

July 26, 2006

The Honorable Elaine L. Chao
Secretary of Labor
U.S. Department of Labor
200 Constitution Avenue, NW
Room S-2018
Washington, DC 20210

Dear Secretary Chao:

We are writing to express our strong support for the petition submitted by the United Food and Commercial Workers International Union and the International Brotherhood of Teamsters calling upon the Occupational Safety and Health Administration to issue an Emergency Temporary Standard (ETS) to protect workers exposed to the chemical diacetyl (2,3-butanedione, CAS # 431-03-8), and to initiate formal rulemaking for permanent regulations to protect workers exposed to diacetyl and other harmful flavoring-related chemicals.

Diacetyl is a commonly used food flavoring and is the primary constituent of artificial butter flavoring. There is compelling scientific evidence linking occupational exposure to diacetyl to *bronchiolitis obliterans*, a debilitating and sometimes fatal lung disease.

In the general population, *bronchiolitis obliterans* is rare. In the last few years, however, numerous cases have been reported to or identified by the National Institute for Occupational Safety and Health (NIOSH) among workers employed in factories where flavorings containing diacetyl are produced or used.¹ Dozens of workers employed at popcorn plants have developed occupational lung disease, and at least one has died. Several of these workers are on lung transplant lists.^{2,3,4}

The sentinel case of the recent outbreak of *bronchiolitis obliterans* was a Missouri microwave popcorn plant worker diagnosed with the condition in 1999. The physician who diagnosed the case notified Missouri's health department, which in turn notified the Centers for Disease Control and Prevention (CDC), NIOSH's parent agency. In August 2000, NIOSH began an investigation at the Jasper, Missouri microwave popcorn plant where eight current or former workers had developed the disease.⁵ In this investigation, NIOSH scientists found that respiratory symptoms were linked with exposure to diacetyl and butter flavor. Workers at this plant had chronic cough and shortness of breath at a rate 2.6 times higher than what would be expected in the U.S. population. Twice as many workers than expected reported being told by their physicians that they had asthma or chronic bronchitis. Lung function testing revealed that three times as many workers as expected had obstruction to airflow. These results were reported first in the CDC's *Morbidity and Mortality Weekly Report* and then in the *New England Journal of Medicine*.^{6,7} In all, NIOSH has conducted six investigations at 10

microwave popcorn facilities, finding respiratory impairment among workers at a majority of the plants.^{3,8,9,10,11,12}

Since the initial reports focused on individuals employed in microwave popcorn factories, the disease is often called “popcorn workers lung.”^{13,14} It has become clear, however, that the disease has struck workers in other segments of the food and flavoring industry, and is not limited to microwave popcorn facilities.¹⁵ The California Department of Health Services has recently reported two cases among diacetyl-exposed workers employed at factories at which the flavorings are produced.¹⁶

To pursue their investigations, NIOSH has developed sampling and analytical methods for measuring exposure to flavoring-related chemicals.¹⁷ At the Jasper, Missouri plant, diacetyl was measured in concentrations ranging as high as 98 parts per million parts air by volume (ppm), with a mean of 8.1 ppm.¹⁸ In their evaluation of six microwave popcorn plants (five of which had workers with flavoring-associated lung disease), NIOSH scientists reported that the “lowest mean TWA [time weighted average] diacetyl air concentrations that we measured in mixing areas (0.02 ppm personal exposure and 0.2 ppm area air concentration) were at a plant with an affected mixer.” On the basis of this finding, the NIOSH scientists concluded “it would seem prudent to maintain worker exposures to diacetyl below these levels.”¹⁹

The role of diacetyl in the development of *bronchiolitis obliterans* has been confirmed in studies of laboratory animals. In 1993, a manufacturer of diacetyl conducted a study, which was never reported to the government or published in scientific literature, in which rats were exposed to pure diacetyl. The study found that one four-hour period of exposure to diacetyl resulted in an “abundance of symptoms indicative for respiratory tract injury.”²⁰ Following the recent outbreak of cases among humans, NIOSH scientists conducted a study in which rats were exposed to airborne concentrations of heated butter flavoring, of which diacetyl was the primary constituent. The rats were exposed for a single, six-hour period. The scientists reported significant lung damage among rats whose exposure was as low as 203 ppm, which according to the authors was “not extraordinary when compared with levels measured in the workplace.”²¹ NIOSH scientists then conducted a study in which rats were exposed to pure diacetyl and found similar results.²² A toxicological study of guinea pigs exposed to diacetyl found exposure to the chemical caused adverse effects to respiratory tissue and structure.²³

Although the precise number of workers already suffering respiratory effects from exposure to diacetyl is unknown, the potential magnitude of the problem is sizeable. NIOSH is currently investigating 15 cases of respiratory disease, including some workers with *bronchiolitis obliterans*, among the employees at a single Cincinnati, Ohio flavor manufacturing plant.³

Additional research will provide useful data on the mechanism through which flavoring-related chemicals cause obstructive lung disease. However, NIOSH has already generated sufficient information for OSHA to issue rules to reduce exposure to these toxic chemicals. In their recent report, NIOSH scientists wrote that “(b)ecause entirely safe levels of occupational exposure to butter-flavoring chemicals are not known, it is important to limit

worker exposures as much as possible.”¹⁹ It is the regulatory responsibility of OSHA to protect workers from exposure to workplace hazards. OSHA has issued permissible exposure limits (PELs) and/or NIOSH has recommended exposure limits (RELs) for only 46 of the 1,037 flavoring ingredients considered by the flavorings industry to represent potential respiratory hazards.¹ This regulatory gap² needs to be addressed; for this reason, we support the United Food and Commercial Workers (UFCW) and the International Brotherhood of Teamsters (IBT) petition to OSHA to initiate formal rulemaking to establish a permanent standard to protect workers from lung disease caused by flavoring-related chemicals.

Until OSHA completes permanent rulemaking on flavoring-related chemicals, an ETS for diacetyl is essential. The data gathered by NIOSH indicate an appropriate emergency PEL would be below 0.2 ppm.¹⁹ In order to provide a sufficient margin of safety, the petition calls for an emergency temporary PEL of 0.05 ppm, averaged over an eight-hour day. Although other flavoring-related chemicals are likely to contribute to the adverse lung effects as well, controlling exposure to diacetyl, a known cause of *bronchiolitis obliterans* and a primary component of butter flavor, will also result in the reduction of exposure to other airborne contaminants in the workplace.

In summary, there is compelling epidemiologic and toxicological evidence linking exposure to diacetyl to severe respiratory impairment and disease. It is more than thirty months since NIOSH issued an alert calling upon employers to “minimize occupational exposures to flavorings or flavoring ingredients.”¹ It is now time for OSHA to use the scientific evidence to protect American workers from debilitating lung disease.

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