

Improving nutrient uptake efficiency by EcoAeon solution

Netafim Team: Yonatan, Ahmed, Eli, Carmel, Orian, Ron, Itamar

Object:

The objective of this study is to examine the ability of the EcoAeon (EA) device to enhance nutrient uptake by pepper plants. We compared a control treatment with 100% nutrition to the EA treatment with 75% nutrition. By doing so, we aim to evaluate the device's effectiveness in improving water quality, increasing nutrient absorption efficiency, and reducing corrosive effects on irrigation systems.

The purpose of this comparison is to assess whether the EA device positively impacts nutrient uptake despite the reduced nutrient concentration, leading to improved sustainability and reduced resource usage.

This research contributes to the larger goal of sustainable agriculture by finding innovative solutions to grow more food with fewer water and fertilizer resources.

Plot data:

- I. Netafim R&D site @ Magal, Israel
- II. Crop: Pepper
- III. Drip type: PCJ 2 l/h
- IV. Soil type: Coco peat growbags

Observation Treatments:

- i. Control – 100% nutrition
- ii. EcoAeon – 75% of control

Measurements:

- iii. Daily drip & drainage EC & pH
- iv. Plant height – 24 plants/treatment
- v. Yield – 24 plants/treatment
- vi. Tissue analysis - 5 plants/treatment
- vii. Water analysis – Drip & Drainage

Results:

Height: Control average growth rate is greater than EA treatment. The height difference became apparent during the productivity stage in mid-May.

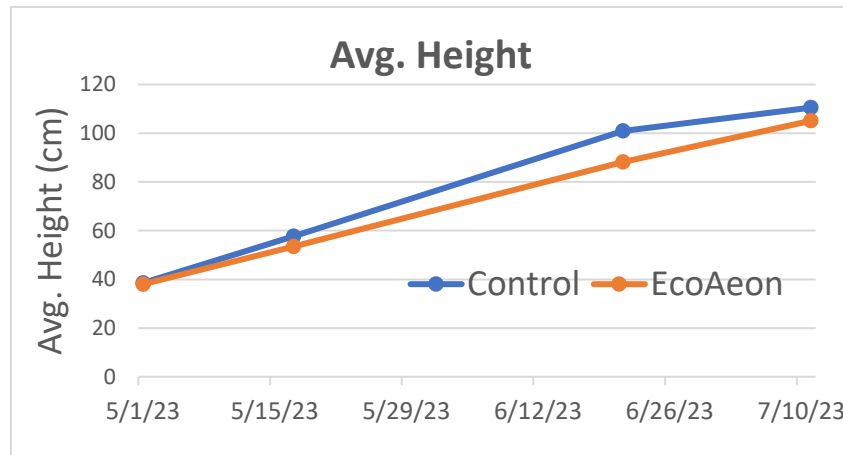


Figure 1: Average height over 3 weeks measures in our greenhouse. Control (in blue) shows greater heights than EA treatment (in blue).

Yield: The EA treatment had a higher yield in terms of both A quality fruits and Total fruits compared to the control group.

The percentage of A quality fruits out of the total weight is 3 times higher in the EA treatment 61% compared to 22% in the control group.

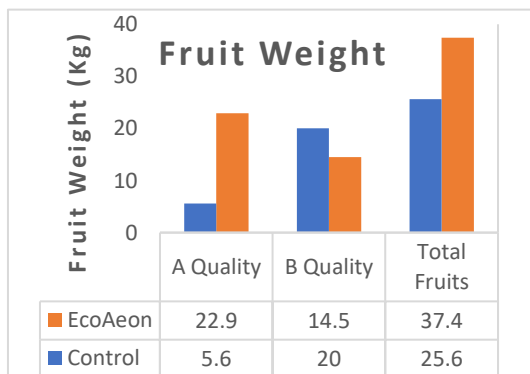


Figure 2: Fruit weight. EA total fruit weight is 37.4 kg; Control total weight is 25.6 kg; A quality refer to fruits with no Blossom Rot symptoms.

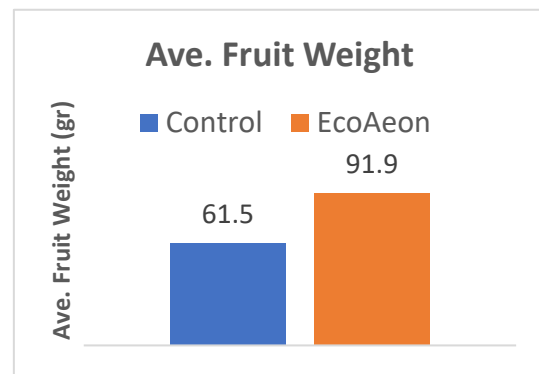


Figure 3: Ave. fruit weight. EA ave. fruit weight is 91.9gr; Control ave. fruit weight is 61.5gr.

EcoAeon treatment improved the ave. fruit weight by 50%.

Irrigation measurements:

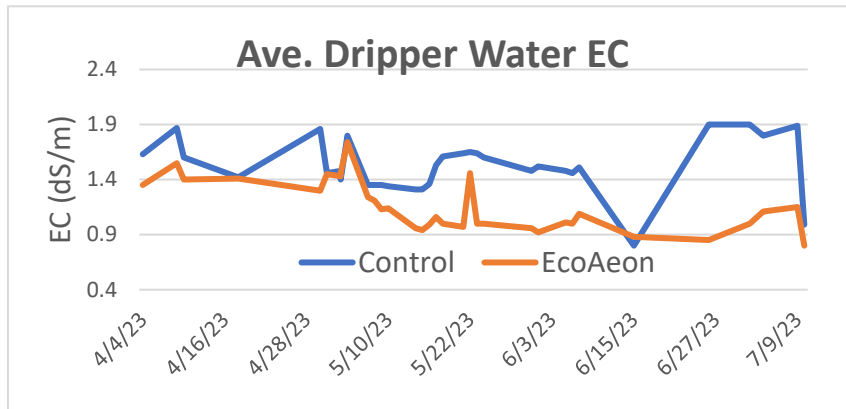


Figure 4: EC measurements of irrigation cycles along the season; Control in blue color, EA in orange color.

Ave. Dripper Water EC in control treatment is 1.52 dS/m (100% nutrition), while in the EA treatment is 1.15 dS/m (75% nutrition).

Tissue analysis:

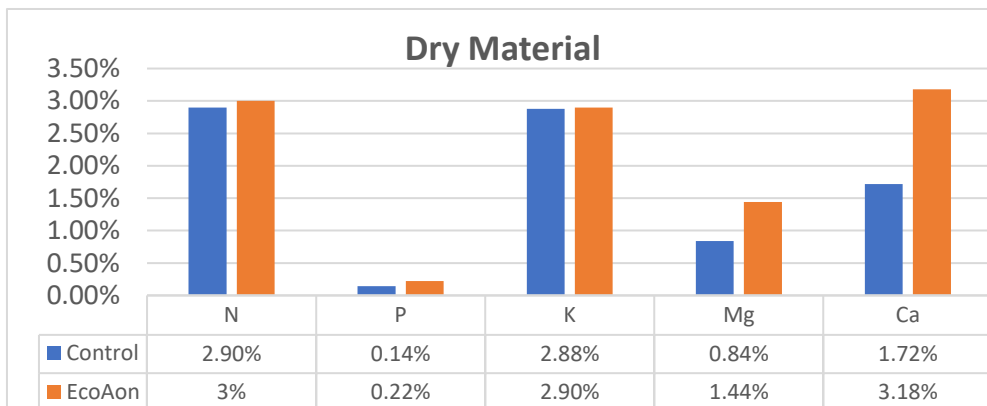


Figure 5: Elements in dried plant tissue; Samples were taken on 26.06.23.



Figure 5: Blossom Rot disease in the control

EA treatment increased the level of P, Ca & Mg absorption almost two times more. The rest of the elements are equal in both treatments.

Findings:

- EcoAeon treatment improved pepper yield by 45%.
- EcoAeon treatment improved the ave. fruit weight by 50%.
- 61% of the EA treatment fruits were A quality, meaning there were no Blossom Rot disease symptoms. This disease develops under conditions of calcium (Ca) deficiency.
- High levels of Ca in EA treatment, compared to control.
- High levels of P and Mg in EA treatment, compared to control.
- Crop load impacts vegetative growth, resulting in reduced plant height in EA treatment.