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Applicaton note

Ethylene production from tomato crops

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EMS measured together with Leibniz Institute of Vegetable and Ornamental Crops in ultra low concentrations, the ethene production from tomato plants. This test took place in the laboratory of EMS. Two types of tomato plants were used, 1 standard ethene producing tomato crop cultivar "Moneymaker" and 1 cultivar called "Epi", which are mutants, modified tomato crops that produces a lot more ethene.

The results show indeed differences in production rates which are expressed in nl/g/hr (nanoliter ethene per gram green parts per hour). The "Epi" modified tomato plants produces about 2.5 times more ethylene then the standard cultivar "Moneymaker". A repetition of this test with other plants, results in exactly the same results and production rates.

Figure 1: Test setup of both different tomato varieties.

Spastraat 30
4697 RZ Sint-Annaland

t +31 (0) 166 65 72 00
f +31 (0) 166 65 72 10

e info@macview.nl
I www.macview.nl

This test showed that it is easy possible to measure with the MACView Postharvest Ethene Analyser in the ultra low concentration range of a few ppb ethene without interfering gases. The measurements were taken automatically and the setup was build-up in minutes.

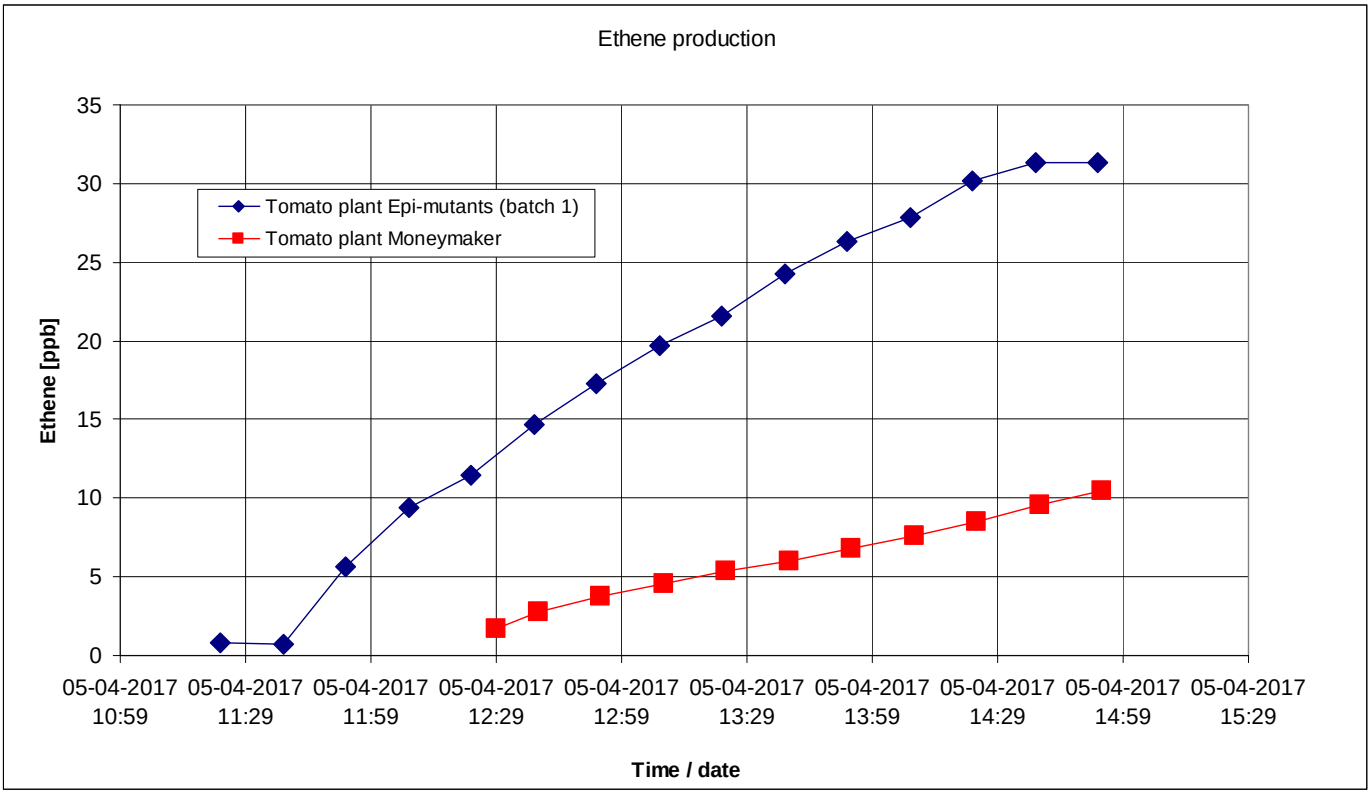

Figure 2: Ethylene concentrations of both cultivars during the collection step. Samplespeed is 4 measurements per hour.

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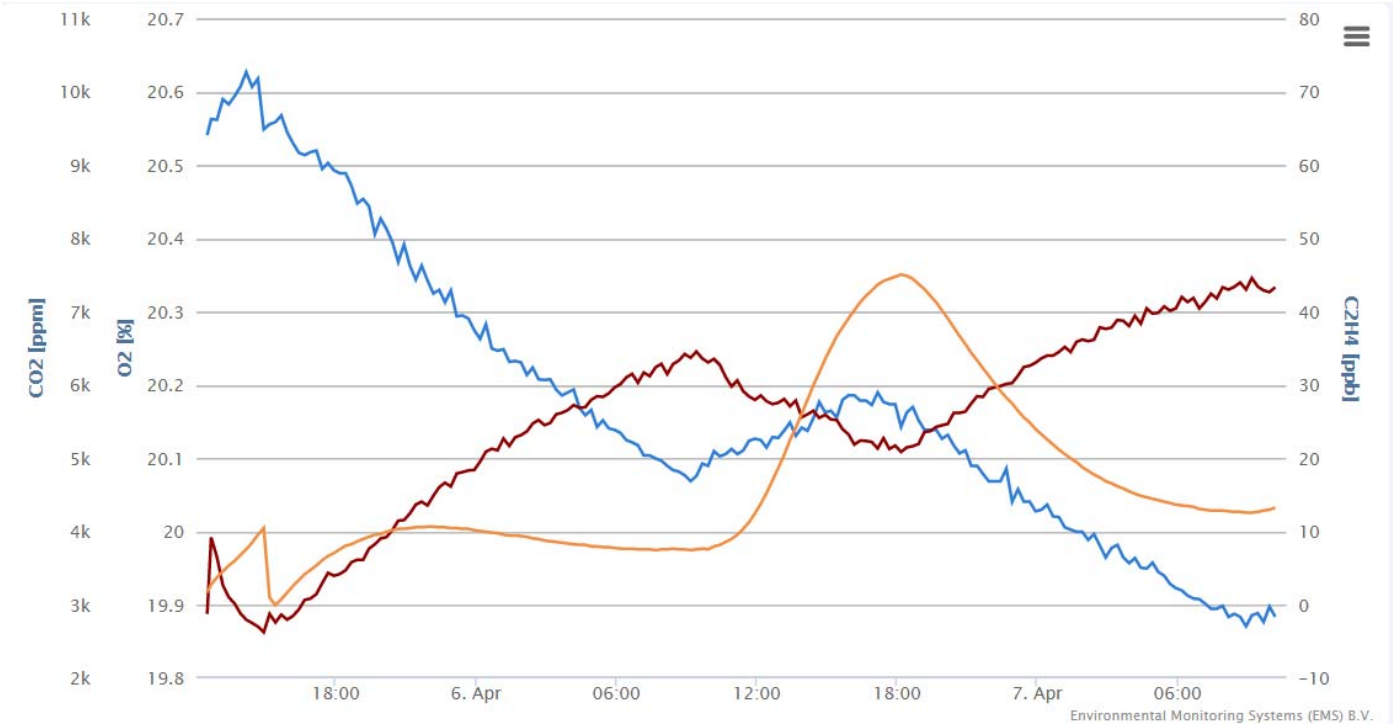

Figure 3: Graph of ethylene (orange), oxygen concentration (blue) and CO2 (red). This information comes directly and real time from the userportal. The ethylene production of the crop is directly related with the day- and night rhythm of the respiration which comes from the photosynthesis process.

Conclusion

The ethylene production of the crop was 2.50 nl/g/uur for the “Epi” mutants and it was 1.04 nl/g/hour for the “Moneymaker”. The apparatus used was the Postharvest Gas Analyser from EMS The Netherlands with a resolution of 0.1 ppb. The sampled gas was flowed back inside the glass jars. During the measurements the crop was artificial lighted to keep on going the photosynthesis process with day- and night rhythm that also affects the ethylene production which was clear recognizable.

This measurements of ethylene production can be used in principle for every type of crop / fruit / vegetable or bulb, as on high concentrations as well on very low concentrations in the ppb range as was demonstrated in this test.

For further questions:

Mr. Jan-Kees Boerman
Environmental Monitoring Systems (EMS) B.V.
Spastraat 30
4697 RZ SINT-Annaland
info@macview.nl