



Benzoyl peroxide

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Benzoyl peroxide is a white, granular or crystalline (sand like) solid.

[NJ.Health].

Pure benzoyl peroxide is a granular solid, greater than 95% benzoyl peroxide by weight, usually containing less than 5% water. Wet benzoyl peroxide, also a granular solid, contains 66-85% benzoyl peroxide by weight and 34-15% water. Pastes consist of approximately 50% benzoyl peroxide and 50% of a plasticizer or other diluent. Flour bleach usually contains 32% benzoyl peroxide and 68% cornstarch [CDC].

Benzoyl peroxide is a flammable, solid, diacyl organic peroxide, which may decompose explosively if subjected to excessive heat, friction, or sudden shock. If benzoyl peroxide is exposed to temperatures of 75-80 C for prolonged periods, it becomes unstable and may spontaneously decompose. This type of sudden decomposition, a deflagration, is the rapid spreading of fire through a mass of reactive material. This decomposition is accompanied by a 200-fold increase in volume and yields a dense white smoke consisting of benzoic acid, phenyl benzoate, terphenyls, biphenyls, benzene, and carbon dioxide. The resulting biphenyls promote the further decomposition of benzoyl peroxide into products which can catch fire and ignite the remaining benzoyl peroxide [CDC].

The presence of small quantities of water diminishes some of the hazardous properties of benzoyl peroxide. pure benzoyl peroxide was shown to ignite violently with a loud noise, but benzoyl peroxide containing 5% water did not ignite at all [CDC].

Usage and exposure

Benzoyl peroxide is used as catalyst in making plastics, and as a bleaching agent for oils, flours, waxes, and fats, and in skin creams [NJ.Health].

Since benzoyl peroxide is a good source of free radicals, it is used in a number of industrial processes, particularly in the manufacture of plastics. Benzoyl peroxide is a curing agent for silicone rubber a source of free radicals in the resin cements used in dentistry, automobile body putty, and roof bolting systems in the mining industry, and an initiator in the synthesis of polyvinyl chloride. It is also a component of flour and cheese

bleaches. In the early 1900's, benzoyl peroxide was used to bleach edible oils, but this practice is now rare. In medicine, it now is used in the treatment of acne and of decubitus ulcers (bed sores) [CDC].

The major concerns from occupational exposure to benzoyl peroxide are the hazards arising from its instability, flammability, and explosive properties. In addition, benzoyl peroxide may cause local irritation of the eyes and skin [CDC].

Occupational exposures to benzoyl peroxide may occur in its production and use in the plastics, rubber and pharmaceutical industries, and in food processing. Consumer exposure occurs from acne medications and dental products containing benzoyl peroxide [IARC].

Routs of exposure:

Eye, skin, respiratory tract, gastrointestinal tract.

Target organs:

Eye, skin, respiratory tract.

Metabolism :

Benzoyl peroxide forms radicals that are involved in its covalent binding to macromolecules. Its biological effects are inhibited by antioxidants. Its genotoxic properties have received little attention. DNA damage has been observed in treated mammalian cells, but it is not mutagenic in bacteria and does not cause chromosomal damage in cultured mammalian cells or dominant lethal effects in mice [IARC].

Health hazards

Acute exposure

Inhalation of dust containing benzoyl peroxide causes irritation to the mucous membranes with coughing, sore throat. Decomposition products are toxic and inhalation of the products can produce life threatening health effects (Hazard.com).

Ingestion may cause abdominal pain, nausea, vomiting (Hazard.com).

Skin contact causes irritation with redness and pain, and skin sensitization in some individuals. Stinging or burning sensation may occur for a brief time after application to skin (Hazard.com).

Eye contact causes irritation, redness, and pain (Hazard.com).

Chronic exposure

Chronic exposure may cause asthmatic effects in some individuals.

Prolonged or repeated contact may cause sensitization dermatitis (Hazard.com).

There is inadequate evidence in humans for the carcinogenicity of benzoyl peroxide. There is limited evidence in experimental animals for the carcinogenicity of benzoyl peroxide. Benzoyl peroxide is not classifiable as to its carcinogenicity to humans (Group 3) [IARC].

References:

- CDC. Occupational Exposure to Benzoyl Peroxide.
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