Text and images: Marjolein van Woerkom

Breeder, propagator and grower Stefan Slijkerman did some research into silicon in his own nursery because he wanted to substantiate the results scientifically.

Kalanchoe grower Slijkerman on silicon fertiliser:

“Now we can really get going with biological control”

It’s a well-known fact that silicon has huge added value as a fertiliser. But Dutch kalanchoe breeder, propagator and grower Stefan Slijkerman goes further: “It represents a major breakthrough for biology in the greenhouse.”

He is a convert, and so is his entire 5-hectare nursery. Silicon has become a permanent part of the mix in the fertiliser tank at Slijkerman. So he can put away his sulphur pots for good now. It even means he can use biological control at his site in Kenya. Slijkerman: “I usually have a natural aversion to these kinds of biological products and the companies that make them, but having done some scientific research in my own nursery, there’s no denying it: this fertiliser is hugely effective against powdery mildew.”

Scientific substantiation

He repeated the trial six times and got the same result each time: between 60 and 85 percent of the plants that he and his researcher deliberately infected with powdery mildew showed no signs of the fungus.

Last year Slijkerman brought in Marisa Lourenço, a Wageningen University & Research student, to investigate the effects of silicon. “Earlier in the year I had already looked into the effects of different trace elements in different concentrations on Kalanchoe, but we didn’t specifically look at this fertiliser,” Slijkerman explains. “Because other growers were getting good results with it, I wanted to trial it in my own nursery. But I did want it to be a scientific study so that I would have proper substantiation for the effect. I wanted to research it properly before we start advising our customers to use it.”

Amazing

Last winter they grew some parent plants in neutral conditions over sixteen weeks. They then put the plants in different containers with water with different concentrations of silicon fertiliser. They used two types of fertilisers from two different manufacturers, SilicaPower and Silika 50%. As a control, one of the containers had nothing at all added to it. They then took cuttings from the plants and

put them in potting compost. Once they had rooted they infected them with powdery mildew. After that it was a matter of looking at what percentage of the plants were diseased and how many were unaffected. The result: between 65 and 85% of the plants did not become diseased, and plants that were infected had a smaller area of infection. “It was amazing,” says Slijkerman. “Both products produced almost the same surprising result. But SilicaPower has the edge for me because you don’t have to add acid and it’s already liquid, so it’s easy to use.”

Concentration-dependent

The success or failure of this method depends on the concentration, he continues. “The dosage must be consistently right, or you’ll miss the mark.” For example, they discovered that if the concentration was too high, the light-sensitive variety Serenity was more badly diseased. Silicon also seems to have an antagonistic effect. If you add too much, fertilisers such as potassium and phosphate become less effective.

Alwin Scholten of the supplier PlantoSys shows some graphs. The curves are concave. “You can see that there is an optimum at some point. The concentration increases all over the leaves, but the dry weight of the roots, the shoots and the plant have an optimum level after which the effect drops off again. So it is very important to use the correct concentration.”

Plant-strengthening product

For Scholten, these impressive results come as no surprise. His company has had its silicon product on the market since 2012, but the first horticultural businesses only picked up on it two years ago. PlantoSys relaunched the product through the dealer Royal Brinkman.

To demonstrate what this fertiliser does, they set up some practical applications in different crops with different growers in 2017. The results were analysed using plant sap analyses and dry matter measurements. Anthurium growers, for example, reported that their crops had thicker and darker green leaves. In tomato plants, the silicon content in the dry matter shot up and Kalanchoe growers saw stronger leaves and fewer fungal diseases. “We can see that the use of this plant-strengthening product results in fewer infections and slows down the rate of infection in a very wide range of crops,” Scholten concludes. “And that means you can cut down on your use of chemicals.”

Alwin Scholten (left) and Stefan Slijkerman: “The dosage must be consistently right.”

Breakthrough

Fewer chemicals. That’s just what Slijkerman wants to hear. “This is a real breakthrough for Kalanchoe cultivation. You do have to see it as a preventive measure, but it is enabling us to cut down our use of chemicals to control powdery mildew by 80 percent. The results of this trial are encouraging enough for us to move closer towards biological control in the greenhouse.”

He wasn’t able to use biological pest control in the past as sulphur destroys the biology in the greenhouse. “If using silicon means we no longer need to use sulphur pots to control powdery mildew, we can get going with biological control,” he says enthusiastically. “That’s absolutely essential, as there are almost no chemicals available now that control thrips effectively.”

Alongside this, he is also working on developing mildew resistant varieties. “This could also be a solution, but it simply takes too long to bring a commercial product to market. We need something we can use now. This fertiliser is one way forward.”

Summary

Silicon as a fertiliser is a way forward for Kalanchoe growers. Scientific research at Stefan Slijkerman’s nursery in Heerhugowaard in the Netherlands has shown that it works well against powdery mildew. It means he can put away his sulphur pots and start using biological controls, which will massively cut his use of chemicals. It has the same effect in other crops. But everything depends on the correct concentration.

Pot chrysanthemum grower Jeroen Berkhout:

“It’s all about the concentration”

Dutch pot chrysanthemum grower Jeroen Berkhout can’t substantiate the effect scientifically, but he can see that using a silicon fertiliser is improving the quality of his plants.

He and his brother have a 2.5 hectare nursery where they grow pot chrysanthemums and Primula obconica. The grower started adding SilicaPower to his irrigation water just before last summer. “It’s a well-known fact that silicon improves the uptake of nutrients and that it makes plants more vigorous, so we were curious to find out what it could do for our pot chrysanthemums.”

Plant sap analyses and dry matter measurements were carried out both at the start of and during cultivation. In the end it’s all about the concentration, Berkhout says. “In the winter I noticed that the effect was tailing off, so we looked into why this was happening. It turned out to be due to the concentration. We add 500 ml of silicon at a time to the fertiliser tank. In summer we use about three or four of these tanks per week, but in winter we only use one every three weeks. As a result, the concentration was dropping. As soon as we started increasing the amount in the tanks in the winter, I began to see the results come through in the crop again.”

Good colour

One of the effects silicon has is a more intense flower colour. “In summer we would usually see the colours fade a bit: pink turned pale pink, red turned pale red, but now the flowers are retaining a good colour. The leaves also look much darker and fresher. What’s more, the fertiliser is easy to use. You don’t need to dissolve anything or add any acid.”

Although it is difficult for him to properly assess the effectiveness of this product – he had no control group to compare it against – he can see such big differences that he will be adding the fertiliser again this year. “For me, this result is a good enough reason to continue.”

Jeroen Berkhout has noticed big differences in colour and quality in his chrysanthmums.