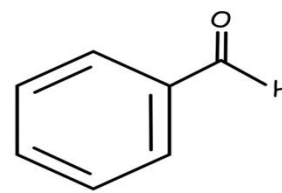


BENZALDEHYDE:

Benzaldehyde is an organic chemical compound. Its systematic IUPAC name is benzenecarbaldehyde. Besides, it is sometimes called **Benzenecarboxaldehyde, Phenylmethanal or Benzoic Aldehyde.**



Benzaldehyde

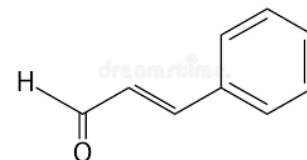
The chemical formula of Benzaldehyde is C_7H_6O . The compound is considered stable under recommended storage conditions. It should be kept in tightly sealed container in cool dry place, far from light and heat. It is strongly recommended to store the chemical under nitrogen, away from the incompatible substances, like strong acids, reducing agents, etc.

Uses:

1. The chemical is primarily applied as a food additive to give products and beverages an almond scent. Moreover, it is often used in the manufacture of cosmetic personal care products.
2. Industrially, the substance mainly serves as a precursor to the wide range of other organic compounds, from plastic additives to pharmaceuticals. It is also a component of some acridine and aniline dyes, such as malachite green.
3. Beekeepers usually apply the chemical as a bee repellent. They put Benzaldehyde solution on a fume board near the honeycombs to make bees to move away.
4. Several studies have suggested that Benzaldehyde can have carcinostatic or antitumor properties. Overall, at the concentrations used in cosmetics, Benzaldehyde was not considered a carcinogenic risk to humans. Although there are limited irritation and sensitization data available for Benzaldehyde, the available dermal irritation and sensitization data and ultraviolet (UV) absorption and phototoxicity data demonstrating no adverse reactions to Benzoic Acid support the safety of Benzaldehyde as currently used in cosmetic products.
5. It is also used in cakes and baked goods as almond extract. Benzaldehyde is also used in additives like antibacterial and antifungal preservatives.
6. It is an intermediary product in the formation of compounds like cinnamic acid, benzoic acid, etc.
7. It is used as a solvent for oils, resins, ethers, etc.

CINNAMALDEHYDE:

- Cinnamaldehyde is an organic compound with the formula $C_6H_5CH=CHCHO$. Occurring naturally as predominantly the trans (E) isomer, it gives cinnamon its flavor and odor.
- It is a phenylpropanoid that is naturally synthesized by the shikimate pathway.
- This pale yellow, viscous liquid occurs in the bark of CINNAMALDEHYDE cinnamon trees and other species of the genus *Cinnamomum*.
- The essential oil of cinnamon bark is about 90% cinnamaldehyde.

**Uses:**

1. The most obvious application for cinnamaldehyde is as flavoring in chewing gum, ice cream, candy, eliquid and beverages; use levels range from 9 to 4,900 parts per million (ppm) (that is, less than 0.5%).
2. It is also used in some perfumes of natural, sweet, or fruity scents. Almond, apricot, butterscotch, and other aromas may partially employ the compound for their pleasant smells.
3. Cinnamaldehyde can be used as a food adulterant; powdered beechnut husk aromatized with cinnamaldehyde can be marketed as powdered cinnamon. Some breakfast cereals contain as much as 187 ppm cinnamaldehyde.
4. Cinnamaldehyde has been tested as a safe and effective insecticide against mosquito larvae. A concentration of 29 ppm of cinnamaldehyde kills half of *Aedes aegypti* mosquito larvae in 24 hours.
5. Trans-cinnamaldehyde works as a potent fumigant and practical repellent for adult mosquitos.
6. Cinnamaldehyde is also known as a corrosion inhibitor for steel and other ferrous alloys in corrosive fluids such as hydrochloric acid. It is believed that this is achieved by polymerization to form a protective film on the metal surface.
7. It can be used in combination with additional components such as dispersing agents, solvents and other surfactants
8. Some early evidence shows that cinnamaldehyde blocks formation of Tau protein aggregation into neurofibrillary tangles, a major pathology in Alzheimer's disease.

9. Cinnamaldehyde also has antimicrobial properties. Cinnamaldehyde is also a TRPA1 activator, and can excite a subset of sensory neurons that are mainly cold-sensitive neurons, to cause nociceptive behaviour in mice.
10. Cinnamaldehyde has been found to improve metabolic health by acting directly on adipocytes and inducing them to start burning energy through a process called thermogenesis.
11. Scientists had previously observed that cinnamaldehyde appeared to protect mice against obesity and hyperglycemia, but the mechanisms underlying these effects were not well understood. Researchers are currently investigating cinnamaldehyde as a potential anti-obesity drug.

VANILLIN:

- Vanillin is an organic compound with the molecular formula $C_8H_8O_3$. It is a phenolic aldehyde. Its functional groups include aldehyde, hydroxyl, and ether. It is the primary component of the extract of the vanilla bean. Synthetic vanillin is now used more often than natural vanilla extract as a flavoring agent in foods, beverages, and pharmaceuticals.
- Vanillin and ethylvanillin are used by the food industry; ethylvanillin is more expensive, but has a stronger note. It differs from vanillin by having an ethoxy group ($-O-CH_2CH_3$) instead of a methoxy group ($-O-CH_3$).
- Natural vanilla extract is a mixture of several hundred different compounds in addition to vanillin. Artificial vanilla flavoring is often a solution of pure vanillin, usually of synthetic origin. Because of the scarcity and expense of natural vanilla extract, synthetic preparation of its predominant component has long been of interest.
- The first commercial synthesis of vanillin began with the more readily available natural compound eugenol (4-allyl-2-methoxyphenol). Today, artificial vanillin is made either from guaiacol or lignin.



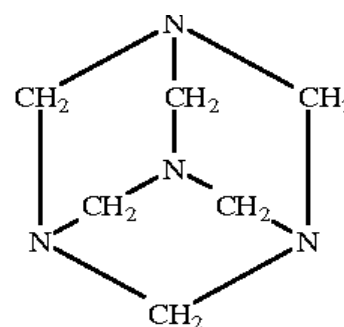
Uses:

- The largest use of vanillin is as a flavouring agent, usually in sweet foods. The ice cream and chocolate industries together comprise 75% of the market for vanillin as flavouring, with smaller amounts being used in confections and baked goods.

- Vanillin is also used in the fragrance industry, in perfumes, and to mask unpleasant odours or tastes in medicines, livestock fodder, and cleaning products.
- It is also used in the flavour industry, as a very important key note for many different flavours, especially creamy profiles such as cream soda.
- Additionally, vanillin can be used as a general-purpose stain for visualizing spots on thin-layer chromatography plates. This stain yields a range of colors for these different components.
- Vanillin-HCl staining can be used to visualize the localisation of tannins in cells.
- Vanillin has been used as a chemical intermediate in the production of pharmaceuticals, cosmetics, and other fine chemicals. In 1970, more than half the world's vanillin production was used in the synthesis of other chemicals. As of 2016, vanillin uses have expanded to include perfumes, flavouring and aromatic masking in medicines, various consumer and cleaning products, and livestock food
- Vanillin is used in the preparation of pharmaceutical drugs for Parkinson's disease, hypertension and many other drugs.
- Vanillin can also be used for rubbers and plastics as well. The manufacturing process of tobacco use need vanillin as a flavouring in cigarettes. Vanillin can be added to the tobacco, cigarette paper or filter. Vanillin masks the harshness of tobacco smoke, making smoking easier.

HEXAMINE:

- $C_6H_{12}N_4$ is a heterocyclic organic compound with the chemical name Hexamine. It is also called **Methenamine, Hexamethylenetetramine or Urotropin**.
- It acts as an anti-infective agent which is most commonly used to treat urinary tract infections. Its anti-infective action is derived from the slow release of formaldehyde (CH_2O) by hydrolysis at acidic pH of 0.2 molar.
- Methenamine is an odourless colourless lustrous crystal or white crystalline powder which is hygroscopic.



Uses:

- Hexamine is used in the production of liquid or powdery preparations of phenolic resins.
- Used as binders in clutch and brake linings.
- Used in the form of spray and cream to treat concomitant odour and excessive sweating.
- Used in Grocott's methenamine silver stain.
- Used as a solid fuel.
- Used as a food preservative.
- Used as a primary ingredient in making RDX.
- Used to prevent vulcanized rubber.
- Used as a corrosion inhibitor for steel.

