

Volatility or vapor pressure is not proportional to its odor. Musk-low volatility but powerful odorant, " Water-high vapor pressure but is odorless.

Low carbon alcohol (methyl & ethyl alcohol are particularly insoluble in fats and have very milk odors while the C4 to C6 alcohol are water and fat soluble and are having strongly odors. However, ethyl alcohol [C6], though lipid soluble is water insoluble and has no odor.

Organic compounds generally elicit odors, but the relation of composition to odor is extremely variable. Compounds of very different chemical composition may have quite similar odors while compounds of similar composition may be different in odor.

In concentrated solutions, many compounds have an unpleasant or repugnant odor but in dilute solutions, the odor may be very pleasant. E.g. H₂S

6.6 Theories of Olfaction

Approximately 50 different theories have evolved in the last century. Four theories are noteworthy due to their relative longevity of existence and / or supporting evidences.

1. Amoore's Stereo chemical Theory

The theory proposes that olfactory receptors are sensitive to the size, shape and the electronic status of the odorant molecule. Based somewhat on the lock and key essential concept of enzymology, it was expressed that all odor sensations are based on a combination of limited number of primary odors and specific nerve receptors site cavities.

The internal dimensions and / or electrical of each nerve cavity were complementary to the molecular morphology of the primary odorant.

This theory is based on nerve impulse electrical conduction. It has been reported that nerve fiber (axon) membranes were composed of a lipid double layer with adsorbed protein on the inner and outer surfaces of axon. In the resting state, there was an excess of sodium and chloride ion on the outer surface and an excess of potassium ions on the inner surface of the axon.

Davies suggested that the relatively bulky, awkward and rather rigid molecules of the odorant (upon contact of axon) tended to penetrate and disorient the double layer of lipid, if only temporarily. This in turn resulted in holes in the axon surface, which permitted ionic changes to occur, and thus initiated a nerve impulse to the brain (odor perception).

2. Wright's Vibrational Theory

It has been suggested that the odor stimulus be conveyed at long range from the source to the nose or antenna by propagated electromagnetic radiation, as by ultraviolet or more

likely infrared lengths. This was further modified by Wright, suggesting that the odors of the given chemicals are a function of their 'intrinsic molecular vibration frequencies, within the far infrared region of the electromagnetic spectrum (100-700 cm-I).

3. Beet's Profile-Functional Group Theory

Beets stated that two molecular attributes were important in determining the characteristic odor: 1] the form and bulk of the molecule and the nature and disposition of the functional groups of the molecule.

Thus, theories of olfaction can be listed as follows:

- Vibrational Theory: based on correlation between infrared or raman spectra and odor quality.
- Molecular Size Theory: based on the ability of specific odoriferous molecules to fit or fill a corresponding receptor sites.
- Molecular Shape Theory: based on the degree of fit into postulated receptor sites.
- Molecular Interaction Theories: dependent upon vapor pressure, solubility and other bulk characteristics of the volatile compounds.

6.7 Olfactory Abnormalities

- Cryptosmia : obstruction in nasal passages.
- Anosmia: temporary / permanent loss of smelling capacity.
- Hemianosmia or Hyperosmia : excessive response.
- Merosmia: loss of only certain odors.
- Heterosmia / Parosmia : false odor perceived.
- Autosmia : odor sensation in absence of odor stimuli.
- Cacosmia : persistent perception of unpleasant odors.

Anosmia may be due to mechanical or central injury, or it may be functional. It has been reported that some individuals subject to migraine headaches had hyperosmia and that individuals with anosmia usually have defective taste sensitivity.

6.8 Odor Intensities

The ratio of the olfactory threshold determined after sifting undiluted substance to the

threshold determined after sniffing the diluents is termed as the order intensity. The threshold found after smelling the undiluted substance were much higher than those obtained after some structural isomers differed odor intensity measured thus increases as the concentration of the undiluted substances in increase, but not after a certain point. Roughly odor intensity is proportional to the square root of the concentration of the solution.

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