Exposure to flour dust at work can cause asthma

Bakery workers in B.C. are routinely exposed to allergens in flour dust, particularly when weighing, pouring, and operating dough mixers. Studies have shown that the concentration of airborne flour dust can be more than 200 times the occupational exposure limit for some operations.

What is flour?

Flour is a complex organic dust that can be made up of a number of cereal types, including wheat, rye, millet, barley, oats, and corn. Wheat and rye are the most common grains, but other materials may be added to the flour, including:

- Raising agents, emulsifiers, improvers (e.g., alpha-amylase), and artificial sweeteners
- Colouring, flavouring, fruits, and nuts
- Gums and gelling agents

Baker's flour

Why is flour dust a problem?

Flour contains naturally occurring chemicals that can induce allergy, respiratory sensitization and, at increasing exposures, occupational asthma (baker's asthma). One of the most potent allergens in flour is alpha-amylase.

Alpha-amylase is an enzyme that occurs naturally, in small amounts, in wheat flour. It is also added as a dough improver to break up large starch molecules and speed up the activity of the yeast.

Asthma has been reported in bakers since Roman times and is listed as one of the major causes of occupational asthma in Quebec and the United Kingdom (in the UK, a baker is considered to be in a "high risk" occupation). There may be a 30-year latency period between first exposure and the development of symptoms. Once sensitization occurs, even a small amount of the allergen can trigger an asthma attack.

Typical dough mixer without cover

In B.C., the eight-hour occupational exposure limit (OEL) for flour dust is 0.5 milligrams per cubic metre (mg/m^3) of air. A recent study of 96 bakery workers in the Lower Mainland revealed airborne flour dust concentrations ranging between 0.1 mg/m^3 to 110 mg/m^3 (more than 200 times the OEL), depending on the work activity.

What can be done to reduce flour dust exposure?

Proper work practices can reduce worker exposure to flour dust.

- Handle flour products carefully to minimize the spread of dust (e.g., take care when loading ingredients into mixers).
- Immediately clean up any flour spills.
- Do not dry sweep flour dust—use HEPA vacuums for cleaning up spills.
- Do not use compressed air for cleaning.
- Minimize the use of dusting flour—use dredgers or sprinklers to spread flour rather than dusting by hand.
- Start up mixers at slow speed until wet and dry ingredients are mixed.
- Minimize the spread of airborne dust when disposing of empty flour bags (roll up bags from the bottom, rather than flattening and folding them).
- Wear proper respiratory protection (e.g., an N95 single-use respirator) when performing short-term, dusty tasks.

Local exhaust ventilation control

Local exhaust ventilation is the most desirable means to reduce worker exposure to flour dust.

- Mixers should be retrofitted with covers and/or exhaust ventilation (see the photo at right). However, the exhaust should be placed behind or beside the mixer, rather than above.
- Flour and ingredient weighing should be performed in ventilated cabinets.
- Bench-top extraction systems should be retrofitted to dough brake tables.
- Stand-alone dust collectors can be used for a variety of tasks.

Where to get more information

The Health and Safety Executive (HSE) of the UK has information on baker's asthma and recommendations for proper work procedures, respiratory protection, and engineering controls, which are posted on their web site: www.hse.gov.uk/asthma/flourdustcoshh.htm.

Dough mixer retrofitted with a cover and exhaust ventilation

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