

SULFURYL FLUORIDE and ITS USE as an ARTIFACT-FUMIGANT to CONTROL the *LYCTUS* BEETLE

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During the last decades Methyl bromide was used to eradicate pests in artifacts in museums. But it is an ozone depletor and is classified as carcinogenic and will be banned in the future. Stimulated by this present regulatory pressure, we investigated Vikane* (= Sulfuryl fluoride) as a substitute for Methyl bromide to control wood-infesting beetles in museum artifacts.

Sulfuryl fluoride (= SF) is an inflammable, odorless, and colorless inorganic gas composed of 99.8 % SO₂F₂ and 0.2 % impurities. SF was used in this study to eradicate an infestation by *Lyctus brunneus* (S.) (powder post beetle) in the Museum of Modern Art in the city of Bonn, Germany. Wood frames of pictures and paintings were infested by *L. brunneus*. The artifacts were enclosed in gastight bubbles for fumigation. SF was released from cylinders and passed through a filtering system, which removed the acid impurities in SF such as hydrogen fluoride and sulfur dioxide to zero. This highly purified SF made sure not to alter or tarnish sensitive materials and surfaces of artifacts. The SF fumigation was monitored to insure efficiency of the fumigation and to reach a 100% mortality of the target insects including the eggs. All infested storage rooms of the museum were sprayed additionally prior to aeration of the bubbles with a Pyrethrum formulation in order to kill *L. brunneus* adults on walls and floors.

When the target ct-products in the bubbles were accumulated, assuming all target pests were eradicated, aeration was carried out. A fan and ducting were used to aerate SF from the bubbles following fumigation.

The low sorption and non-reactivity of SF gas fumigant with artifacts are extremely favourable properties for rapid aeration. Following the aeration period, the artifacts were tested with an approved detection device of sufficient sensitivity to confirm a concentration of SF of 1 ppm or less in the breathing zone. No altering was seen on the artifacts. Bioassays (adults, larvae, pupae, and eggs of *L. brunneus*) showed a 100% mortality. No reinfestation was observed 6 months after the fumigation.

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