SAFER AND MORE EFFICIENT USE OF FUMIGANTS TO REDUCE THE DOSAGE

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Modern fumigation for pest control comprises various adjustments of the envisaged object for disinfestations, like for instance suitability, gas tightness and improvements of the structure. The location has to be inspected in advance to obtain information from the client on the location, the neighbourhood, the expected weather conditions, the kind of and structure and product to be infested, the information on the occurring pests (and stages) to be controlled, the envisaged treatment time, on the authorities that have to be informed in advance, the logistics to bring in and apply the fumigant, the time schedule for taking measurements, the locations of measuring points for observation and guiding of the fumigation. During the fumigation, access of unauthorised persons has to be effectively inhibited.

A very important and crucial point is the identification of the appropriate dosage to achieve complete control of all present pests. There are many publications and recommendations around for the fumigants, especially the fumiguide that contains a computer program to guide the fumigator in selecting the right dosage. The best program and recommendation can not work if the basic data are wrong. This concerns the real temperature and relative humidity within the object. If the temperature at certain locations within a factory, e.g. in the basement, is actually during the treatment 5°C lower than presumed and the wrong figure introduced into the calculation of the necessary lethal dosage, pest insects will surely survive. Only if the dosage is chosen in advance in excess of about 25 % of the theoretically necessary figure such wrong presumptions may not lead to failures. Of course the better way is a realistic measurement and estimation of the temperature regime shortly prior to the treatment within the object. Still, the risk exists that the temperature may drop during the treatment. This may be overcome by inforced artificial heating to a certain regulated value and gas recirculation to ensure even temperature within the building throughout the treatment.

At the beginning of the treatment, the gas is released into empty space from where it has to penetrate into cracks and crevices before meeting and killing the target pest and enter into it to meet the target site. This fact of this considerable delay is often neglected. Additional exposure time must be added to theoretical literature values, that are taken from experiments in fumigation chambers.

An argument of paramount importance is the determination of the target mortality. Insects tend to multiply fast in big numbers, progeny of 500 within

a few weeks is no exception. Therefore, at least 99.9% of all living stages if not more must be killed to be free from the threat of short rebound time. In US quarantine probit 9 (99.9968 % mortality) is required to prevent survival of quarantine pest. These considerations must be implemented in the fixing of the dosage and may need further changes of computer programs for fumigators.

The precise selection of the appropriate dosage to control the pests present in an object for fumigation can lead to significant reduction of chemical used and later on emitted into the ambient, since different insect species may require very different lethal dosages. Also the increase of temperature within an object can help to reduce the amount of chemical used.

The details of these thoughts will be discussed with practical and theoretical examples.