

## Propylene Oxide: The Most Complete MB Replacement

Morris Warren ABERCO Inc

Propylene Oxide is the most complete Methyl Bromide replacement under consideration today as it can be used as an efficient pre-plant fumigant and is registered as a post harvest pesticide. The latter as both an insect fumigant and to reduce bacteria and mold in food to acceptable levels without changing the desirable properties of taste, crunch and texture.

Cancer concerns have been eliminated since the U.S. EPA recognized that the human stomach acid would quickly convert any residual PPO into the GRAS food additive, propylene glycol. The half life of PPO under these conditions is only 60 seconds.

On this basis EPA eliminated the 4 hour PPO exposure limit that did not allow adequate kill to treat heavily contaminated commodities such as spices. This will enable PPO to replace ethylene oxide (ETO) because of worker safety and the fact that ETO leaves highly toxic byproducts such as ethylene chlorohydrin and ethylene glycol (auto antifreeze) in the commodities. This is of great concern to EPA.

The unlimited treatment time allows a lower dose that will offgas quicker thereby saving both PPO costs and aeration times if required to reduce the PPO residues below the 300 ppm residue "tolerance".

In the past the PPO inhalation exposure limit was 20 ppm Permissible Exposure Level (PEL) but this has been changed to 2 ppm 8 hour twa and PEL of 10 ppm. Convenient lightweight NIOSH approved organic respirators have been approved eliminating the heavy, hot sweaty SCUBA respirators except for emergencies. Altogether our customers and ABERCO are pleased with the results of the re-registration.

### PART 2

The advantages of the low toxicity and proven conversion to propylene glycol in ground water within 4-5 days as well as in the human stomach makes PPO safe to be used near homes, wells and ponds containing fish. This may become very important as some of the most effective MB alternatives are being outlawed in many countries. In the USA buffer zone problems or limited use in certain counties and townships are becoming common. Other soil fumigants may have limits due to worker inhalation toxicity far below the 2 ppm 8 hr twa (PEL 10 ppm) allowed for PPO. These provide excellent preplant opportunities for PPO.

Working together with IR-4 and interested preplant experts ABERCO has accumulated tests that prove propylene oxide to be equal to or better than MB to control all the major soil pathogens. This data is concentrated in the following charts.

Chart #1

SUMMARY OF TESTS FOR MAJOR PATHOGENS

<i>Pathogen</i>	<i>Dose</i>	<i>Application</i>
Fungal	45-60 gal/a	Shank or drip
Nematodes	45-60 same	same
Nutsedge	60-80 same	same
Weeds, annual	45-50 same	same

Chart #2-1 thru 2-4

1) Fungal & Nematode	Strawberry Driscoll 4 year summary
2) Nematode	Tomato Root Gall Severity . J. Noling
3) Nematode & weeds	Tomato- 2005 Nematode & Weed Management- J. Gilreath
4) Nutsedge Densities	PPO Dose required to control nutsedge J. Gilreath

Summary

Propylene Oxide (Propozone) is a viable Methyl bromide replacement with low inhalation and oral toxicity. PPO's current wide post harvest use along with the successful evaluation as a preplant fumigant makes PPO a versatile replacement for many methyl bromide applications.