FIRST GLOBAL APPROVAL AND COMMERCIAL USAGE OF PROFUME* IN SWITZERLAND

A. Schreyer*[a], D. Fassbind[b], B. Ruebsamen[c], S. Buckley[d], and M. J. Drinkall[e]

Background

ProFume* gas fumigant (99.8% sulfuryl fluoride) is a broad-spectrum postharvest fumigant being developed by Dow AgroSciences for the control of stored product insect pest in the food industry. Potential uses of the fumigant to replace methyl bromide include mills, food processing, storage areas and commodities. Registration submissions have been made in the USA and Europe.

Registration

On the 30th June 2003 the registration authorities in Switzerland granted the first tolerances of Sulfuryl fluoride for the food industry. This approval represented the first commercial approval to be granted globally. The approval follows a submission made by Dow AgroSciences in September 2002. The authorities considered data generated from both the European Union and the USA in granting the tolerances. The approval enables commercial fumigations to be undertaken in emptied mills, storage facilities and silos in Switzerland enabling methyl bromide to be phased out for these uses.

Fumigator – Transfer of ProFume Technology

To enable the commercial fumigations to take place Dow AgroSciences has worked closely with the Swiss fumigation company, Disinfecta Dienstleistung AG (Daellikon Switzerland), to transfer ProFume technology. Disinfecta fumigators, who are already qualified according to National Laws, completed extensive training on the fumigant with the emphasis on safety and precision. The training consisted of classroom sessions and a practical fumigation completed under a trials permit. During the commercial introduction phase on-going support from Dow AgroSciences technicians will also be provided.

[a]Dow AgroSciences, Horgen, Switzerland
[b]Disinfecta Dienstleisting AG, Daellikon, Switzerland
[c]Dow AgroSciences, Truderinger Str. 15, Munich, Germany
[d]Dow AgroSciences, Buroplos, 1240, Route des Dolines, Sophia Antipolis, Cedex, France
[e]Dow AgroSciences, Latchmore Court, Brand Street, Hitchin, Hertfordshire, UK

First Commercial ProFume Fumigation

Site details

The first ProFume commercial fumigation took place at the wheat flour mill in Malters, near Luzern between 17-20 July 2003. The mill owned by Fa. Meyerhans Hotz contained various modern milling equipment typically found in Europe and was constructed of clay brick walls with a concrete roof. It consisted of five floors and the area fumigated was 4318 m^3.

Sealing

The building was sealed to improve the structure's fumigant retention properties. Doors and windows were sealed with polyethylene sheeting and tape. Also, since food tolerances are currently being established, the wheat kernel silos were sealed to prevent fumigant entry and the flour silos were emptied before the introduction of ProFume.

Cleaning of mill, machinery

The milling machinery and augers were opened and cleaned: flour deposits on floors and on other surfaces were removed as far as possible to improve sanitation.

ProFume – dosage determination

The dosage, (CT = concentration x time) of ProFume and the amount fumigant required for introducing into the mill was determined by using the Fumiguide* Program for ProFume gas fumigant. This computer software is part of the product label. Input of the following parameters were made: volume of the structure, target pest/life stage: rust-red flour beetle (*Tribolium castaneum*) – all life stages, temperature at site of insect location: 25^{o}C, predicted half loss time (HLT - time taken for 50% of the fumigant to be lost from the structure): 12 hours, exposure time: 48 hours.

ProFume introduction

ProFume was introduced into the mill via 100 m lengths of polyethylene tubes (0.95 cm outside diameter, 0.64 cm inside diameter). These were constructed to meet the requirement of a minimum burst pressure of 35 bar; brass compression fittings were used to connect the tubes. The tubes were connected to introduction fans placed on the 2nd, 3rd and 4th floors. These fans were 220 volts, 5.5 amps (8.5 amps at start up) and delivered an air flow of 240 m^3/min.

ProFume monitoring

Polyethylene tubes were placed at 7 locations on all floors of the mill. These were connected to a Fumiscope (Key Chemical and Equipment Co., Clearwater, FL) to measure the concentration (g/m^3) during the fumigation. Data from the Fumiscope were then placed into the Fumiguide and the accumulated CT and the HLT determined.

Aeration, clearing and re-entry

Following the accumulation of the required CT the mill aeration was initiated using passive ventilation procedure commencing with the upper floors to avoid exposure of the fumigant to operators and bystanders at ground level building. Once the concentration had dropped ventilation was increased progressively and the building was cleared to a level of 5 ppm or below. Monitoring was undertaken using an Interscan Gas Analyzer (Interscan Corporation, CA, USA) around the building during aeration and for clearing the mill for re-entry.

Results

The mean CT achieved in the mill was 1358 $g\text{-}h/m^3$. The temperature range during the fumigation period of 45 hours was estimated between 25 – 30°C. The mean HLT for the mill was calculated at 27 hours. Visual inspection of the milling equipment after the fumigation and re-entry showed no damage and no signs of live insect activity.

Conclusions

The first global commercial fumigation of ProFume was successfully completed in Switzerland. Switzerland is the first country to have available this fumigant as an alternative to methyl bromide for the food industry. During 2003 a total of three commercial fumigations have been planned to enable the fumigator, working with Dow AgroSciences, to build expertise with the product. This will enable a progressive phase out of methyl bromide for a number of uses in Switzerland in 2004 and 2005 as an increasing number of ProFume fumigations are scheduled.