Title Some properties of sulphuryl fluoride in relation to its use as a fumigant in the cereals industry.

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Citation Advances in stored product protection. Proceedings of the 8th International Working Conference on Stored Product Protection, York, UK, 22-26 July 2002 (2003); 910-915

Abstract

The toxicity of sulfuryl fluoride (SF) to various pest species, the penetration of SF into flour, and the potential for any problems to arise because of fumigant cross resistance or malfunction of electronic equipment exposed to SF were studied in the UK. The pest species included *Tribolium castaneum* (rust-red flour beetle), *T. confusum* (confused flour beetle) *Cryptolestes turcicus* (Turkish grain beetle), *Ephestia kuehniella* (Mediterranean flour moth), *Ptinus tectus* (Australian spider beetle), *Sitophilus granarius* (granary weevil), *Gnatocerus cornutus* (broad-horned flour beetle), *Tenebrio molitor* (meal worm), *Liposcelis bostrychophila* (book louse) and *Acarus siro* (flour mite). For most of the pests, the egg stage was the most tolerant of fumigation, but the postembryonic stages of mites were as tolerant as the eggs. Most of the species were completely controlled by a concentration x product of 500 g h-1 m-3 at 30 deg C, or 1000 g h-1 m-3 at 25 deg C. Penetration studies into flour of 30 cm depth revealed that SF required 30 to 40 minutes to break through to this level whether or not there was forced air movement over the flour surface, and that only 2.5-3 h were required, irrespective of temperature over the range 18-28 deg C, for concentrations to reach 50-60% of those at the surface. At venting, 90% of the gas present in flour at 30-cm depth had dissipated after 4.5 h. Studies on phosphine-resistant and susceptible strains of *T. castaneum* revealed no cross resistance to SF, and repeated exposure of computer equipment to the gas revealed no malfunction. SF is a promising replacement for methyl bromide in the flour milling industry.

Sulfuryl chloride fluoride is the chemical compound with the formula SO2ClF. It is employed as a solvent for highly oxidizing compounds. The laboratory-scale synthesis begins with the preparation of potassium fluorosulfite: SO2 + KF â† KSO2F. This salt is then chlorinated to give sulfuryl chloride fluoride. KSO2F + Cl2 â† SO2ClF + KCl. Further heating (180 Â°C) of potassium fluorosulfite with the sulfuryl chloride fluoride gives sulfuryl fluoride. In many crops, its amount in the plant is similar to phosphorus. Roles of sulfur in plants. Sulfur has various functions in plants. Some major roles are: It is found in some amino acids, the building blocks of proteins. Most of the sulfur absorbed by plants, about 90%, is used for that purpose. Sulfur is essential for chlorophyll formation. It is a major constituent of one of the enzymes required for the formation of the chlorophyll molecule. Essential in the synthesis of oils, especially in oil crops. Active in the metabolism of nitrogen. Easily create your fertilization plan with our softwar Presentation on theme: "Sulfuryl Fluoride ProFume* Gas Fumigant"â€" Presentation transcript: 1 Sulfuryl Fluoride ProFume* Gas Fumigant Technical Update August 5-7, 2003 Suresh Prabhakaran, Ph.D. Field Research Scientist Dow AgroSciences. 2 ProFume* Development Dow AgroSciences investigated sulfuryl fluoride as a MeBr alternative for postharvest insect control. Initial research focused on flour mills, food processing facilities, warehouses, and stored grains. Cooperative research since 1995 with researchers, food scientists, food commodity groups, industry consultants, and fumigators in