

Chemistry SUB. CODE- BSCC2402

For B.Sc. 4th Semester

(Terpenoids) Module-VII

a-Terpineol

By

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α-Terpineol

- > α -Terpineol is a monoterpene alcohol.
- It has been isolated from a variety of sources such as cajuput oil, pine oil, and petitgrain oil.
- There are four isomers, alpha-, beta-, gammaterpineol, and terpinen-4-ol. beta- and gammaterpineol differ only by the location of the double bond.
- Terpineol is usually a mixture of these isomers with alpha-terpineol as the major constituent.





Terpineol has a pleasant odor similar to lilac and is a common ingredient in perfumes, cosmetics, and flavors. α -Terpineol is one of the two most abundant aroma constituents of lapsang souchong tea (Smoked tea); the α -terpineol originates in the pine smoke used to dry the tea. (+)- α -Terpineol is a chemical constituent of skullcap.





A medicinal plant **used for** (insomnia), anxiety, stroke, and paralysis caused by stroke. It is also **used for** fever, high cholesterol, "hardening of the arteries" (atherosclerosis), rabies, epilepsy, nervous tension, allergies, skin infections, inflammation, and spasms





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Synthesis of α-Terpineol

1. Prepared by the hydration of α -Pinene in the presence dilute mineral acids



2. Commercially it is prepared by dehydration of terpin (diol), which gives a mixture of three isomers of terpineol.







1. Mol formula was determined as $C_{10}H_{18}O$

2. Presence of one double bond (C=C): It adds one molecule of H_2 or one molecule of bromine to form addition product, which indicate the presence of one carbon-carbon double bond.

$$C_{10}H_{18}OBr_2 \xleftarrow{Br_2} C_{10}H_{18}O \xrightarrow{Pt/H_2} C_{10}H_{20}O$$

3. It does not give aldehyde or ketone on mild oxidation and can be dehydrated to limonene. Hence the alcoholic group should be tertiary.

$$C_{10}H_{18}O \longrightarrow C_{10}H_{16} + H_2O$$



Structure Elucidation

4. The fully saturated hydrocarbon corresponds to α -terpineol is C₁₀H₂₀. Therefore it should be monocyclic monoterpenoid tertiary alcohol.

5. When treated with conc. H_2SO_4 it gives p-cymene.





Structure Elucidation

6. Position of tertiary alcohol was found out by oxidation reactions







Structure Elucidation



Oxidation of D gives E and acetic acid. This indicates that D must be a methyl ketone having CH_3CO - group.

Structure of D to be a **homoterpenyl methyl ketone** was confirmed by its synthesis. Oxidation of D to E and then to F is given below.





References

- 1. K.D Sharma and Y. R. Sharma, Kalyani Publishers, Unit III
- 2. University Chemistry, Vol-IV, Dr. U. N. Dash, Dr. K. K. Ojha, Himalaya Publishing house, Unit V
- 3. Text Book of Organic Chemistry-III, M. K. Jain, S. C. Sharma, Amita, Vishal Publishing Co, Chapter- 6, Page-165.