Out, damn pest

The food and beverage industry is looking for pest control operators who can offer effective, yet environmentally-friendly, treatments to replace the phase out of methyl bromide. **By Gill Hyslop**

Traditionally, methyl bromide has been used to eradicate pests. But the use of this ozone-depleting gas is quickly being phased out and causing a few more holes in its absence. 'The phase out of methyl bromide, as per the Montreal Protocol, is a concern for us as there are very few environmentally-friendly alternatives,' comments Lynette Cokayne, CEO of the South African Pest Control Association (SAPCA).

'The Registrar has assured the industry that it could continue to use methyl bromide beyond 2015, but for critical needs only. However, we should take cognisance of the pressure to completely phase out the use of this gas on an international level, so there is no guarantee that Quarantine and Preshipment exemption, and critical needs will be allowed,' adds Cokayne.

The heat-seeking solution

One such solution that has met with considerable success in the UK, and has even received the backing of SAPCA, is heat treatment. Since 1998, Thermokil scientists have been developing methods to eradicate pests. Dave Hammond, managing director of Thermokil, explains how heat treatment on its own, or in conjunction with low doses of pesticides, can be effective against pests, irrespective of their stage of development.

'Heat treatment through cooking is one of the oldest forms of eliminating unwanted life in our food, however, it has had a chequered past as treatment for food factories, because of some major incidences of damage caused by over-enthusiastic and ignorant operators. The fumigation lobby, driven by the big chemical companies, has been quick, both in the past and now, to deride heat treatment as it is a major threat to their sales,' states Hammond.

'However, with now at least nine of my fellow fumigation and pest control friends and colleagues going down with brain tumours, not to mention other cancers, and many known carcinogenic insecticides being quietly phased out, and legal action being threatened against anyone who suggests any possible links between certain pesticides or pest control companies, my motivation to find ways of reducing pesticide usage was obvious,' he says.

'I first became aware of heat treatment in 1996, after seeing a poster presentation about a company who heat treated museum artifacts in a chamber to 50°C for one hour, to kill all stages of an insect lifecycle: eggs, larvae, pupae and adult. I contacted them and, together, we looked into the feasibility of converting this chamber-based concept into mobile system.

'As a science graduate, a biologist in flour mill pest control, and an ex-fumigator I brought to the table diverse experience and formal training to convert it into a successful system. My plan from the outset was to ignore everything that had gone before and start with the basic pest management and scientific principles, adding in field experience and formal scientific training – unusual combinations in the pest control industry.'

Simple principle

Hammond continues, commenting 'the simple principle of the Thermokil system is to isolate the heat treatment area, just as you would isolate a fumigation area, by covering it in insulating sheets and then by setting up distinct air flow patterns aimed to achieve even levels of heat, hot enough to kill insects, but not so hot that you cause damage. Thermokil is not patented, but our system is supported by highly experienced staff and a network of member companies. Some people have tried to copy us, but it usually ends in embarrassment and treatment failures.'

He explains that heat treatment is not about what you do, but how you do it. 'The key is the understanding of how heat distribution occurs in different situations, and the management of your heat resources to maximise efficiency and eliminate potentially damaging situations. It should also be noted that various species showed varying thresholds to heat treatment.'

The method is controllable and environmentally-friendly and results in a wide range of other advantages. It can be applied without any health and safety hazards to people or animals, but still kills insects irrespective of their stage of development. Reduced treatment time – hours instead of days – is a huge time- and cost-saving factor. Also of major importance is the fact that no factory shutdown or exclusion of staff from adjacent areas is needed.

Gavin Heron

South Africa is a massive food and beverage exporter to the Western world where sensitivity to pesticide use is increasing. This country still uses a limited amount of methyl bromide, which will eventually become a serious situation for the export market.

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'SAPCA welcomes technologies that add value to both the consumer and environment,' states Colin Jardin, VP of SAPCA. 'We are constantly evaluating and raising its awareness of the demands of our global environment, and local and international marketplace.' He says that timing and acceptance play a significant role in the adoption of technologies in SA, and that is why SAPCA aligns itself with suppliers that have a solid track record. 'This ensures that investments are made in technologies that have longevity and support. South Africa faces a number of unique challenges that are prevalent in pest management and Integrated Pest Management (IPM); however, the addition of heat treatment will add value to the industry.'

Thermokil has had considerable success with the eradication of pests in mills, bakeries and other food production machinery, as well as in empty silos, small rooms or sections of buildings, while the treatment of whole buildings have also become commonplace in recent years. Heat treatment of pests that normally occur in the wooden structures of buildings and in wooden pallets and packaging under ISPM 15 export regulations has also been efficaciously carried out.

Brewing industry

'One of the first industries to embrace heat treatment was the brewing industry, which often is faced with insect infestations on their dry products side, such as mills, malt bins and grist cases, and associated conveyors and elevators. Methyl bromide fumigations proved fruitless, as the gas would disperse in a house and only killed some of the adult population, leaving the more resistant eggs, larvae and pupae. Then heat took off and within a short time, pest control contractors who had bought Thermokil kits were told by the brewers that they had done such a good job the previous year, there was no infestation left to treat,' concludes Hammond.

In order for an establishment to be HACCP-compliant (Hazard Analysis and Critical Control Points), it means that all threats – and the procedures to avoid them – have been identified for all stages of a food chain. The chain starts with food production and preparation, continues with packaging, and ends with distribution, not forgetting stacking, stocking and serving, too. 'In other words, following the best system to ensure that food is safe for consumption when it gets to the table,' explains Deena Govender of Rentokil Pest Control.

Perhaps the most important of these fundamentals is an IPMP programme to guard against cross-contamination by rodents and other pests.

Lynette Cokayne

Jaco Lamprecht (SAPCA Bloemfontein president) with Dave Hammond

Firstly, a good IPMP should be tailormade by a professional pest control operator. Further keys include proper stock control and rotation. Redundant stock, broken equipment, or other clutter creates harbourage for pests. It is also essential that proper deep-cleaning procedures be implemented to minimise infestation and contamination. Cover ingredients and products that will attract rats, mice, cockroaches, ants and flies and be on the constant look-out for droppings, insect fragments and rodent hair. Instil an Active Hand Hygiene code among the staff, such as a 20 second hand wash, when to wash, the right kind of soap, when a nailbrush or hand sanitiser is needed, and the correct type of glove or utensil for every process.

Govender warns against using soap from a contaminated source. There should be a robust, attractive, fully-maintained soap dispenser with sealed sachets installed in every washroom in the facility. Initial, a division of Rentokil, also equips areas without direct access to hand washing and drying facilities. The mobility of hand gel and wipes for waterless hand sanitising are effective when staff cannot leave their workstation, or even as extra protection after visiting the bathroom, handling equipment or foodstuffs.

Food waste recycling

Today, everyone is fully aware that something needs to be done to reduce our environmental footprint. And, surprisingly, food waste is increasingly being highlighted as a key contributor to environmental degradation. The Save Food report commissioned by the UN's Food and Agriculture Organisation (FAO) estimates that one-third of all food produced for human consumption is either wasted or lost. Most wastage is directly attributable to retail standards, such as discarding perfectly good but blemished potatoes, and to direct consumers discarding food according to 'best-before' instructions. The UK's Department of Environment and Rural Affairs measures the CO_2 emissions from food waste at 400kg/tonne, which is higher than that of plastic and even tyres. When dumped into landfill, food waste emits a further 335kg/tonne of CO_2.

According to Gavin Heron, co-founder of Earth Probiotic Recycling Solutions, there are four strategies for up-cycling food waste, versus dumping it in a landfill: generating biogas; using as a feed for pigs; incinerating; and composting. Of these, the most environmentally-friendly is feeding it to pigs, however, in South Africa, this has moral as well as public health impact. Biogas is


Interroll Drum Motor washdown

viable but only on a very large scale, such as mining landfills for methane; and energy generators are not in wide use locally for the incineration route.

Anaerobic digestion

That leaves compositing, with three options: in-vessel composting, where food waste is mixed with a bulking agent and subjected to hot aerobic conditions (a variant of this is the installation of machines which process food waste into a soil amendment); vermicomposting, where waste is used as a feed stock for worms; and anaerobic composting, using beneficial microorganisms.

Earth Probiotic Recycling Solutions uses anaerobic digestion to enable the safe and fast up-cycling of food waste into a highly beneficial soil amendment. 'For centuries, the Japanese have been fermenting food waste and reapplying it into gardening and vegetable production,' explains Heron. 'In 1980, a soil scientist harnessed these microorganisms in the form of EM (effective microorganisms) and started a waste and agricultural revolution. Today, bokashi is widely used all over Asia to process food waste into soil food and is being taken up in the UK, Australia and New Zealand. In fact, some UK councils subsidise the cost of bokashi digesters to households to reduce the volume of food waste going to landfill.

'The bokashi system, simply, requires the layering of food waste with bokashi bran in anaerobic conditions, where it ferments and thus does not rot. The fermentation also pre-digests the food waste and starts the conversion of protein into amino acids. The advantages are ease of use, low energy requirements, low capital requirements and the odourless nature of the process (the fermentation stops putrefaction). In addition, the fermented waste is a living matrix full of beneficial bacteria and fungi. All of which are essential for building a healthy and vibrant soil-food-web.'

The issue of recycling food waste is larger than merely reducing CO_2 emission, though. Research indicates that food waste separation at source minimises contamination and increases the volume of dry recyclables by 32 per cent. Ultimately, we have to think of everyone involved, and be aware of the landfill waste picker whose survival is based on going through waste with its complementary attachments of sickness-inducing pests.

The growing industrialisation and trade of food production, and the emergence of new or antibiotic-resistant pathogens, are increasingly challenging international health security. Although it is difficult to establish the exact figure of the global impact of foodborne diseases on society, a study by a former US Food and Drug Administration (FDA) economist estimates the total economic impact of foodborne illness, in the US alone, is $152 billion annually. Around 31 known pathogens are responsible for 20 per cent of the illnesses (and 44 per cent of the deaths); the remaining unknown/unspecified pathogens are responsible for 80 per cent of the illnesses (and 56 per cent of the deaths).

On the other hand, product recall is threatening the food industry, with increasing vigilance and monitoring of the quality and safety of food; and public perception when bacteria-related issues make the headlines.

Intense pressure

As a consequence, there is intense pressure on food manufacturers to improve quality control in the coming years. Risk management and risk reduction are the start to better food safety practices.

To assist food manufacturers to comply with international regulations in material handling processes, Interroll has created a highly hygienic conveyor drive. Conventional gear motors are bulky, complex to install, and most importantly, non-hygienic. The Interroll Drum Motor, however, can be cleaned and disinfected regularly using high pressure water, steam and chemicals. The company's R&D department has designed the Synchronous Drum Motor according to guidelines of the European Hygienic Engineering & Design Group (EHEDG), using materials approved by FDA and EC regulation 1935/2004.

The chemical resistance of the materials used has been validated in real environmental tests. Cleaning specialist Ecolab has certified a five year minimum lifetime of the Topax range of products when exposed to typical cleaning and sanitation procedures. □

Voice for the industry

The South African Pest Control Association (SAPCA) acts as the representative body to promote and uphold the standards of the industry. It agrees that pesticides should be used responsibly and by trained and registered pest control operators who only apply pesticides when absolutely necessary. In many instances, there are various preventative and alternative measures that can be taken. SAPCA is a Section-21, non-profit organisation with voluntary membership-association that advocates and encourages responsible pest control with the least possible impact on life and the environment.

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