

Big difference in the effect of manganese agents

Manganese sulfate works better than manganese nitrate and manganese carbonate.

Experiments show a big difference in how well the commercial manganese agents work. Manganese sulfate is both the best and cheapest. But most important is spread-adhesive.

Experiments at the University of Copenhagen (KU) show a marked difference in the degree of effectiveness between commercial manganese agents.

This is what Pai Pedas from the Faculty of Natural and Life Sciences at the University of Copenhagen tells us.

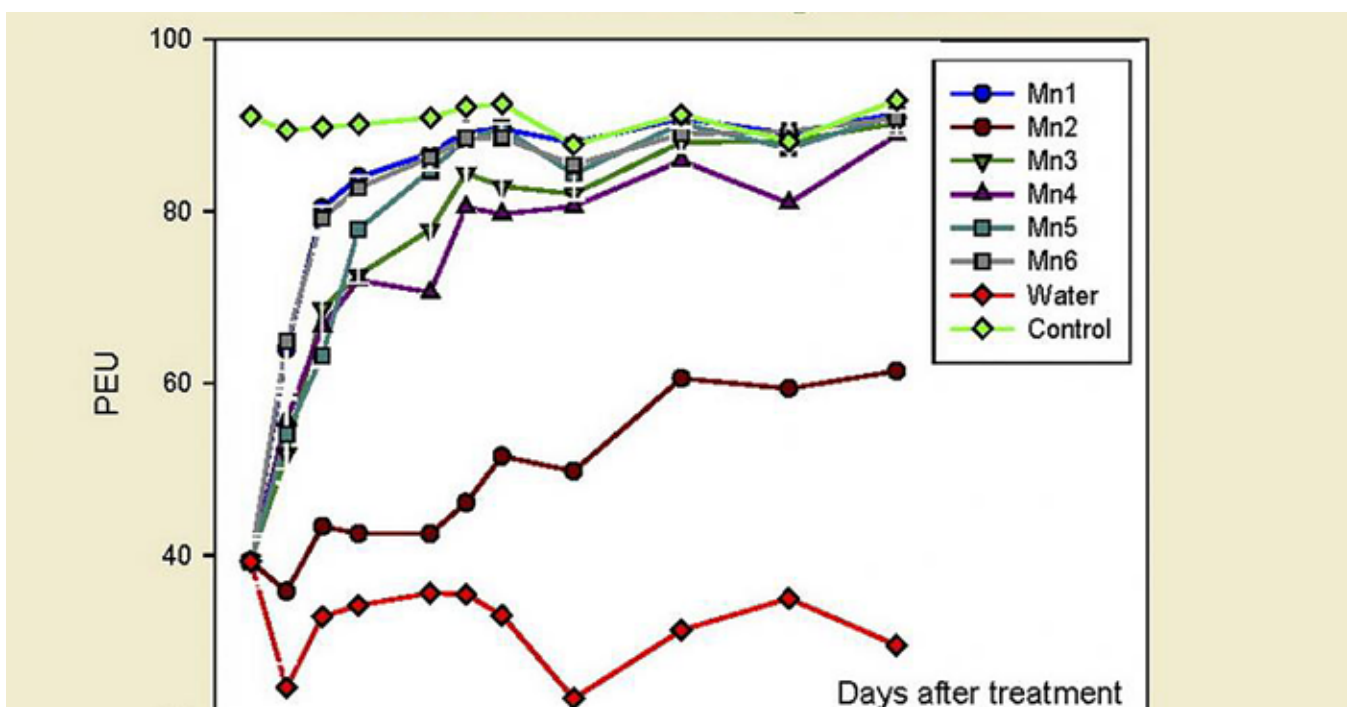
"We have investigated the effect of a number of commercial manganese agents, and there is

a big difference. One means in particular stands out negatively, as you can see in the figure (Mn2). But there is also a difference in the effect of the other agents, especially in the first eight days after spraying."

However, Pai Pedas will not reveal which commercial means have been tested in the trials.

"We can only state that there is a big difference between them. And encourage the companies to carry out more thorough tests of how well their funds work," he says.

The researchers have also investigated whether the different manganese salts in the agents have any significance. And they have.



Effect of manganese application determined by measuring fluorescence PEU (Plant Efficiency Unit) after treatment of manganese-deficient corn plants with commercial manganese agents. The funds are anonymous (Mn1 to Mn6). A rapid increase in PEU indicates efficient uptake and incorporation of manganese into the plant.



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Manganese sulfate is best

'The experiments show that manganese sulphate and manganese nitrate have a higher efficiency than manganese carbonate. However, manganese nitrate causes scald damage even in low concentrations. That's why we recommend manganese sulphate, which is also the cheapest.'

Increasing concentrations of manganese in the agents have also been tested. And there was not much difference between which concentration of manganese sulfate and manganese nitrate was used. The effect was the same.

'This means that you can just as well spray the two agents in a lower dose. For example 0.05 per cent manganese, which corresponds to 300 grams/ha of manganese sulphate with 200 liters of water. After all, only the leaves that are hit are protected. Manganese is not transported around the plant. So you have to use manganese later to protect the next leaves if the deficiency continues,' says Pai Pedas.

In contrast, there was a clear concentration effect for manganese carbonate.

'The more we used, the better it worked. So manganese carbonate requires a higher dose (0.2-0.4 per cent manganese). But does not work better than the other two remedies - quite the contrary.'

Remember wetting agent

The importance of wetting agents for manganese absorption was also tested in the experiments. And the conclusion is clear:

'Wetting agents are the most important factor for effective manganese spraying. It is more important for the effect that you have spreading adhesive than which type of manganese you choose and which dose,' says Pai Pedas.

However, one must be careful not to use too high a concentration of wetting agent. You risk breaking down the plant's wax layer and dissolving the leaf. Wetting agent reduces surface tension and increases contact with the leaf surface so that the liquid is better absorbed.

Types of manganese

- **Manganese sulphate: powder, easily soluble, different quality**
- **Manganese nitrate: more easily soluble than manganese sulphate**
- **Manganese carbonate: sparingly soluble, therefore a suspension**
- **Manganese chelate: less concentrated + more miscible than manganese sulphate**

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