SULFURYL FLUORIDE AS A QUARANTINE TREATMENT FOR WOOD PRODUCTS

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Sulfuryl fluoride (SF) was first registered as Vikane® gas fumigant (Dow AgroSciences, Indianapolis, IN) in 1961 in the United States (US) for treatment of buildings, vehicles, construction materials, furnishings, and non-edible commodities for a variety of pests (Thoms and Scheffrahn 1994). Since 1961, more than two million homes, museums, cathedrals, historical landmarks, rare book libraries, and scientific and medical research laboratories have been fumigated with Vikane. In Europe it was first introduced in the early 1990s to eliminate wood destroying beetles, such as *Anobium punctatum* and *Ptilinus pectinicornis*, from structures. SF has been the fumigant of choice for control of wood-destroying insects and museum pests because of its efficacy (Osbrink et al. 1987, Su and Scheffrahn 1990) and physical properties (nonflammable, non-corrosive, relatively inert as a gas, and diffuses and aerates rapidly).

With the adoption of the Montreal Protocol, the phase out of methyl bromide (MB) in developing countries started and the search for replacements began. Several progressive food industries in the US and Europe approached Dow AgroSciences to consider developing SF for food commodity use. As a result, Dow AgroSciences formed partnerships with leading stored product researchers, fumigators and food industries around the world and developed SF as a successful post-harvest fumigant (ProFume® gas fumigant). ProFume was registered in the US in 2004 and 2005 for the control of rodent, insect and other invertebrate pests in food handling establishments (e.g., pet food facilities, bakeries, food production facilities, mills, warehouses, etc.), stationary transportation vehicles (railcars, shipping containers, trucks, etc.), temporary and permanent fumigation chambers, and storage structures. ProFume is currently registered in 17 countries globally.

The Montreal Protocol and the global registration status of ProFume® gas fumigant have led to increased interest in using SF as a replacement for MB for quarantine treatment of wood products. SF possesses numerous attributes for this application. SF compared to MB penetrates through wood more readily (Scheffrahn et al. 1992) and sorbs less to wood (Barak et al. 2009, 2010). SF is readily confined, even when applied at high doses, using standard quarantine tarping methods (Barak et al. 2010). Equipment for accurate and reliable measurement of SF during fumigation and for clearance testing is commercially available. Fumigators are available with experience and equipment to conduct SF fumigations at ports. Research has been conducted to establish SF dosage rates for quarantine treatment of unseasoned wood for control of pathogens, such as oak wilt fungus (Woodward and Schmidt 1995, Schmidt et al. 1997), nematodes, such as pinewood nematode (Dwinell et al. 2005, Sousa et al. 2010) and insects, such as the Asian long horn borer (Barak et al. 2006), emerald ash borer (Barak et al. 2010) and bamboo borers (Yu et al. 2010).

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