# Accelerated degradation of metam sodium in the field and its management

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Accelerated degradation of Metam-sodium (MS) in soil was documented in Holland, Australia and Israel. In controlled environment studies we have demonstrated that that repeated applications of MS resulted in a rapid dissipation of MITC in soil and loss of effective pathogen control .Soil samples which were collected from several in Israel were repeatedly treated with MS to test for their potential to be induced for accelerated degradation of MS. Accelerated degradation was induced in most of the tested soils, indicating the occurrence of the potential in these soil. A wide survey which included 40 soil samples from different agricultural fields was conducted in order to asses the dissipation profile of MITC in each soil after MS application. The results indicate that the soils differ in their capacity to degrade MITC in soils. Different dissipation curves were obtained for tested soils ranging from fast dissipation (24 hours) to slow and long and high concentration of MITC in soil. The dissipation curves in each soil were highly correlated with the efficacy of pathogen control in the tested soil. The Diversity of MITC dissipation among the tested soils can explain failures in pest control in certain fields following MS application for disease management.

The objectives of the present study were to determine the possible occurrence of accelerated degradation of MITC under field conditions in Israel, and first assessing prevention strategies in order to delay and/or control the development of the phenomenon.

Two fields were selected for the studies. Insufficient management of soilborne disease was documented in these fields during the previous crop. The first field was infested with *Verticillium* wilt of potatoes and the second with *Pythium* and pod wart pathogens in peanuts. Soil treatments during the first year of the experiments included application of MS, and Combination of MS and formalin. After the first year the experiments were expended and additional half for each field was treated with the same soil treatments. This experimental setup enabled to evaluate the decrease in MS efficacy after repeated application. The dissipation cure of MITC for each soil history was tested in the lab. Disease development and crop production was determined during the too seasons.

MS was effective in controlling *Verticillium* wilt in potato and maintaining commercial yield during the first year. Disease occurrence in the non-treated plots was 100% after 100 days of growth. The combination of MS and formalin further improved pest control. Loss of disease

control was observed with MS after the second application indicating fast dissipation of MITC in the soil following repeated application.

MS was not effective in controlling *Pythium* pod rot in peanuts during the first year. Disease occurrence in the non-treated plots was over 50%. The inefficient control of pod rot was correlated with rapid dissipation of MITC in this soil. The combination of MS and formalin improved pest control and yielded commercial yield. Further Loss of disease control was observed with MS after the second application indicating enhanced dissipation of MITC in the soil following repeated application.

Laboratory studies indicated that the combination of formalin and MS does not prevent accelerated degradation of MS. Heating of soil in with accelerated degradation syndrome cured the syndrome.

The accelerated degradation phenomenon of soil fumigants has important practical implications and further emphasizes the importance of alternating pesticides and avoiding frequent application of the same pesticide. The potential of soils to degrade fumigants rapidly, and thus to reduce their efficacy is shown in this study for MITC. This phenomenon should be studied also for other fumigants in order to prevent the rapid loss of efficacy of these chemicals.

## REFERENCES


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