



Dr Jim Desmarchelier, Sylvia Allen and Le Vu from the Division of Entomology work on the development of the new fumigant, carbonyl sulfide.

# World patent for natural, non-toxic fumigant

Partners are being sought to help commercialise a new fumigant developed by CSIRO's Division of Entomology. Carbonyl sulfide, recently patented world-wide, is touted as a replacement for methyl bromide in the control of some insect, nematode and fungal pests.

Fumigants are used widely to control insect pests in quarantine services and grain and building industries throughout the world. In recent years the number of registered fumigants has declined as their toxicity to humans or the environment has been revealed. Parallel with this decline has been an increased reliance on the fumigant methyl bromide.

During the past 10 years, regulations governing the use of methyl bromide in Australia have tightened. In the long term, methyl bromide is likely to be removed from sale.

Methyl bromide has been implicated in the depletion of the ozone layer. It is listed under the Montreal Protocol, which aims to reduce and ultimately eliminate chemicals that deplete the ozone. Australia is an active supporter of this Protocol.

Senior assistant director of plant quarantine and export inspection at the Australian Quarantine Inspection Service (AQIS), Mick Catley, says the Montreal Protocol scared many quarantine services.

Catley says the biggest use of methyl bromide in Australia is for insect control. AQIS is concerned at the likely withdrawal of methyl bromide because it could restrict imports and exports and increase the risk of insect pests spreading between countries, he says.

Recognising this problem, the Commonwealth Environment Protection Agency gave the Division of Entomology, a \$400 000 grant to find alternatives to methyl bromide for quarantine applications.

Grain storage and hygiene adviser at the Australian Wheat Board (AWB), Dr David Webley, says the number of fumigants for control of insect pests in grains has been shrinking.

Webley says there used to be a large number of liquid fumigants, such as ethylene bromide and chlorinated hydrocarbons, but many have been withdrawn because of their carcinogenic properties. Now, phosphine and methyl bromide are the main ones left, he says.

CSIRO has been investigating carbonyl sulfide as a fumigant for about two years. The project is half funded by CSIRO and half by the Bulk Handling Authorities and the AWB.

Dr Jim Desmarchelier of CSIRO's Division of Entomology says carbonyl sulfide, comprised of one atom each of carbon, oxygen and sulfur, occurs extensively in the atmosphere. It is part of the natural environment and is emitted from soils, marshes, manures, compost and most combusted products.

Carbonyl sulfide is better for the environment than methyl bromide, Desmarchelier says. It breaks down quickly and doesn't cause the residue problems of persistent chemicals.

The AWB would welcome another fumigant if it is safe and easy to apply, Webley says. Restrictions on the use of methyl bromide and its potential withdrawal from sale have led the grain industry to rely heavily on phosphine to kill insect pests. There is concern insects may become resistant to phosphine, so an alternative fumigant will be welcomed, he says. The AWB is already testing the new fumigant at its Werribee laboratory in Victoria.

CSIRO has secured a world-wide patent covering usage of carbonyl sulfide as a fumigant for durable commodities (such as grains), non-durable commodities (such as fruit), soil, buildings, quarantine and other applications.

Desmarchelier says there is still a great deal of work to be done before the fumigant can be registered for commercial use. Information and toxicology data must be collected to meet regulations covering its areas of application, he says. Once the product is registered, it's likely the cost of production would be similar to that of methyl bromide.

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