ODOUR CONTROL – G3

Eco-efficiency resources for the food processing industry

Reducing complaints

Odour can cause significant problems for food processors, especially where residential areas are close to industrial areas, and complaints from neighbours can require costly action. This fact sheet investigates the causes of odour in the food industry and identifies actions to minimise odour.

Odour and eco-efficiency

Odour is not usually associated with eco-efficiency as the mitigation measures are generally end-of-pipe solutions costing money rather than actions that provide monetary savings. However, eco-efficiency benefits from odour reduction include:

- better use of resources and reducing odour-producing waste
- more efficient cleaning through dry cleaning operations reducing water consumption and tradewaste generation
- better waste management reducing resource wastage, landfill disposal charges and improved recycling
- food safety gains and reduced microbiological problems leading to less loss of product and safer working environment
- improved public image leading to increased sales.

Wastewater treatment systems can be a source of odour if not operated correctly.

Sources of odour

The main source of odour during food processing is caused by biological or chemical reactions releasing volatile organic compounds (VOC). For most food processors this occurs in many of the essential processing stages such as:

- drying
- cooking
- smoking
- wastewater treatment.

Odour can also be caused by inappropriate storage of materials and waste.

Measure odour

Measuring the odour is difficult – often we get accustomed to odours and do not regard them as offensive. However, they can be a problem for others. Means of measuring odour include gas spectrometry which analyses a gas sample to determine the levels of specific odourous gases.

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Dynamic olfactometry uses a panel of people who have measured their responses to certain concentrations of specific odour compounds and then compares these with various dilutions of samples collected on site. Several organisations supply dynamic olfactometry tests, but as a panel of people is required they are generally not economical. The Department of Primary Industries and Fisheries has a commercially available dynamic olfactometry laboratory.

Electronic 'noses' have not yet achieved sufficient reliability or acceptance to be readily available as test instruments. The problem with measuring specific compounds is that it does not reflect the complexity of the general population's odour sensitivities.

For more information on dynamic olfactory, www2.dpi.qld.gov.au/environment

Reduce the source of odour

Solid waste removed from waste stream at Sirromet Winery.

Water is often a contributing factor in odour production. It can act as a catalyst in the decay of food wastes. Practices such as dry cleaning can be used to reduce the amount of water present (refer to *Water efficiency overview (W1)* fact sheets for more information).

Similarly, odour in wastewater treatment systems can occur when there are significant levels of contaminants in the wastewater stream. Removing the source of odour from the water is the most effective way of reducing odour.

Flow splitters which separate solid waste from liquid waste can reduce the amount of waste entering the wastewater stream that could rot.

Methods such as product recovery (refer to *Resource recovery from wastewater (W8)* fact sheet) can also be used to reduce the concentration of contaminants in the wastewater stream and hence reduce the odour potential. This has added benefits of reduced water treatment costs and reduced raw material loss.

Generally anaerobic conditions (that is, without air) cause odour problems. As organic material degrades odourous sulphur compounds are formed such as hydrogen sulphide (rotten egg gas). Prevention of wastewater or other materials from becoming anaerobic can prevent these odours. Appropriate operation and maintenance of wastewater systems can reduce odour problems.

Remove waste immediately

Potential sources of odour, such as meat, fruit and vegetable waste, should be removed to waste disposal or recovery as soon as possible to limit decay occurring at the factory. Waste removal should be scheduled frequently to prevent significant deterioration of waste on site.

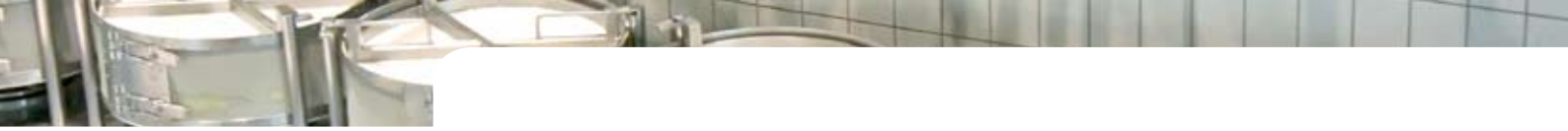
Temperature

Temperature has a major impact on odour. High temperatures promote decay and odours. If waste cannot be removed immediately, consider locating bins of perishable wastes in cool areas or cool rooms. Some companies have installed waste compactors in cool rooms to reduce offensive odours.

Storage of waste in a cool room at Sirromet Winery.

COLD STORAGE REDUCES ODOUR

Sirromet Wines has installed a cool room where all its organic wastes can be stored before they are taken away to be composted and fed to the worm farm.



Contain

Sometimes odour cannot be avoided. For example, one operation in meat processing is rendering which involves heating wastes and produces significant odours. Containing rendering in enclosed buildings can reduce the distribution of odour and allow odour to be removed and treated, for example by biofilters.

Odour removal

There are several methods that mask or remove odour from industry exhausts and fugitive emissions including:

- dilution of the odour through the addition of other raw materials such as water or excess air. Whilst this can be effective in reducing the perception of the odour it also results in additional solid or liquid waste to be treated
- masking or neutralising agents using chemical additives to overpower odours. Whilst this may reduce some odours, the chemicals can be expensive and should not be sprayed around food. There are also questions about their effectiveness
- high temperature oxidation (greater than 800°C) breaks down compounds using heat but it is energy intensive and can produce air-polluting sulphur and nitrogen oxide compounds
- wet scrubbers absorb odours into water which then has to be treated
- absorption techniques collect odours in substances, such as activated carbon or charcoal, which then require disposal
- biofiltration uses microbes to break down odours and is an effective option for large-scale plants with high volume airstreams.

Enclosed biofilter at the Australian County Choice processing plant.

CONTAINMENT AND REMOVAL OF MEAT PROCESSING ODOURS

Australian Country Choice (ACC), an integrated meat processor, has processing operations located within 500 metres of new residential and commercial property. Under previous ownership, the site had a less than satisfactory record for odour control and was regularly dealing with complaints from neighbouring properties.

Under the site's new ownership by ACC, the processing operations built were fully enclosed and the building placed under a slight negative pressure allowing high source point odours to be extracted from the factory to the biofiltration system. The blower pulls 144,000m^3/hr of air through air scrubbers, to remove the soluble and particulates, then directs the stream into four totally-enclosed biofilter beds. The four beds are separated to allow individual maintenance without shutting down the system.

Whilst the system was costly to construct, upkeep is minimal and there have been no odour complaints regarding factory odours since installation.

This series of fact sheets provides examples and suggestions to the modern food processor on how to achieve both economic and environmental benefits from eco-efficiency. Visit the project website www.ecoefficiency.com.au for more ideas and case studies.

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This series of eco-efficiency fact sheets will demonstrate the importance of water in a modern food factory and suggest areas where savings can be made. The project website www.eco-efficiency.com.au has more ideas and case studies on water savings across the food industry.

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