

Fumigation and Controlled Atmospheres — Session Summary

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The biggest single issue in the last four years has undoubtedly been the implication of methyl bromide in ozone depletion. It has been significant in terms of our positive approach to this, that there have been no papers on methyl bromide per se at this conference.

Rather the emphasis has been on making the most of the existing alternative, phosphine. In the light of concerns on health and safety and environmental issues, scientists were urged to collect data on the environmental fate of phosphine to bolster the data in support of this useful fumigant.

New methods of formulation and application (mixtures with carbon dioxide and in combination with heat, and constant flow systems) have been strongly represented.

In the light of this need to nurture phosphine, there was much discussion on the practical significance of resistance and the need to distinguish between detection of the resistance gene and the significance in terms of field dosages. The importance of rapid detection as an early warning was acknowledged, but the need for a test which reflected the field significance was stressed.

In the same context the need for improved education and training in good fumigation practice, as perhaps the single most important factor in the continued effective use of phosphine, was discussed.

Alternative fumigants have emerged at this meeting. Carbonyl sulphide is developing as an exciting prospect for the future and the re-evaluation of other existing alternatives, such as methyl isothiocyanate, offer promise. Indeed this may rekindle interest in the international scientific community in the search for yet more alternative chemicals.

Returning to the theme of protecting useful fumigants, a general agreement emerged that:

1. Government and regulatory authorities, in co-operation with manufacturers and distributors, provide accurate information for the effective training of fumigators.
2. Adoption of effective fumigation practice be fostered by:
 - appropriate extension by government;
 - effective training for fumigators including regulation;
 - identification of incentives that ensure fumigations are carried out in the best possible way, including: effective preparation of enclosures using pressure test standards and; concentration monitoring during the fumigation to ensure minimum effective concentrations are exceeded.

Controlled atmospheres are in many ways a mature technology with a long research history but they have not been widely used. Nevertheless, there is now an upsurge in interest in CA use as the conventional fumigants become harder to use, mainly on environmental grounds. This increased interest was shown by the number of papers on old methods revisited, and on novel methods of application. Of special interest was the use of high pressure carbon dioxide to disinfest small batches of commodity. This technique, if developed to full commercial standards, could replace methyl bromide for small-scale fumigations.

Several papers on biogenesis and hermetic storage aimed to address problems associated with the more toxic fumigants. The renewed interest in these ancient storage technologies is a reminder that all that is old is not yet ready for discarding. One of the papers on dry grain respiration showed that, despite its long history, all research aspects of this topic have not been exhausted.

There were several papers on the effects of CA on a range of storage pests, contributing to the steadily increasing knowledge base on quantitative aspects of CA toxicology, which are the basis for determining controlled atmosphere dosage regimes for specific circumstances.

Certain CA topics clearly need further work and discussion, and it was recommended that these be brought to the attention of the organisers of the next controlled atmosphere and fumigation conference, to be held in Cyprus in 1996. They included the following:

- Standards required for CA treatment, especially pressure testing
- Revisions to recommended CA dosage regimes, with particular reference to specific sets of conditions, such as species present, commodity treated, extreme temperatures and other modifying factors
- Studies on the economics of controlled atmospheres.