

## A Study of Silo Unloading: The Work Environment and Its Physiologic Effects

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We have recently reported on a febrile illness occurring in farmers 4–12 hr after inhalation of feed-associated organic dust [Pratt and May, 1984]. Episodes have occurred following work in feed stores, corn cribs, and barns, but the majority of cases occur after uncapping a silo in preparation for unloading. In hopes of better defining this occupational exposure and its effects on the farmer, we studied the initial unloading of five dairy silos by eight farm workers. Air samples were collected at the base and within the headspace of each silo during the uncapping. These samples were analyzed for total suspended particulates, respirable dust, and quantification of viable microorganisms. Spirometry, white cell count, and serum complement levels were measured before and 6 hr after completion of uncapping. Silage samples from each silo were analyzed for mycotoxins (trichothecenes and zearalenone) using gas chromatography and gas chromatography-mass spectrometry. Predominant fungal species recovered from the dust were identified on subcultures.

Total dust levels within the five silos varied from 0.2 to 138 mg/m<sup>3</sup>, with levels at the silo base generally similar to those in the headspace. Levels of respirable dust ranged from 0.2 to 24 mg/m<sup>3</sup>; 10<sup>5</sup>–10<sup>9</sup> organisms m<sup>3</sup> were present, the most prevalent being thermophilic bacteria. Very low concentrations (100–200 parts per billion) of a single mycotoxin, deoxynivalenol, were detected in one silo. The farmers' spirometry did not change during exposure and complement levels were not significantly altered, whereas white cell count was increased. Two farmers in the dustiest silo experienced symptoms of illness. This silo did not contain detectable mycotoxins.

We conclude that silo unloading may result in high levels of respirable dust containing large numbers of bacteria and fungi. This exposure appears to have physiologic consequences despite the absence of mycotoxins.

### REFERENCE

Pratt DS, May JJ (1984): Feed-associated respiratory illness in farmers. *Arch Environ Health* 39:43–48.

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