

Impact of plasma -treatment Water on the growth and germination Of *Vicia Faba* L.

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Abstract

"This experiment was conducted at the Faculty of Natural and Life Sciences, University of El Oued, in 2023, with the aim of determining the effect of plasma treated irrigation water on the growth and germination of *Vicia faba* L plants of the Fito Histal and Haba Fava varieties. The experiment was designed by selecting 18 pots for each variety, divided into six treatments (untreated seeds with regular water, treated seeds with dry regular water, treated seeds with wet regular water, untreated seeds with treated water, treated seeds with dry treated water, and treated seeds with wet treated water), with three replicates for each treatment. The results obtained showed that plasma-treated water had a clear effect on the morphological and physiological characteristics during the germination and growth stages of the Fito Histal and Haba Fava varieties. It led to an increase in various vegetative measurements and chemical criteria. This demonstrates that plasma-treated water has a relative effectiveness in positively affecting the growth and germination of *Vicia faba* L plants in both the Fito Histal and Haba Fava varieties.

Keywords: *Vicia faba* L, Fito Histal, Haba Fava, plasma-treated water.

Introduction

Bean production has witnessed a significant decline in recent years after Algeria was one of the largest countries producing it In North Africa, this is due to several factors that deteriorate production, such as drought and salinity (Joseph, 2010) To reduce salinity, increase the quality of soil and crops, and improve the performance of plants. Several researchers have developed a set of experiments and techniques, including plasma treatment technology, which is used in Various applications such as soil remediation and air pollution control. The study of Farhet an al. has proven that plasma water treatment technology increases rooting speed, reduces Water consumption, promoting seed germination, stimulating plant growth. The aim of our study was to determine the effect of plasma water treatment technology on the growth and germination of plants Six different Haba Fava and Fito Histal treatments for the two *Vicia Faba* L bean cultivars

Water analysis was studied for two samples: normal water and treated water the results are shown in the table.

Table: 01 Standard results for analysis of normal water and treated water

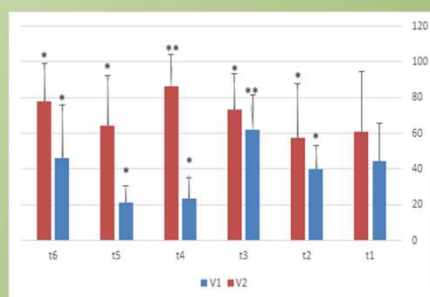
	Treated water	Regular water
Conductivity	3634Um/cm	3617Um/cm
Turbidity	1.02NTu	NTu 0.335
Po ₄ ⁻	0.036mg/l	0.0055 mg/l
No ₂ ⁻	1.5mg/l	0.016 mg/l
NH ₄ ⁻	0.108 mg/l	0.009mg/l
Ng	41,318mg/l	17.013 mg/l
HCO ₃	95.16 mg/l	74.42mg/l
Calcuim	340.68mg/l	476.952mg/l
TH	1020 mg/l	1260 mg/l
CL	517.613mg/l	531.735 mg/l
TAC	78mg/l	61mg/l
NO ₃ ⁻	35.785 mg/l	41.375mg/l
Dry residue	2960mg/l	2920mg/l

Matériel and methods

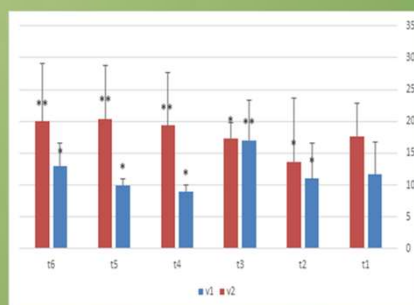
in this study we used two varieties of seeds *Vicia faba* L, each one containing 90 seeds. We treated both varieties with two types of treatments, the first with Regular water and the second with plasma-treated water at an intensity of 1700 watts. **V1 : Fito Histal** **V2: Haba Fava**

Vegetative Measurements

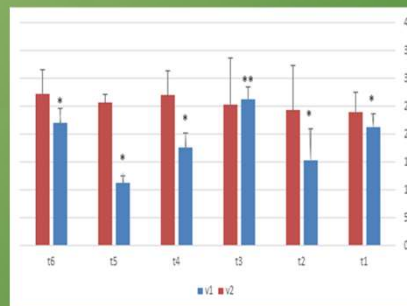
Germination percentage



Average Stem Length



Number of plant leaves



Discussion

The application of plasma technology to water and seed treatment has shown significant effects on the germination and growth of *Vicia Faba* L. This technology influences both the chemical and physical properties of water, leading to the formation of new elements while reducing others. These changes can enhance the bioavailability of essential minerals for plants, facilitating improved growth and development. absorption and promoting healthier, more robust growth. The plasma treatment of seeds and water enhances the germination rate, leading to a more vigorous initial growth phase. Plants irrigated with plasma-treated water exhibit healthier leaves and stronger root systems, indicating better overall plant health and resilience. These findings suggest that plasma technology can significantly benefit agricultural practices by improving water quality and enhancing seed germination and plant growth. The positive effects observed in the physiological traits of faba beans highlight the potential for plasma-treated water to contribute to more sustainable and productive farming methods.

Conclusion

This applied study was conducted with the aim of determining the extent of the effect of treating irrigation water with plasma on the growth and germination of bean plants *Faba Vicia* L when *Haba Fava* and *Fito Histal* varieties. From the results obtained, it was found that the varieties varied in their response to water treated with plasma, and that the latter had a positive effect on Growth and germination of bean plants for both varieties, such that for the Histal Fito variety, the effect was on dry-treated seeds watered with plain water. More positive in relation to the other treatments, and for the Fava Haba variety, the two treatments (wet treated seeds watered with plain water) were Untreated seeds watered with plain water are the most effective compared to other treatments. In conclusion, we can say that the effect of treating irrigation water with plasma on bean plants is effective on growth and germination, depending on the difference in response.