

Ultrasol®ine K Plus, Potassium Nitrate with Iodine application, improved fruit weight of musk melon in Thailand

Iodine (I) should be considered a plant micronutrient. That is the main conclusion of [Kiferle et al., 2021](#). In that paper, the presence and identity of naturally occurring iodinated proteins in higher plants, which had never been described before, was published. Eighty-two iodinated proteins have been identified that take part in important biological processes in higher plants. Similar to deficiency in any other plant nutrient, a deficiency in iodine is predicted to cause yield losses.

In fertigated and protected horticultural crops, grown in a commercial production setting, iodine deficiency can occur when the presence of iodine in the nutrient solution is below a sufficiency target value. In intensive, fertigated cropping systems under cover, the nutrient solution and irrigation water are the main sources of iodine. This deficiency will be visible as sub-optimal root or leaf development, later flowering, lower fruit growth and lower resilience to stress, resulting in lower yields compared to a crop which has been supplied with sufficient iodine in the nutrient solution.

Musk melon of the cultivar 'Barabee' was cultivated in soil, in 128 m² plastic tunnel greenhouses in a cycle of 75 days from sowing. The grower did not apply any plant protection products during the crop development. Water soluble fertilizers were applied daily. The nutrient solution was prepared from straight fertilizer sources in a concentrated stock solution, with separate stock tanks for each tunnel (300 plants/tunnel). A pH of the nutrient solution of 6-6.5 was maintained for all crop stages. EC was adapted to crop stage, starting at 1.2 mS/cm up to flowering, 1.5-1.8 mS/cm from flowering to fruit netting and 2.5-3.0 mS/cm from fruit netting till harvest.



The potassium concentration in the same three crop stages increased from 1 mmol K/L, to 2 mmol K/L and finally 7 mmol K/L, and was applied with potassium nitrate (KNO_3) as the main K-source, amended with K from NPK-formulas and potassium sulphate in the fruiting stage. Over the total season, 340 kg of KNO_3 /ha was applied. KNO_3 in the control tunnel was applied with Ultrasol[®] K Plus whilst in the test tunnel Ultrasol[®]ine K Plus was used to prepare the same nutrient solution composition.

The concentration of iodine in the untreated irrigation water and nutrient solution from the drippers in the control greenhouse was tested and found to be between 0.14 - 0.16 $\mu\text{mol I/L}$, which is below the minimal amount of 0.2 $\mu\text{mol I/L}$ in hydroponic solution of *Arabidopsis thaliana*, applied to remedy iodine deficiency in scientific trials by [Kiferle et al., 2021](#). Ultrasol[®]ine K Plus effectively raised the concentration of iodine compared to the nutrient solution in the test tunnel and this resulted in twice the concentration of iodine in the leaves of the test tunnel, compared to the control crop (Figure 1).

Plant vegetative growth was comparable between the two tunnels. At harvest, a representative sample of twenty fruits per greenhouse was measured and weighed. A greater average fruit yield (+11%) was found in the test tunnel with application of Ultrasol[®]ine K Plus compared to the control (Figure 2). The improvement of fruit quality and yield by prevention of iodine deficiency with Ultrasol[®]ine K Plus may be explained from a more efficient production of carbohydrates to fill the fruits.

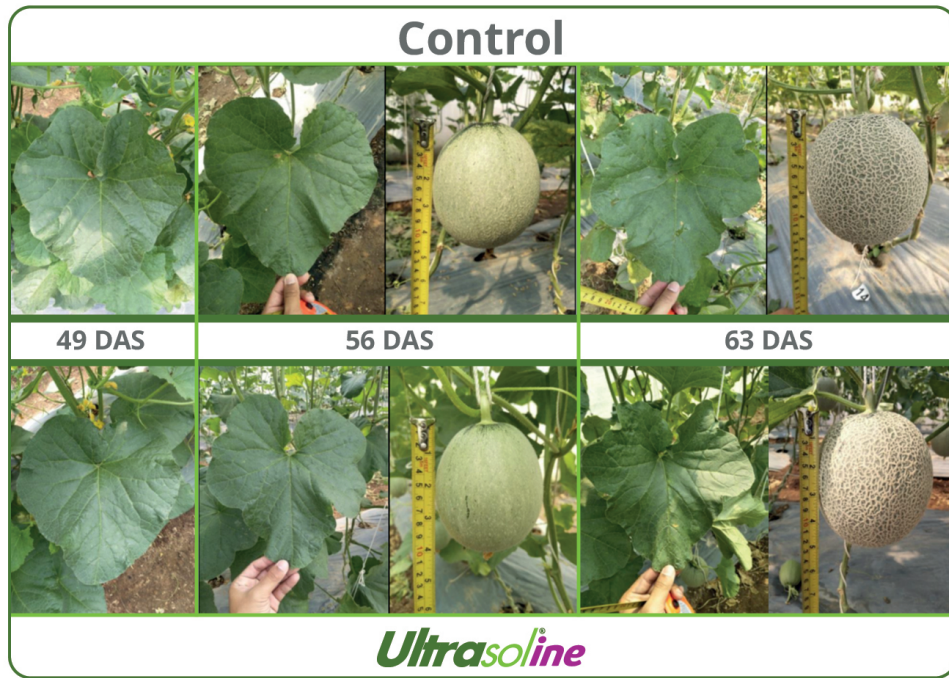
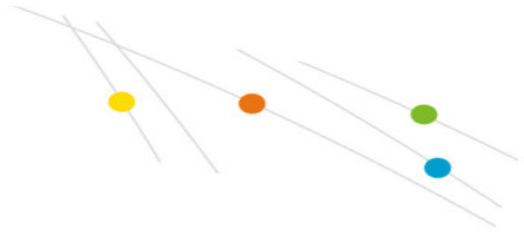


Figure 1: Development of the crop receiving either Ultrasol[®] K Plus in the control or Ultrasol[®]ine K Plus in the test tunnel. The leaves of the test crop contained twice as much iodine compared to control. DAS= Days After Sowing

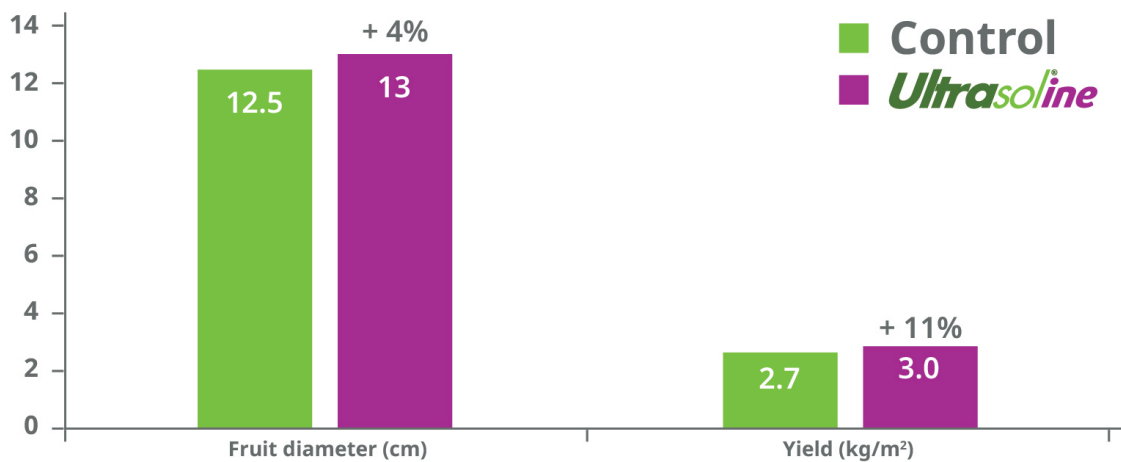
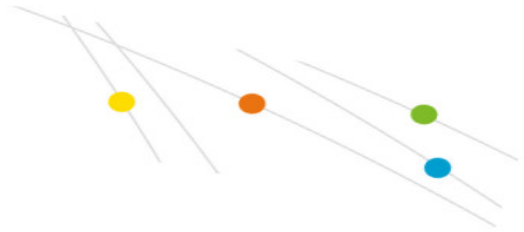
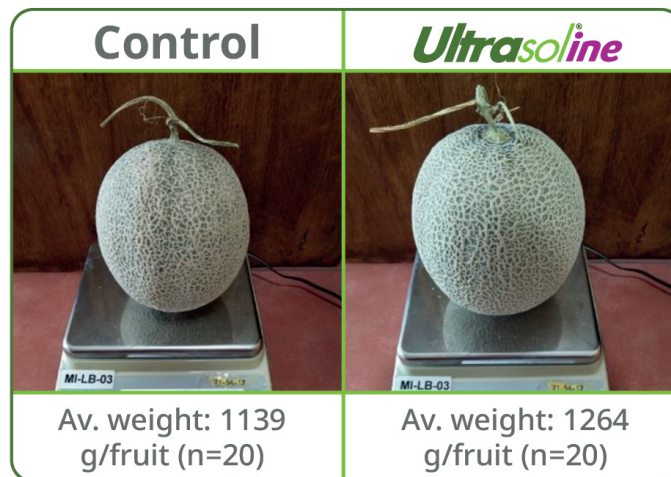
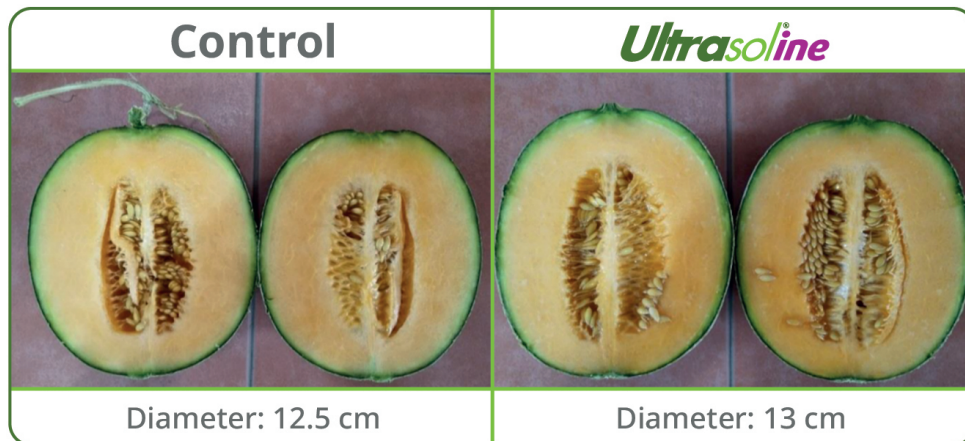


Figure 2. With Ultrasol[®]ine K Plus, larger, and more heavy fruits resulted in a +11% greater yield of musk melon fruits in Thailand, by greater fruits of higher weight. The



average of both parameters is statistically significantly higher for *Ultrasol*[®] ine K Plus (Wilcoxon-Mann-Whitney $m=n=20$, $p<0.05$).



Kiferle et al., 2021, <https://doi.org/10.3389/fpls.2021.616868>