santalol and santenone are main constituents of the sandalwood oil.

It has been found to enhance the activity of glutathione S-transferase, increasing the level of acid-soluble sulfhydryl groups.

Uses: - Sandalwood oil has a warm, woody odor and is commonly used as a fragrance in incense, cosmetics, perfumes, and soaps.

It also is used as a flavor for foods and beverages.

The wood has been valued in carving because of its dense character.

In traditional medicine, sandalwood oil has been used as an antiseptic and astringent, and for the treatment of headache, stomachache, and urinary and genital disorders.

In India, the essential oil, emulsion, or paste of sandalwood is used in the treatment of inflammatory and eruptive skin diseases.

The oil has been used in the traditional Ayurvedic medicinal system as a diuretic and mild stimulant, and for smoothing the skin.

The leaves and bark were used by early Hawaiians to treat dandruff, lice, skin inflammation, and sexually transmitted diseases.

Sandalwood oil has also demonstrated repellency against the crop pest *Tetranychus urticae* (two-spotted spider mite).

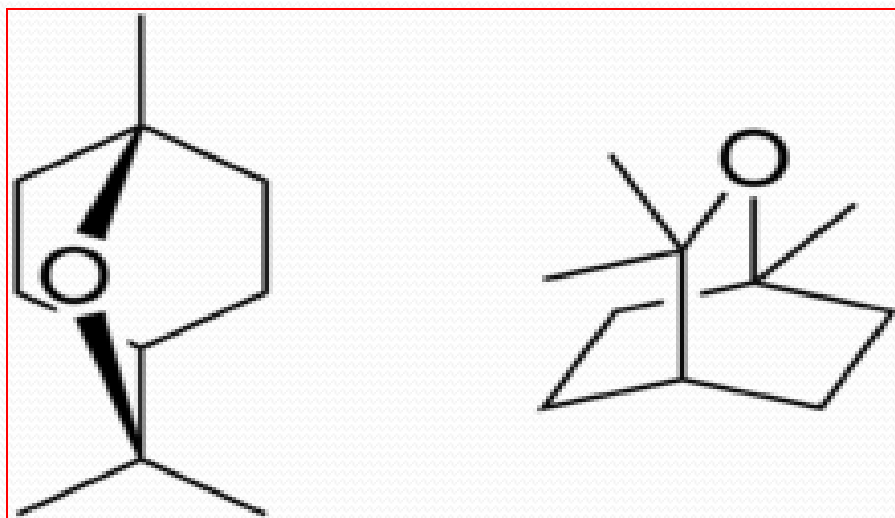
Importance's in Cosmetics: -

Sandalwood oil has been reported to have diuretic and urinary antiseptic properties, but clinical trial data are lacking. The oil has mainly been used as a fragrance enhancer.

Sandalwood oil plays an important role in perfumeries as it has an exotic woody-floral scent which tempts consumers.

Apart from perfumeries, sandalwood oil is also used as facial cleansing oil, anti-wrinkle ingredient, and as a moisturizing agent in the cosmetic and personal care industries.

4) Eucalyptus: - (C₁₀H₁₈O): -



Structure

Name: - 1,3,3-Trimethyl-2-oxabicyclo[2.2.2]octane

Properties: - Eucalyptol is monoterpenoid. A colorless liquid, it is a bicyclic ether. Eucalyptol has a fresh mint-like smell and a spicy, cooling taste. It is insoluble in water, but miscible with organic solvents. Eucalyptol makes up 90% of eucalyptus oil. Eucalyptol forms crystalline adducts with hydrohalic acids, o-cresol, resorcinol, and phosphoric acid. Formation of these adducts is useful for purification.

Uses and Importance's in Cosmetics: -

Because of its pleasant, spicy aroma and taste, eucalyptol is used in flavourings, fragrances, and cosmetics. Cineole-based eucalyptus oil is used as flavouring at low levels (0.002%) in various products, including baked goods, confectionery, meat products, and beverages. Eucalyptol was listed as one of the 599 additives to cigarettes to improve the flavour. Eucalyptol is an ingredient in commercial mouthwashes, and used in traditional medicine as a cough suppressant. Eucalyptol also exhibits insecticidal and insect repellent properties.

Eucalyptus oil is often used in hair and skin products. Eucalyptus oil can also be added to lotions to help with certain skin conditions. For example, the antiviral and anti-inflammatory agents of the oil make it a great treatment for shingles, a rash caused by a virus.

INDUSTRIAL CHEMISTRY
CHAPTER- CHEMISTRY OF
PERFUMES
ONLINE LECTURE
NO. 5
DATE:-4 , MAY 2021 10

5) Rose oil: -

Structure: - The most common chemical compounds present in rose oil are: citronello, geraniol, nerol, linalool, phenyl ethyl alcohol, farnesol, stearoptene, α -pinene, β -pinene, α -terpinene, limonene, p-cymene, camphene, β -caryophyllene, neral, citronellyl acetate, geranyl acetate, neryl acetate, eugenol, methyl eugenol, rose oxide, α -damascenone, β -damascenone, benzaldehyde, benzyl alcohol, rhodinyll acetate, and phenyl ethyl formate.

Name: - Rose otto, attar of rose, attar of roses or rose essence.

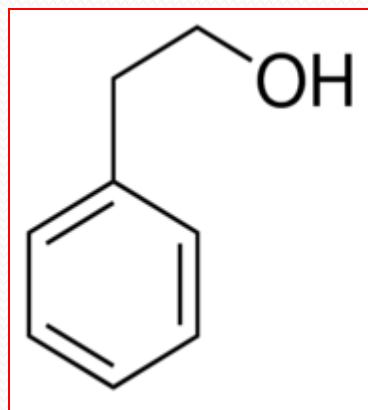
Properties: -

Rose otto oil is a pale yellow or olive-yellow liquid that precipitates colorless crystals of stearopten at temperatures below 21°C; the liquid supernate is known as the elaeopten. It is the essential oil extracted from the petals of various types of rose. *Rose ottos* are extracted through steam distillation, while *rose absolutes* are obtained through solvent extraction, the absolute being used more commonly in perfumery.

Uses and Importance's in Cosmetics: -

Rose essential oil is used in a variety of cosmetic products such as skin care lotions, moisturizers, and balms. It is used in perfumes and soaps due to its beautiful aroma and is also used in shampoos as its astringent properties can help prevent hair fall.

6) 2-phenyl ethyl alcohol: - ($C_8H_{10}O$): -



Structure

Name: Phenethyl alcohol, or 2-phenylethanol, is the organic compound that consists of a phenethyl group ($C_6H_5CH_2CH_2$) attached to OH.

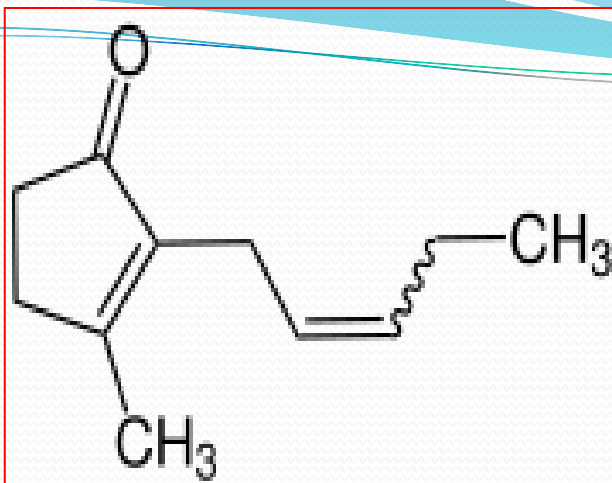
Properties: - It is a colourless liquid that is slightly soluble in water (2 ml/100 ml H_2O), but miscible with most organic solvents. It occurs widely in nature, being found in a variety of essential oils. It has a pleasant floral odor. Phenethyl alcohol is found in extract of rose, carnation, hyacinth, Aleppo pine, orange blossom, ylang-ylang, geranium, neroli and champaca.

Uses and Importance's in Cosmetics: -

It is common ingredient in flavours and perfumery, particularly when the odour of rose is desired. It is used as an additive in cigarettes. It is also used as a preservative in soaps due to its stability in basic conditions. It is of interest due to its antimicrobial properties.

In cosmetics and personal care products, Phenethyl Alcohol is used in the formulation of eye area makeup, makeup products, skin care products, shampoos and perfumes and colognes. Phenethyl Alcohol prevents or retards bacterial growth, and thus protects cosmetics and personal care products from spoilage.

7) Jasmone: - (C₁₁H₁₆O): -



Structure

Name: - 3-methyl-2-[(2Z)-pent-2-en-1-yl] cyclopent-2-en-1-one

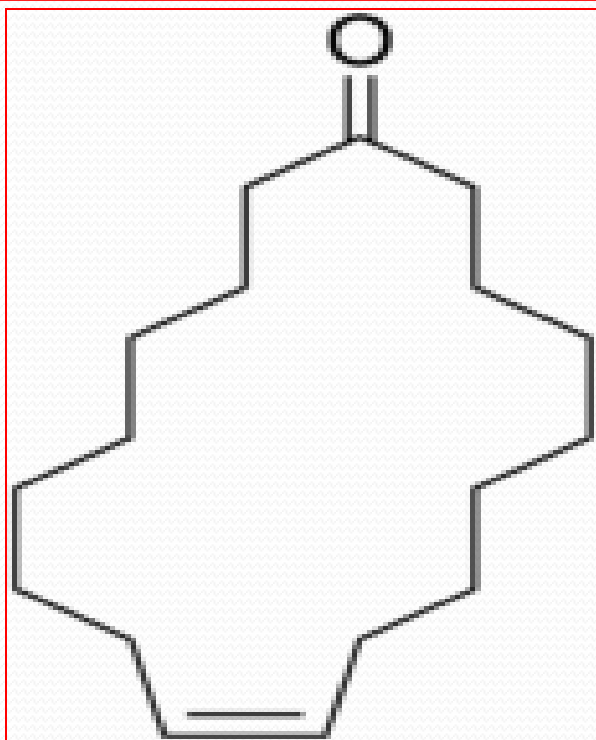
Properties: - Jasmone is an organic compound, which is a volatile portion of the oil from jasmine flowers. It is a colorless to pale yellow liquid. Jasmone can exist in two isomeric forms with differing geometry around the pentenyl double bond, *cis*-jasmone and *trans*-jasmone. The natural extract contains only the *cis* form, while synthetic material is often a mixture of both, with the *cis* form predominating. Both forms have similar odors and chemical properties. Its structure was deduced by

Uses and Importance's in Cosmetics: -

Jasmone is produced by some plants by the metabolism of jasmonic acid, via a decarboxylation. It can act as either an attractant or a repellent for various insects.

Commercially jasmone is used primarily in perfumes and cosmetics.

8) Civetone: - ($C_{17}H_{30}O$): -



Name: - (9Z)-Cycloheptadec-9-en-1-one

Structure

Properties: -

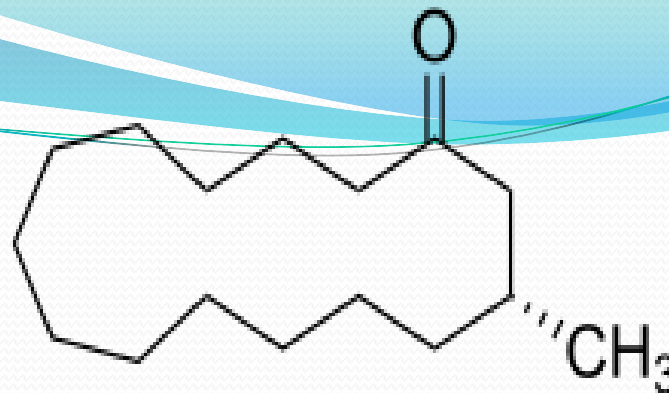
Civetone is a macrocyclic ketone and the main odorous constituent of civet oil. It is a pheromone sourced from the African civet. It has a strong musky odor that becomes pleasant at extreme dilutions. It is soluble in oils. Civetone is closely related to muscone, the principal odoriferous compound found in musk. The structure of both compounds was elucidated by Leopold Ruzicka. Today, civetone can be synthesized from precursor chemicals found in palm oil.

Uses and Importance's in Cosmetics: -

Civetone is used as a perfume fixative and flavor. In order to attract jaguars to camera traps, field biologists have used the cologne Calvin Klein's Obsession For Men. It is believed that the civetone in the cologne resembles a territorial marking.

9) Muscone: - (C₁₆H₃₀O): -

Structure



Name: - (*R*)-3-methylcyclopentadecanone

Properties: - Colourless or opaque crystalline mass; Soft, sweet, tenacious musk aroma. Very soluble in acetone, ethyl ether, and ethanol. Soluble in oils; Slightly soluble in water. Muscone is an organic compound that is the primary contributor to the odor of musk.

The chemical structure of muscone was first elucidated by Leopold Ruzicka. It consists of a 15-membered ring ketone with one methyl substituent in the 3-position. It is an oily liquid that is found naturally as the (–)-enantiomer, (*R*)-3-methylcyclopentadecanone. Muscone has been synthesized as the pure (–)-enantiomer as well as the racemate. It is very slightly soluble in water and miscible with alcohol.

Natural muscone is obtained from musk, a glandular secretion of the musk deer, which has been used in perfumery and medicine for thousands of years. Since obtaining natural musk requires killing the endangered animal, nearly all muscone used in perfumery today is synthetic. It has the characteristic smell of being “musky”.

Uses and Importance's in Cosmetics: -

Muscone is now produced synthetically for use in perfumes and for scenting consumer products.

Isotopologues of muscone have been used in a study of the mechanism of olfaction.

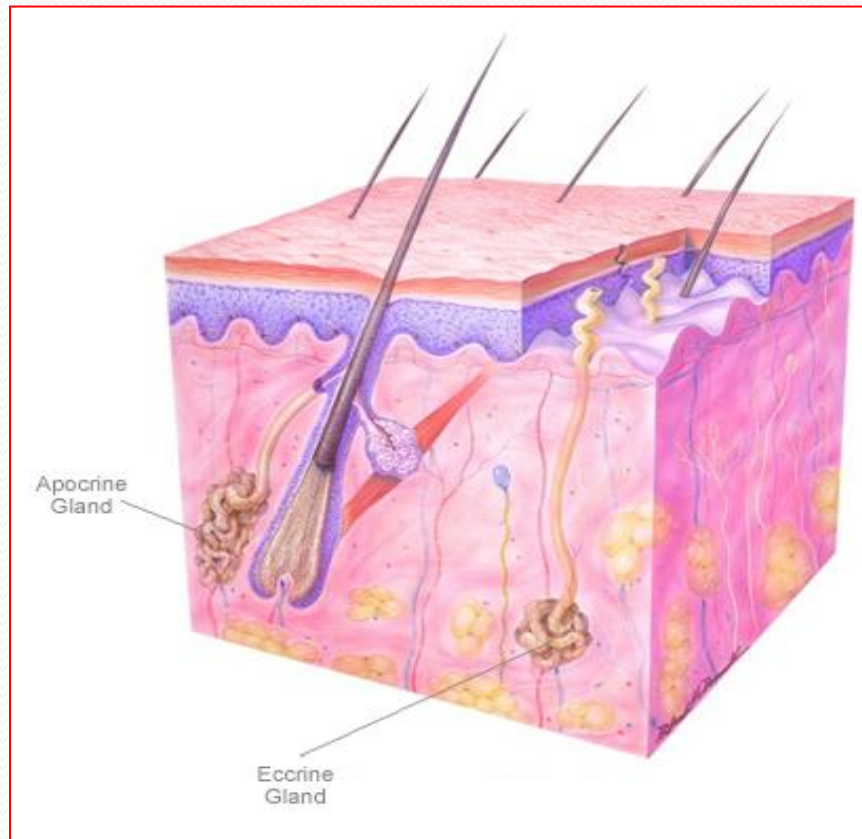
Antiperspirants and artificial flavours: -

Sweating is an essential and natural biological process that starts soon after we are born. Sweating, or perspiring, is the body's mechanism of keeping us cool. Whether the extra heat comes from hardworking muscles during exercise, from over-stimulated nerves due to stress, or from high air temperatures and humidity, sweating is the body's natural way of regulating its temperature. During extended, vigorous activity, a person can lose several quarts of fluid through the evaporation of perspiration.

Sweat itself is odorless. It's the bacteria that live on the skin and break down the sweat that cause the unpleasant odor. Most people have several million sweat glands distributed over their bodies, providing plenty of opportunity for odors to develop. Keeping underarms dry and smelling pleasant are what antiperspirant and deodorant products are designed to do. These products, designed for both men and women, include aerosols, sprays, pumps, roll-ons, solid sticks, gels, and creams.

There are two types of sweat glands:

- a) Eccrine sweat glands: which we are born with and are the most abundant and produce most of the sweat in the underarms, open directly onto the surface of the skin.
- b) Apocrine sweat glands: which are triggered by emotions, develop in areas abundant in hair follicles, such as the scalp, underarms, and genitals. Apocrine sweat glands only begin to secrete sweat after puberty (Youth), and have little, if anything, to do with temperature regulation.



underarms, to minimize the odor caused by the bacterial breakdown of perspiration. Deodorants are classified as cosmetics by the U.S. Food and Drug Administration (FDA) and typically contain an odor-masking fragrance. Deodorants are generally formulated into a solid, aerosol or liquid base.

Antiperspirants are products whose primary function is to inhibit perspiration. By inhibiting perspiration, which is a necessary component for the growth of bacteria that cause malodor (unpleasant odour), antiperspirants also act as deodorants. Antiperspirants are classified as Over-The-Counter (OTC) drugs by the FDA because they prevent sweat formation (a biological function). The active ingredient, aluminum-based compounds, gives antiperspirants their sweat-blocking ability by forming a temporary plug within the sweat duct that stops the flow of sweat to the skin's surface. A few commonly used antiperspirant active ingredients are aluminum chloride, aluminum chlorohydrate complexes, and aluminum zirconium complexes.

Deodorants are substances that reduce or mask unpleasant body odours

Function of antiperspirant: -

When an antiperspirant is applied to the skin surface, its antiperspirant active ingredients – usually aluminium salts – dissolve in the sweat or moisture on the skin surface of the armpit. The dissolved substance forms a gel, which creates a small temporary ‘plug’ near the top of the sweat gland, significantly reducing the amount of sweat that is secreted to the skin surface. Bathing and washing will remove the antiperspirant gel. Re-application of antiperspirants can be beneficial to help reduce sweating and keep fresh throughout the day. While antiperspirants reduce underarm sweating, they do not impact the body’s natural ability to control its temperature (thermoregulation). While there are between 2 and 5 million sweat glands in our bodies, relatively few are located in the armpits, which produce only about one per cent of the body's sweat.



Antiperspirant applied



Dissolves in sweat



Forms a gel on top of pore



Gel released from skin surface

Safety Information: -

Like all cosmetic products, deodorant and antiperspirant products and their ingredients must be safe before they are introduced for consumer use. In addition, antiperspirants are regulated by the Food and Drug Administration as Over-The-Counter (OTC) drugs. As such, they must be shown to be safe and effective and must comply with all other requirements listed in the FDA's OTC antiperspirant monograph.

Thank You.

**STAY HOME,
STAY SAFE**