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## NEW INSIGHTS IN THE MODE OF ACTION OF THIOPHANATE-METHYL

Thiophanate-methyl (TM) is a fungicidal substance which belongs to the agent group of benzimidazoles. It has been applied since the 1960s against a variety of fungal pathogens. In Germany it has been approved for the indications: white mould in winter rape, rots in stores of stone fruit and *Fusarium* head blight in wheat and triticale. The primary effect of TM is caused by the transformation product methyl-benzimidazole-2-yl-carbamate (MBC), which binds to the fungal tubulin and disturbs the formation of the spindle apparatus during mitosis so that homologous chromosomes can not divide and cell growth will be inhibited.

Field trials performed under different climatic conditions in Europe revealed that deoxynivalenol contents in winter wheat treated with TM-concentrations of up to 500 g ai/ha decreased although the percentual amount of *Fusarium*-diseased kernels did not correspondingly. We assumed that TM could influence the metabolism of the fungi possibly by causing a lack in the energy supply, thus reducing the production of mycotoxins as secondary metabolites, which are rich in energy.

Investigations into the effect of TM and MBC on mycotoxin-producing species of *Fusarium* showed that the influence on the biosynthesis of mycotoxins was more distinct than on the growth of the fungi. In cases when the growth of different species of *Fusarium* was inhibited to a low extend the mycotoxin production decreased by about 80-95%. Moreover, we investigated the respiration of *Fusarium* spp. subject to TM and MBC, and found out that the oxygen consumption was reduced. The fact that the ergosterole content in the samples did not differ shows that the effect on the respiration was not due to reduced growth. In this context the activity of the cytochrome c oxidase as one of the key enzymes in the respiration chain was measured in mitochondria preparations. We observed that TM affected the cytochrome c oxidase of *Fusarium* spp. depending on incubation time and concentration. Investigations into the energy status of the *Fusarium* spp. subject to TM and MBC are being conducted at the moment with their results being discussed.

Present data indicate that there may be an additional mode of action of TM in *Fusarium* spp. directly affecting the energy supply, which will result among others in a reduced mycotoxin formation.