

# FIRST EXPRESSION IN USE OF ECOSOLV WATER UNIT IN BANANA CULTIVATION UNDER SUBTROPICAL CONDITION

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#### ABSTRACT

Bananas have been grown in both open-field and protected cultivation in Turkey. So far, protected cultivation has gained popularity due to the high yield. Due to climate changes, there is a water shortage problem especially in open-field banana cultivation in Turkey. The other problem is the high cost of electricity for irrigation. The objective of the study is to evaluate the use of the ecoSolv water unit in open-field banana cultivation under subtropical conditions. The experiment was carried out in the Province of Gazipaşa, Antalya, Turkey. Dwarf Cavendish cultivar was used as the experimental material and drip irrigation was used. The effect of the ecoSolv water unit was examined on yield and quality of the open-field banana cultivation. The experimental results showed that the ecoSolv water unit increased the yield and quality compared to the control. Average annual yield with ecoSolv water was 13% higher than Control (44.91 t/ha compared with 50.85 t/ha). Furthermore, the most important quality parameter of finger weight was higher than the Control.

#### INTRODUCTION

Banana production is localized only in the coastal Mediterranean region where the northern parts are protected by the height of the Taurus Mountains. *Alanya* and *Gazipaşa*, towns in *Antalya* Province and *Anamur* and *Bozyazı* towns in *Mersin* Province are the most important banana growing locations in Turkey. Presently, banana growing locations have been expanded towards other towns in coastal regions including: *Antalya* (*Kumluca, Finike* and *Manavgat* districts), *Mersin* (*Erdemli*), *Adana* (*Yumurtalık*) and *Hatay* (*İskenderun*) Provinces. Although banana growing areas in Turkey are located outside of the subtropical zone (36°latitude), they have been grown economically in Turkey for over a century.

Bananas are very much an anticipated crop for farmers in Turkey. Local importers pay very high custom taxes (over 140%) for banana importations; as such, banana retail prices

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Bananas have been grown both in open-field and protected cultivation in Turkey. The main differences between cultivation systems are in the number of days from shooting to harvest and yield. While one crop/per year is produced in open field conditions, either one crop/per year or sometimes two crops/per year are obtained under protected cultivation. Days required from shooting to harvest are shorter (between 90-120 days) in protected cultivation. Thus, bunches are harvested quite earlier in protected cultivation compared to open-field cultivation. The shorter growing time is a great advantage in the subtropical region, especially in case of frost damage. After mid-November, the temperature begins to drop in the cool subtropical climate. Frost damage occurs not only in plants, but also in the fruit. Frost damage can rarely be seen in sucker and fruit in protected cultivation, but not in open-field cultivation. Average yield per ha (hectare) is between 25-30 tons in open-field and 50-70 tons under protected cultivation.

Therefore, the income is double under protected cultivation.

The main problems of banana growing in Turkey are abiotic stress<sup>1</sup>. The main abiotic stress factors can be shown to be low temperatures in winter and very high temperatures in summer. So far, due to the climatic changes water shortage is a

problem especially in open-field areas. Banana farmers have to bring water very long distances and pay a high price for electricity. The objective of the study was to evaluate the ecoSolv water unit on yield and quality of bananas.

<sup>&</sup>lt;sup>1</sup> **Abiotic stress** is defined as the negative impact of non-living factors on living organisms in a specific environment. The stresses include drought, salinity, low or high temperatures, and other environmental extremes. **Abiotic** stresses, especially hypersalinity and drought, are the primary causes of crop loss worldwide.

#### MATERIAL AND METHOD

The experiment was conducted in the 2019 and 2020 growing season. Drip irrigation system was used in the experiment. Fertilizers were applied according to farmer's condition. Plant density was 1600 plant/ha. The ecoSolv water unit was used in irrigation. Hand number, finger number, bunch weight, yield, finger weight, finger circumference, finger length was determined according to the treatment. Finger weight, peel rate and soluble solid content after ripening were also evaluated.

### RESULTS

Values of all the examined features were found to be higher with ecoSolv water (Table 1). Average hand number 11.40 in Control and 11.75 with ecoSolv water. The finger number and bunch weight were found to be higher with ecoSolv water. Yield was also found to be higher with ecoSolv water unit (50.85 t/ha) than in Control (44.91 t/ha).

Treatments	Hand Number	Finger number	Bunch Weight (kg)	Yield (t/ha)
Control	11.40 b*	230.60 b	28.07 b	44.91 b
ecoSolv Unit	11.75 a	243.94 a	31.78 a	50.85 a
LSD <sub>%5</sub>	0.179	3.804	0.795	0.785

**Table 1**. The effects of ecoSolv water on hand and finger numbers, bunch weight and yield

\*Mean comparisons were significantly different at the 5% level according to the LSD test (P≤0,05).

Finger weight was found to be higher with ecoSolv water (Table 2). Finger circumference and lengths were not found statistically different (Table 2). These were measured as 11.15 and 11.95 cm in Control and 19.22 and 19.50 cm with ecoSolv Unit, respectively.

Treatments	Finger weight (g)	Finger Circumference (cm)	Finger Length (cm)
Control	105.80 b*	11.15	19.22
ecoSolv Unit	120.60 a	11.95	19.50

LSD <sub>%5</sub>	4.075	N.S.**	N.S

\*Mean comparisons were significantly different at the 5% level according to the LSD test (P≤0,05).\*\*N.S., indicates non-significant.

Finger weight was found higher with ecoSolv after ripening (Table 3). Average finger weight 101.17 g in Control and 117.79 g with ecoSolv water. Peel rate was found higher in Control (37.92 %). Soluble solid content was not found statistically different.

 Table 3. The effects of ecoSolv water on finger weight and finger circumference and length after ripening

Treatments	Finger Weight (g)	Peel Rate (%)	Soluble Solid Content (%)
Control	101.17 b*	37.92 a	19.37
ecoSolv Unit	117.79 a	35.38 b	19.00
LSD <sub>%5</sub>	2.930	1.593	N.S**

\*Mean comparisons were significantly different at the 5% level according to the LSD test (P≤0,05). ).\*\*N.S., indicates non-significant.

Figures 1 and 2 show general view of plants and bunches.









## CONCLUSION

The ecoSolv unit increased yield and quality of bananas compared to control under subtropical conditions. Yield was determined at 13% higher than control plants. In the future experiment, whether ecoSolv unit effects water quality and quantity can be determined. It is also necessary to repeat the study in the second year to reach final results.



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