

NIOSH

ALERT

Preventing Lung Disease in Workers Who Use or Make Flavorings

WARNING!

Breathing certain flavoring chemicals in the workplace may lead to severe lung disease.

Flavorings are complex mixtures of natural and manmade ingredients that are added to many food products in the production process. Depending on the flavoring and the process, workers may be exposed to hazardous flavorings or flavoring ingredients in the form of vapors, dusts, or sprays.

Workers who make, use, or work near flavorings or flavoring ingredients should take the following steps to protect their health:

- Ask your supervisor for training on the hazards associated with the flavorings and ingredients.
- Read labels on containers and material safety data sheets (MSDSs) on the flavorings and ingredients.
- Know and use the exposure control devices and work practices that keep flavorings and ingredients out of the air in your workplace.
- Keep containers of flavorings and chemical ingredients tightly closed when not in use so that their contents do not get into the workplace air.
- Understand when and how to wear a respirator (protective breathing mask) and other personal protective equipment (such as gloves and eye goggles) that your employer may provide.

- Participate in breathing tests provided by your employer.
- Promptly report any persistent shortness of breath or cough, or any problems with your eyes, nose, throat, or skin to your supervisor and your doctor. When you report your symptoms, show them a copy of this Alert.

Companies that use or make flavorings should take the following steps to protect the health of their workers:

- Limit hazardous worker exposures:
 - Consider substitution of less hazardous flavoring ingredients or formulations where feasible.
 - Use closed production processes (i.e., avoid handling of open containers of flavorings and ingredients).
 - Apply effective local exhaust ventilation as well as general dilution ventilation in places where flavorings or their ingredients are handled.
 - Isolate mixing and other high-exposure processes from the rest of the workplace and maintain these work areas under negative air pressure.
 - Use the lowest temperatures necessary if heated processes are used.
 - Establish and enforce work practices to limit release of chemical vapors and dust into the workplace air.

- Monitor air concentrations of flavoring ingredients to assure that control efforts are limiting exposures.
- Train workers on the potential for lung disease and other health effects from exposure to flavoring-related chemicals and on ways exposure can be avoided or minimized.
- Assure appropriate labeling of containers and posting of warnings.
- Provide workers with appropriate respiratory protection if they are at risk for hazardous respiratory exposure to flavorings or their ingredients
 - while optimal exposure controls are being implemented,
 - when controls are not working properly because of a breakdown or maintenance procedures, and
- when even the lowest exposures that can be achieved are still associated with potential risk.
- Provide workers with other appropriate personal protective equipment (e.g., gloves, masks, and goggles) if they are at risk for hazardous eye and skin exposure.
- Provide breathing tests (spirometry) before the first exposure, and on a regular basis thereafter, to all workers at risk of hazardous exposure to flavorings or their ingredients. Refer workers for evaluation by a physician if they have abnormal test results, an accelerated drop in test results over time, or persistent symptoms.
- Assess the patterns of reported symptoms and lung function results among the entire workforce to identify work areas, processes, or exposures that may require more intensive intervention to prevent further adverse health effects.

For additional information, see ***NIOSH Alert: Preventing Lung Disease in Workers Who Use or Make Flavorings*** [DHHS (NIOSH) Publication No. 2004-110]. Single copies of the Alert are available free from the following:

NIOSH—Publications Dissemination
4676 Columbia Parkway
Cincinnati, OH 45226-1998

Telephone: 1-800-35-**NIOSH** (1-800-356-4676)
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E-mail: pubstaft@cdc.gov

or visit the NIOSH Web site at www.cdc.gov/niosh

Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health





Subject: **Bronchiolitis Obliterans among Workers Who Use or Make Flavorings**

Dear Health Care Provider:

November 20, 2006

The recent report of two cases of bronchiolitis obliterans (BO) among flavoring industry workers in California has prompted the State of New Mexico to alert you to the possibility of discovering cases and to the need to notify the New Mexico Occupational Health Registry (NMOHR) if you diagnose such a case.

Bronchiolitis obliterans is a serious, disabling, and sometimes fatal disease that has been linked to diacetyl, a butter flavoring ingredient. It is an uncommon occupational disease, and is often misdiagnosed. The disease, first reported among workers at a microwave-popcorn plant, has now been reported in diacetyl manufacturing plants and in other food manufacturing plants using diacetyl (see list on back of this letter). The references^{1,2} below, the included NIOSH Alert, and the following information can help you recognize and diagnose work-related BO.

Take an occupational history including a description of all jobs held, specific exposures to chemicals, and reporting of symptoms in other workers. Ask for a Material Safety Data Sheet (MSDS) for the chemicals. Diacetyl should be listed under Hazardous Ingredients by the CAS number 431-03-8.

Ask about symptoms. Respiratory symptoms experienced by affected workers include cough (usually without phlegm) and shortness of breath on exertion. Symptoms typically do not improve at home, weekends or vacations. Symptoms are usually gradual in onset and progressive, but severe symptoms can occur suddenly. Some workers experience fever, night sweats and weight loss. Symptoms have been incorrectly attributed to asthma, chronic bronchitis, emphysema, pneumonia, and smoking.

Conduct a medical evaluation. Spirometry most often shows fixed airways obstruction and sometimes restriction. Lung volumes may show hyperinflation. Diffusing capacity of the lung is generally normal, especially in early disease. Chest x-rays are usually normal. High resolution chest CT scans at full inspiration and expiration may show findings consistent with bronchiolitis obliterans. A lung biopsy may be necessary to make a definitive diagnosis.

Occupational lung diseases are included in the list of reportable diseases in the State of New Mexico (NMAC 7.4.3.13). All suspected cases of occupational lung disease must be reported to the NMOHR (see brochure). Please contact NMOHR at 505-272-4672 or e-mail us at smoraga-mchaley@salud.unm.edu if you suspect a case, or if we can be of further assistance.

Sincerely,

Karen B. Mulloy, DO, MSCH
Director, NMOHR

¹ Kreiss K et al. (2000) Clinical bronchiolitis obliterans in workers at microwave-popcorn plant. *N Engl J Med* 347:330-338.

² Boylstein R et al. (2006) Diacetyl emissions and airborne dust from butter flavorings used in microwave popcorn production. *J Occ Environ Med* 3:530-535.

Food manufacturing with possible flavoring exposures

SIC*	Title	NAICS†	Title
2021	Creamery Butter	311512	Creamery Butter Manufacturing
2022	Natural, processed, and imitation cheese	311513	Cheese Manufacturing
2026	Fluid Milk	311511	Fluid Milk Manufacturing
2045	Prepared flour mixes and doughs	311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing
2052	Cookies and Crackers	311822	Flour Mixes and Dough Manufacturing from Purchased Flour
		311821	Cookie and Cracker Manufacturing
		311919	Other Snack Food Manufacturing
		311812	Commercial Bakeries
2064	2064 Candy and other confectionery products	311330	Confectionery Manufacturing from Purchased Chocolate
		311340	Nonchocolate Confectionery Manufacturing
2066	2066 Chocolate and cocoa products	311330	Confectionery Manufacturing from Purchased Chocolate
		311320	Chocolate and Confectionery Manufacturing from Cacao Beans
2079	Shortening, table oils, margarine, and other edible fats, NEC	311223	Other Oilseed Processing
		311222	Soybean Processing
		311225	Fats and Oils Refining and Blending
2087	Flavoring extracts and flavoring syrups, NEC	311942	Spice and Extract Manufacturing
		311930	Flavoring Syrup and Concentrate Manufacturing
		311999	All Other Miscellaneous Food Manufacturing
		311920	Coffee and Tea Manufacturing
2096	Potato chips, corn chips, and similar snacks	311919	Other Snack Food Manufacturing
2099	Food preparations, NEC	311423	Dried and Dehydrated Food Manufacturing
		311823	Dry Pasta Manufacturing
		311999	All Other Miscellaneous Food Manufacturing
		311340	Nonchocolate Confectionery Manufacturing
		311911	Roasted Nuts and Peanut Butter Manufacturing
		311991	Perishable Prepared Food Manufacturing
		111998	All Other Miscellaneous Crop Farming
		311212	Rice Milling
		311942	Spice and Extract Manufacturing
		311920	Coffee and Tea Manufacturing
		311830	Tortilla Manufacturing
		311941	Mayonnaise, Dressing, and Other Prepared Sauce Mfg.

*Standard Industry Classification code

†North American Industry Classification System

Employers in New Mexico in the industries listed above can be found at <http://laser.state.nm.us/>.