

If It Smells Rotten...Beware!

You are standing near a sewer line and smell rotten eggs. You are helping to resuscitate a patient in cardiopulmonary arrest and smell bitter almonds. What is that odor?

Volatilized chemicals that humans and animals perceive by the sense of smell (olfaction) cause odors. Some odors are pleasant while others are unpleasant or even repulsive. An odor can serve as a warning of potential danger. In medicine, recognizing odors is an important skill. It can aid in rapid diagnosis, guide laboratory evaluation and may allow for early treatment before development of more serious clinical signs. For example, a diabetic patient with a fruity odor on their breath should be evaluated for ketoacidosis.

There are several important factors to consider with regard to odors and toxicology. If there is a mixture of volatile substances present, then some odors may mask other odors. People with decreased perception of odors (hyposmia) or a loss of sense of smell (anosmia) will have difficulty recognizing odors. Older adults may not perceive some odors, as olfactory dysfunction is common in this age group. Interestingly, patients poisoned with cyanide may smell like bitter almonds but only 40-45% of people can detect the bitter almond odor.

Another factor is olfactory fatigue, a temporary inability to smell a particular odor after a variable period of exposure to the airborne chemical. For example, hydrogen sulfide is a very toxic chemical with a characteristic odor of rotten eggs that is easily detectable at low concentrations. At higher concentrations (50 ppm), the odor is less offensive and olfactory fatigue may occur in under 15 minutes; at even higher concentrations, olfactory fatigue occurs even more rapidly. Therefore, serious toxicity and death may occur when people remain in the area if they falsely assume that the toxic fume is no longer present.

Recognizing odors can be a useful tool in toxicology. Some substances have a characteristic odor that can serve as a warning of a potential toxicological hazard. See the table on next page for a list of odors and their corresponding toxic substances.

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Did you know?

Chronic exposure to some drugs may decrease or lead to loss of sense of smell.

Cytarabine (a chemotherapy drug), gentamicin nose drops, inhaled corticosteroids and insufflated cocaine are examples of drugs that can sometimes cause this adverse effect.

Did you know?

We can take advantage of odors to prevent a hazardous situation.

Sometimes a relatively non-toxic chemical with a strong odor is added to a toxic chemical to aid in detection. For example, since natural gas is odorless, mercaptans, which have a pungent and unpleasant odor, are added to it to help with recognition of a gas leak in homes.



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If it Smells Rotten...Beware! (continued)

Odors and their corresponding toxic substances:

Characteristic Odor (resembles)	Responsible Toxin
Acetone (sweet, fruity)	Lacquer, ethanol, isopropanol, chloroform, trichloroparaldehyde, chloral hydrate, methylbromide
Ammonia	Ammonia
Bitter Almond	Cyanide
Carrots	Cicutoxin (water hemlock)
Disinfectants	Phenol, creosote
Eggs (rotten)	Hydrogen sulfide, carbon disulfide, mercaptans, disulfiram, N-acetylcysteine
Fish or raw liver (musty)	Zinc phosphide, aluminum phosphide
Fruit	Nitrites (amyl, butyl, etc.)
Garlic	Organophosphates, phosphorus, tellurium, arsenic, selenium, thallium, dimethylsulfoxide (DMSO)
Hay	Phosgene
Mothballs	Napthalene, p-dichlorobenzene, camphor
Peanuts	Vacor (rodenticide)
Pepper	O-chlorobenzylidene malonitrile (tear gas)
Rope (burnt)	Marijuana, opium
Shoe polish	Nitrobenzene
Tobacco	Nicotine
Vinegar	Acetic acid
Vinyl	Ethchlorvynol (Placidyl)
Violets	Turpentine (metabolites excreted in urine)
Wintergreen	Methylsalicylate

Table adapted from *Goldfrank's Toxicologic Emergencies (10th edition, 2015)*, Chiang WK. Chapter 26: Otolaryngologic Principles