RISK INSIGHTS Manufacturing

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Flavouring Substances in Food and Beverages

Although flavourings are considered safe to eat, they are complex mixtures of chemicals, and the hazards of working with and inhaling many of these chemicals have not been evaluated. It is important for all facilities that manufacture flavourings and food products to understand the hazards these chemicals may pose and take appropriate steps to protect workers from exposure and serious respiratory disease.

Diacetyl

Diacetyl is used in the production of many foods and flavourings. The occurrence of severe lung disease among workers in workplaces where diacetyl is manufactured and used has led many manufacturers to reduce or eliminate the amount used in flavourings, foods and beverages. Commonly used alternatives to diacetyl as well as other chemicals used in flavourings also pose potential risks. Industries that manufacture flavourings and food manufacturers who use these flavourings should control workers' exposure and continuously monitor the workplace.

Controlling Exposures

To minimise exposure to hazardous flavouring substances and airborne dust, it is important to implement appropriate control measures. There are several engineering controls employers can implement in the workspace to protect employees.

- Isolate flavouring production and handling areas with structurally sound walls, doors or other appropriate barriers.
- Install separate ventilation systems in the production room and all other areas where flavourings or heated flavoured products are handled.
- Maintain negative air pressure in the production room with respect to adjoining or adjacent rooms.
- Where powder or liquid flavourings are manually blended, weighed, mixed, poured, transferred, packed or handled, install local exhaust ventilation (LEV) systems.

It is important to understand the hazards posed to workers exposed to certain flavourings used in food and beverage manufacturing.

- Use general dilution ventilation, such as wall or ceiling fans.
- Reduce the operating temperature of holding and mixing tanks to ambient temperature or the lowest temperature possible.
- Install tank lids with small openings for adding flavouring substances through funnels.
- Maintain hoppers under negative air pressure at all times while flavourings are added.
- Install bag-dumping stations equipped with LEV systems.
- Use a closed system cleaning process, such as clean-in-place, for tanks and blenders.

- Keep laboratory hood LEV at a minimum velocity of 0.51 m/s for liquids and 1.02 m/s for powders across the opening of the bonnet.
- Educate workers on best practices and proper methods for minimising exposure.

Controlling Work Practices

- Restrict access to areas where flavourings are mixed, stored or openly handled only to those who are authorised to work in those areas.
- Compound or dispense flavourings when few workers are in the area.
- If possible, obtain flavouring substances in sealed, pre-measured containers suitably sized for routine production batches to eliminate weighing and measuring steps.
- Instruct workers to seal containers tightly when storing or transferring flavourings.
- Provide funnels for pouring to reduce exposures, splashes and spillage.
- Establish standard procedures, including prompt cleanup of spills.
- Do not allow use of a shovel to transfer powdered substances or the use of compressed air/dry sweeping to clean surfaces.

Monitoring Exposure

Monitoring can provide useful information about each worker's exposure to flavouring substances and whether control measures are working effectively. Reviewing work processes with an environmental health professional or industrial hygienist can help identify critical areas of exposure. Air should be monitored for airborne diacetyl, 2,3 pentanedione and acetoin. For best effectiveness, collect air samples in all of the following places:

- Flavouring production rooms.
- Areas where compounding and packing operations occur.
- Areas where flavourings are handled manually or openly.
- Areas with mixing or storage tanks
- Areas where maintenance and cleaning is performed.
- Where laboratory use of hazardous chemicals is performed.
- QA/QC laboratories, facilities or processes that are adjuncts of production operations that perform repetitive procedures to assure reliability of a product or process.

Medical Surveillance

A medical examination should be conducted on all newly hired workers before they start work in areas where diacetyl or other food flavouring chemicals are present, including a health questionnaire focused on respiratory symptoms and a history of pre-existing lung disease to provide baseline information for comparison during subsequent evaluations.

Often the onset of lung disease occurs very rapidly in workers. For early detection of decreasing or abnormal lung function in workers, include spirometry, which measures the breathing capacity of the lungs, in periodic medical evaluations, and regularly conduct spirometry tests on workers.

If you detect respiratory symptoms or evidence of skin or eye irritation in workers, follow up with further medical evaluation. Plan to refer workers with rapidly declining lung function to a specialist. In addition, be sure to implement appropriate workplace restrictions, which may include:

- Use of personal protective equipment.
- Restriction of each worker's exposure.
- Routine medical evaluations.