

Microbiological pesticides in green houses – a possible health risk

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ABSTRACT

In agriculture, forestry as well as in greenhouses chemical pesticides are increasingly replaced by more ecologically friendly biological pesticides. The biological pesticides include various macrobiological pest management techniques (predator mites, nematodes) as well as various microorganisms (bacteria or fungi), i.e. microbiological pesticides (MP).

The possible health effects in relation to the exposure of MP may be mediated by Type 1 allergy and/or asthma and other inflammatory lung diseases. Further, upper airways symptoms as rhinitis may be considered, as well as eye symptoms (conjunctivitis) and skin symptoms (eczema or itching).

In 1996 a prospective study was initiated in the greenhouses culturing ornamental plants in Funen, Denmark.

The design of the study considers a cohort of employees in a selection of greenhouses, where the four main groups of MP's were used, namely *Bacillus thuringiensis*, *Verticillium lecanii*, *Trichoderma harzianum* and *Paecilomyces fumosoroseus*.

The study population was selected in 1997-1998. The participants were included in a three year follow-up investigation, encompassing annual examinations including: I) Interview-data considering a) registration of the working condition,; b) personal, structured interview about the health conditions; II) Spirometry. III) Bronchial challenge test. IV) Allergy tests: total IgE, specific IgE against the products: Bactimos, Dipel, Vectobac (*Bacillus thuringiensis*), Supresivit, Binab (*Trichoderma harzianum*), Mycotol, Vertalec (*Verticillium lecanii*), and Preferal (*Paecilomyces fumosoroseus*). A Histamin Release test were made for the same products. A standard medical skin prick test included ten inhalation allergens. In order to follow the detailed change in symptoms self administered questionnaires about working- and health conditions were collected every third month.

The study cohort comprised 184 males and 395 females. In all 262 persons were followed for three years, 342 were followed for at least

two years, while 402 were followed for at least one year. This resulted in 1585 single observations and 1006 observations of incidence data covering 1146 person years.

The participation-rate approximately 60%. The most frequent cause of "dropouts of study" was change of job.

The study was primarily designed to find risk factors for sensitization and asthma/hay-fever among gardeners exposed to MP. But no regular sensitization was observed. A high prevalence of hay-fever and dermatological symptoms in relation to atopy was demonstrated, but this did not associate with exposure. No one with convincing signs of allergy to any of the four types of MP was identified during the follow up period.

In conclusion, these results indicate that MP can be used without negative health effects.