



DIACETYL and FLAVORINGS

Oregon OSHA is issuing this *Safety and Health Hazard Alert* to inform employees and employers in the food processing and flavoring-manufacturing industries of possible respiratory hazards posed by diacetyl, a chemical used in artificial flavorings.

Diacetyl is a naturally occurring chemical found in fermented beverages and dairy products. Its butter-like taste is used as an artificial flavoring in food products such as baked goods and microwave popcorn. While diacetyl is recognized as a safe food ingredient,

workers exposed to diacetyl and other flavorings in industrial level concentrations may experience skin, nasal, or eye irritation and respiratory disorders. The most serious respiratory disorder is fixed obstructive lung disease (“bronchiolitis obliterans”) also known as “popcorn workers’ lung” or “flavorings workers’ lung.”

Most flavoring workers who developed bronchiolitis obliterans, a relatively uncommon disease, were young, healthy, non-smokers without pre-existing respiratory conditions. Workers were sometimes misdiagnosed as having asthma, emphysema, or chronic bronchitis. Respiratory



symptoms may include persistent coughing, shortness of breath on exertion, and difficulty breathing that does not improve with time away from the workplace. Workers may develop severe and disabling shortness of breath because the lung’s smallest airways become scarred and inflamed as the disease progresses.

Workers who measure, mix, and heat large quantities of flavorings in open containers are at risk because the chemical ingredients become airborne and are easily inhaled. Quality assurance technicians, flavoring specialists, and workers who clean vessels used for mixing also may be exposed to unsafe levels of flavoring chemicals. Workers who chemically synthesize diacetyl also may be at risk.

Researchers have not determined if chefs or kitchen workers are at risk to diacetyl when butter-flavored cooking oils or butter substitutes are heated during food preparation.

BEST PRACTICES

- Substitute a less hazardous flavoring ingredient or formulation, if feasible.
- Avoid flavoring vapors, dusts, and sprays. Use closed production processes and other engineering controls.
- Isolate mixing and other high-exposure processes from the rest of the workplace.
- Use the lowest temperatures necessary if heated processes are required.
- Label containers and post warnings on the hazards of flavoring ingredients.
- Monitor air concentrations to assure that controls are effective.
- Supply appropriate respiratory protection and personal protective equipment. Do fit testing and training for respirator use.
- Refer workers to a physician if they experience respiratory symptoms.
- Provide breathing tests (spirometry) for workers at risk.
- Study patterns in reported symptoms and lung function results to identify work areas needing further intervention.



Oregon OSHA
www.orosha.org
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Hazard alerts provide information on unusual safety or health hazards or unusual or hazardous materials or practices. For more information, contact the Oregon OSHA Standard and Technical Resources Section at 503-378-3272, toll free at 800-922-2689 or visit our Web site at www.orosha.org.

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TRAINING

Educate flavorings workers about the hazards of diacetyl and similar chemicals. Provide information on ways to avoid or minimize exposure.

REGULATORY REQUIREMENTS

There is no workplace exposure standard or recommended exposure limit for diacetyl and other chemicals used in artificial flavorings. However, the Oregon Safe Employment Act requires employers to provide each employee a place of employment that is free from recognized hazards.



At LabCor, a Seattle analytical laboratory, analyst Eryn Knaack heats cooking oils and butter substitutes to see how much diacetyl is released. (Photo by Andrew Schneider) (December 21, 2007)

RESOURCES

- **OR-OSHA Consultation Program**
www.orosha.org/consultation.html
- **NIOSH Safety and Health Topic: Flavorings-Related Lung Disease**
www.cdc.gov/niosh/topics/flavorings/
- **Preventing Lung Disease in Workers Who Use or Make Flavorings**
(NIOSH Publication No. 2004-110)
www.cdc.gov/niosh/docs/2004-110/
- **The Washington State Department of Labor and Industries**
www.lni.wa.gov/Safety/Research/HazardousChem/FoodFlavor/Default.asp

