



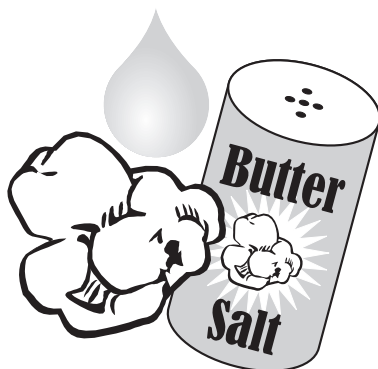
N.C. Department of Labor  
Division of Occupational Safety and Health  
1101 Mail Service Center  
Raleigh, North Carolina 27699-1101

Cherie Berry  
Commissioner of Labor

# HAZARD ALERT

## Diacetyl Use by Food Manufacturers

Exposure by inhalation to diacetyl, a chemical used to add butter flavor to foods, may cause a serious lung disease (bronchiolitis obliterans) in workers. Workers from several companies that use diacetyl have been diagnosed with the disease. Damage to the lungs can be permanent, can require a lung transplant and can lead to death. The main symptoms are a persistent cough and shortness of breath even during slight exertion, such as walking fast or up a slight hill, and wheezing. The symptoms continue away from work. Symptoms can start gradually and get worse over time, or they can suddenly be very severe. Doctors may associate the symptoms with asthma, chronic bronchitis, emphysema, pneumonia or smoking. If you work at a company that uses diacetyl, see a doctor to make sure that your health is not being affected. Take this information sheet with you. Companies should follow the recommendations in this document to reduce exposure to diacetyl and other flavoring chemicals.



### Diacetyl: What is it and how can it be identified?

Diacetyl (also known as 2,3-butanedione, butane-2,3-dione, or butanedione; Chemical Abstract Service (CAS) number 431-03-8) is a yellowish liquid in its pure form and is a normal by-product of fermentation. In the food flavoring industry, it is usually mixed with other ingredients to produce butter flavor or other flavors in a variety of food products, including microwave popcorn and butter salt. If you think diacetyl is used in your workplace, read labels on containers and ask to see a material safety data sheet (MSDS). The Hazard Communication Standard (1910.1200) requires employers to inform workers if they are using diacetyl and to train them about its health hazards and how to use it safely.

### Exposure to Diacetyl

Diacetyl enters the body by inhaling vapors, droplets of spray or dust containing diacetyl. The risk of health effects depends on the level of diacetyl in the air and how long workers are exposed to it. There is currently no workplace exposure limit identified for this chemical.

### Health Effects of Exposure to Diacetyl

**Lungs.** Diacetyl has been associated with damage to the lungs. Symptoms include a dry cough, shortness of breath when using extra energy, and wheezing. The symptoms can start gradually, or severe symptoms can occur suddenly. The symptoms continue even away from work. Asthma medicines are not effective. Some workers may not exhibit symptoms. Diacetyl has been shown to damage the respiratory system of test animals.

**Eyes, nose and throat.** Diacetyl vapors can sting or burn the eyes. Eye contact with vapors can also cause chemical burns that require medical treatment to heal. The vapors can cause your nose and throat to burn and feel sore.

**Skin.** Diacetyl can irritate the skin. It can cause a rash with dryness, redness, flaking and cracking of the skin.

**Cancer and reproductive effects.** Diacetyl has not been tested for these effects. However, reducing exposure to prevent lung disease will help to protect workers from other possible effects.

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## Medical Tests for Exposure to Diacetyl

Breathing tests (spirometry) that measure how well the lungs are working and a respiratory symptom questionnaire are the best ways to detect bronchiolitis obliterans and other serious lung diseases. Early detection is critical. Workers should have a lung function test before starting work for a company that uses diacetyl and on a regular basis after starting work.

## Employer Obligation to Reduce Exposure to Diacetyl

- ☞ **Substitution.** Less hazardous flavoring ingredients should be used whenever possible. Make sure substitutes are safe.
- ☞ **Closed production processes.** Handling open containers of diacetyl and other flavoring ingredients should be avoided.
- ☞ **Ventilation.** Maintain air levels of diacetyl as low as possible using local exhaust ventilation. A permissible exposure level has not been identified.
- ☞ **Respiratory protection.** Respirators should be used until ventilation and other controls are determined to be effective. Use NIOSH-approved air-purifying respirators with organic vapor cartridges and particulate filters or supplied-air respirators. Employers must comply with the Respiratory Protection Standard (1910.134).
- ☞ **Skin and eye protection.** Employers must provide protective gloves, goggles and other protective equipment.

## Employee Rights

Employers are required to provide workers with safe and healthy working conditions that are free of recognized hazards that cause or are likely to cause serious physical harm, serious injury or death. If you feel that your working conditions are unsafe, you can file a complaint by calling 1-800-625-2267 or online through the N.C. Department of Labor Internet site [www.nclabor.com](http://www.nclabor.com). For more information concerning education, training and interpretations of occupational safety and health standard contact:

**Bureau of Education, Training and Technical Assistance**  
4th Floor, Old Revenue Building  
Raleigh, N.C.  
Phone: (919) 807-2875  
Fax: (919) 807-2876

## Information Sources

1. Kreiss et al., N. Engl. J. Med., 347:330-8 (2002).
2. National Institute for Occupational Safety and Health (NIOSH). "Health Hazard Evaluation Report: American Pop Corn Company, Sioux City, Iowa." HETA #2001-0474-2943 (2004).
3. National Institute for Occupational Safety and Health (NIOSH). "Preventing Lung Disease in Workers Who Use or Make Flavorings." DHHS (NIOSH) Publication No. 2004-110. See [www.cdc.gov/niosh/topics/flavorings/](http://www.cdc.gov/niosh/topics/flavorings/).
4. Flavor and Extract Manufacturers Association of the United States (FEMA). "Respiratory Health and Safety in the Flavoring Manufacturing Workplace," August 2004. See [www.femaflavor.org/html/public/RespiratoryRpt.pdf](http://www.femaflavor.org/html/public/RespiratoryRpt.pdf).
5. 29 Code of Federal Regulations Part 1910 Section 1200.

## Disclaimer

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*(Adapted from "Diacetyl (Butter Flavor Chemical) Use in Flavoring Manufacturing Companies," Occupational Health Branch, California Department of Health Services, May 2006.)*



**Cherie Berry**  
Commissioner of Labor  
**1-800-625-2267**  
**[www.nclabor.com](http://www.nclabor.com)**

