



WAGENINGENUR

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wetenschapswinkel



## **EM: Effectieve microben of effectieve magie?**

Een onderzoek naar de effectiviteit  
van Effectieve Micro-organismen (EM)

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## Abstract

In this research the effects of the microbial inoculant EM (Effective Microorganisms) were determined on the composting process and suppression of root diseases. EM is said to contain 80 species of effective micro-organisms, belonging to different groups of bacteria, fungi, yeasts and actinomycetes. EM-A produced by the company Agriton was added to a mixture of wood chips, prunings and grass clippings. Control piles did not receive EM-A. The composting process in open containers was monitored by measuring the internal temperature and CO<sub>2</sub> emission. No clear differences were found in the composting process or the composition of the final compost. The temperature was slightly increased during composting after addition of EM.

EM was also added to organically managed soils in the form of fermented organic matter (bokashi). Different experiments and soil analyses were carried out to determine if EM would affect the disease suppression of soils. Three different treatments were used: EM bokashi, sterilized bokashi (to test the effect of addition of organic matter) and a control. In the first bio-assays, soil mixes were infested with a pathogen, and a specific host plant was sown. An experiment with *Pythium ultimum* and cucumber did not result in a disease suppressive effect by EM. In fact, the addition of both bokashi treatments gave lower disease suppression; more plants were infected in these treatments. In one of three soils, infection of carrot by *Rhizoctonia solani* was reduced by EM compared to the sterilized bokashi and control treatments. Bio-assays were also done with naturally infested soils, but no effect of EM on disease severity was observed. A mycelium growth test was done to determine inhibitory effects of EM on fungal growth. There was no indication that EM had a suppressive effect on the fungi tested. Additional soil analyses were done to determine effects of EM on soil microbiology. A soil respiration analysis was carried out to determine if EM changes the total soil microbial activity. A higher CO<sub>2</sub> production was observed for the bokashi treatments, but there were no differences between the EM bokashi and the sterile bokashi. This indicates that EM does not change the total microbial activity, although the EM could have replaced part of the indigenous microflora. A DGGE (Denaturing Gradient Gel Electrophoresis) analysis was performed to determine if soil amendment with EM changes the bacterial community in the soil. No differences were observed between the different soil treatments. The added microorganisms in EM were possibly immediately outcompeted and did not affect the existing bacterial community. It can be concluded that EM does not improve the general disease suppression of soils, but EM may improve the specific disease suppression in some soils.

In general, the composition and effects of EM can vary significantly. It is therefore advisable to test the use of EM first on a small scale before applying any EM on a larger scale.