

Effect of Soil and Water Salinity on The Quality of Deglet Noor Dates In Biskra Region, Algeria

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Abstract. The Biskra region in Algeria is known for the production of very good quality Deglet Noor dates. This quality is the result of the interaction of several ecological and agronomic factors. Our work aims to study the impact of hydro-edaphic parameters on the quality of Deglet Noor dates, produced in the region of Biskra. The study is carried out in three stations: Tolga, Sidi Okba and Ouled Djelal. Three farms are chosen in each station. The methodological approach is based on Soil, water, biometric and biochemical analyzes on sampled dates. The results shows that the water irrigation have a high salinity in Sidi Okba station. The statistical analyzes (ACP) shows that, the high salinity of irrigation water is the main cause of soil salinization. This salinization reduces the biometric characteristics of dates (length, width and weight), and increases their total sugar content.

Keywords. Characteristics, Hydro-edaphic, Deglet Noor, Quality, Biskra.

I. INTRODUCTION

The Ziban region is one of the most important phoenicultural regions in Algeria, not only by production of dates; but also on the quality scale of the famous Deglet Noor date [1]. The Deglet Noor date, export variety par excellence, represents 53.56% of the national production in dates. The Biskra region provides 49.38% of the national production in Deglet Noor [2]. According to [3,4], the quality of dates is influenced by the type of cultivar and by environmental conditions. Our work aims to characterize the effect of some hydro-edaphic properties on the quality of Deglet Noor dates, produced in some palm groves in the Biskra region.

II. MATERIAL AND METHODS

- *Zone of Study*

The study was carried out at three stations in the Biskra region, known for significant production of Deglet Noor dates: Tolga, Sidi Okba and Ouled Djellal (Figure 1).

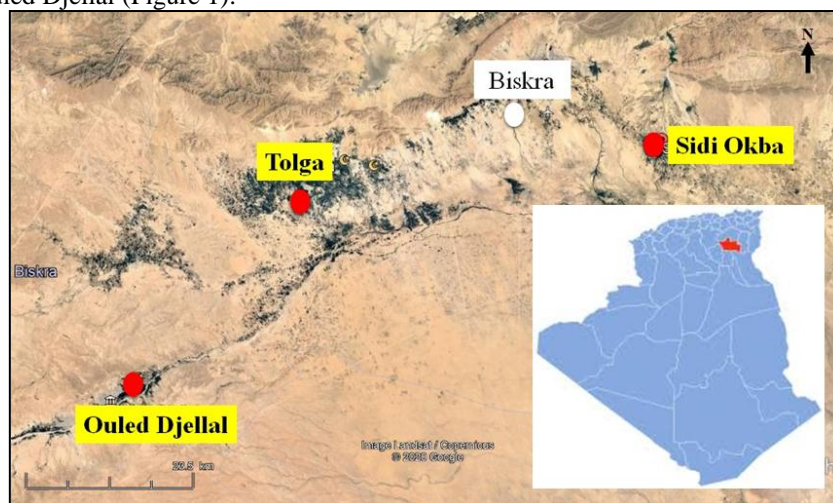


FIGURE 1. Presentation of sites of study [5].

- *Methodological Approach*

The objective of our work is to study of the influence of some hydro-edaphic characteristics on the characteristics of Deglet Nour dates in the Biskra region. In each station we have selected three (03) farms and the dates are taken from five (05) date palm trees at full production age. Water and soil samples are taken in front of each selected plant at a distance of 100 cm. The analyses carried out are as follows: the length and the diameters of the dates using a calliper and their weight by a precision balance [6]. The water composition of dates by desiccation of the dates in the oven for 24 hours, their total sugars content by the method of Bertrand, reducing sugars by Fehling's method and in sucrose [7].

III. RESULTS AND DISCUSSION

- *Length and Diameter of Dates*

The length of the dates studied varies between 40.9 mm and 42.8 mm. The width varies between 19.2 mm and 20.2 mm (Figure 2).

According to [8], a Deglet Nour date has, on average, a length of 60 mm and a diameter of 18 mm. We note that the results found are lower than these values.

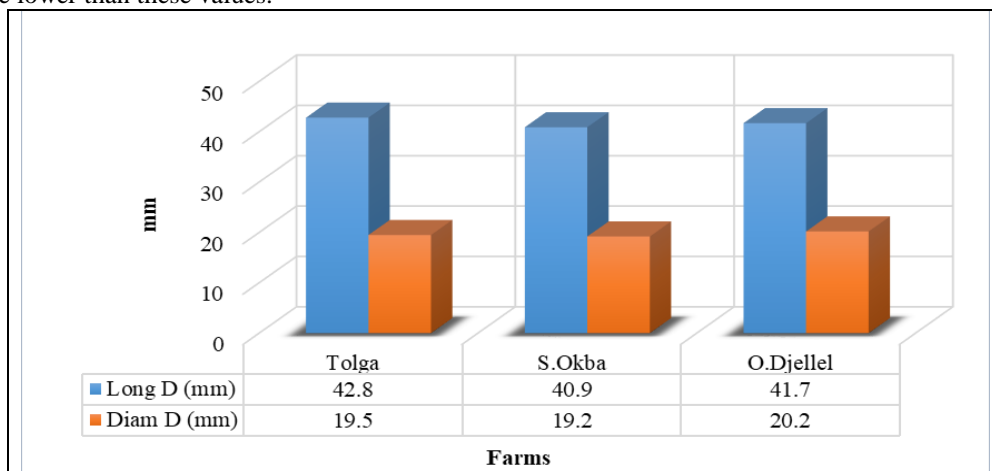


FIGURE 2. Length and width of dates.

- *Weight of Dates*

From the Figure 3, we found that the weight of the dates studied varies between 11.2 g and 11.8 g. According to [9], a Deglet Nour date of good market quality has an average weight of 10 g. we find that the dates studied meet this standard.

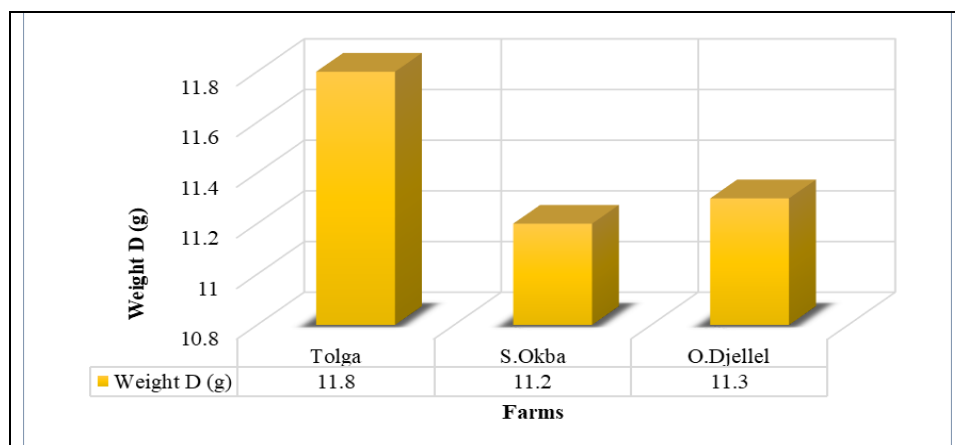


FIGURE 3. The weight of dates.

- *Water Content*

The water content of the dates studied varies between 22.57% and 26.8% (Figure 4). Our results are close to that given by [8], which is 25.52%.

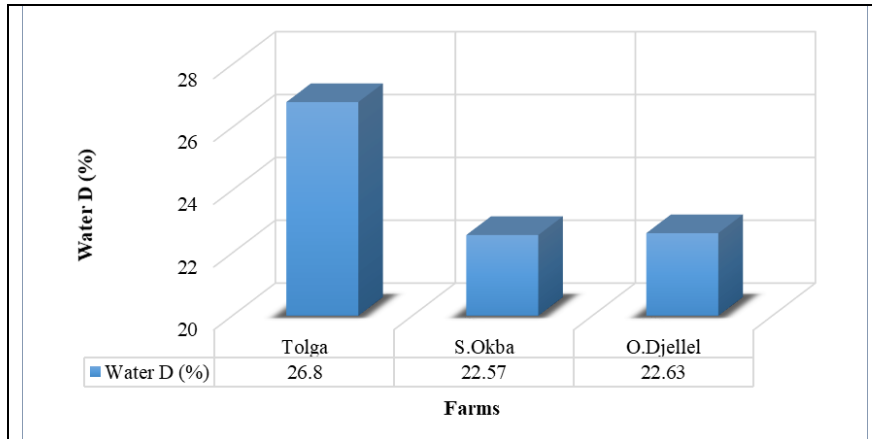


FIGURE 4. The water content of dates

- *Total and Reducing Sugars*

From Figure 5, we found that the total sugars vary between 46.79% and 53.37%. The reducing sugars vary between 20.69% and 22.95%. According to [8], the average total sugar content of Deglet Nour dates is 71.37%, and the reducing sugars is 22.81%. We found that our results are lower than the value of total sugars.

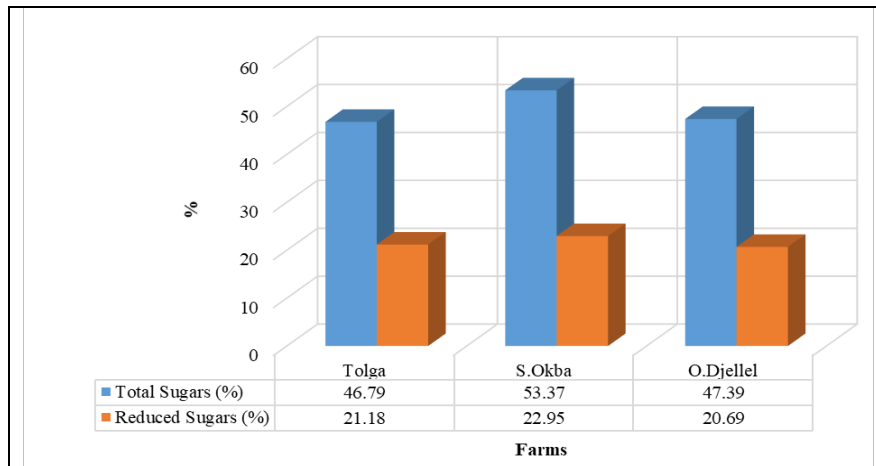


FIGURE 5. Total and reducing sugars .

- *Water Salinity*

La salinité des eaux exploitées pour l'irrigation varie entre 3.62 mS/cm et 6.14 mS/cm. Ces eaux sont classées de fortement salines à excessivement salines (figure 6).

The salinity of water used for irrigation varies between 3.62 mS / cm and 6.14 mS / cm. These waters are classified from highly saline to excessively saline, according to [10] (Figure 6).

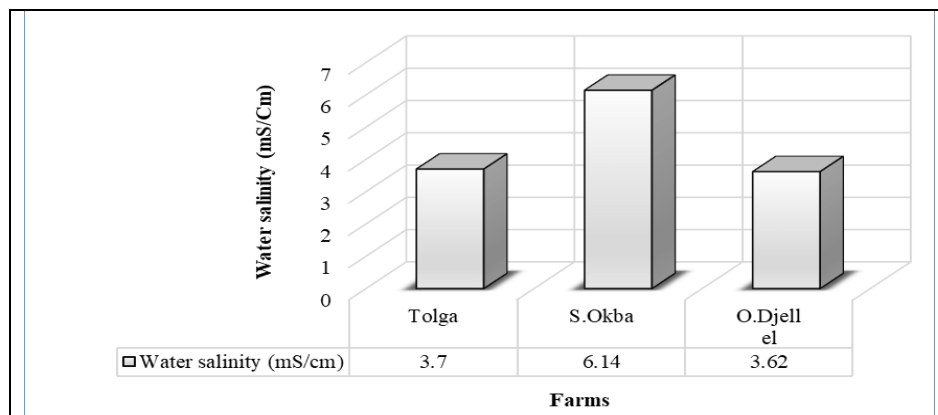


FIGURE 6. Salinity of water irrigation.

- **Soil Salinity**

According to the scale of [11], we can classify the soil as slightly salty to salty in the O.Djellal station and very salty in Tolga and S. Okba (Figure 7).

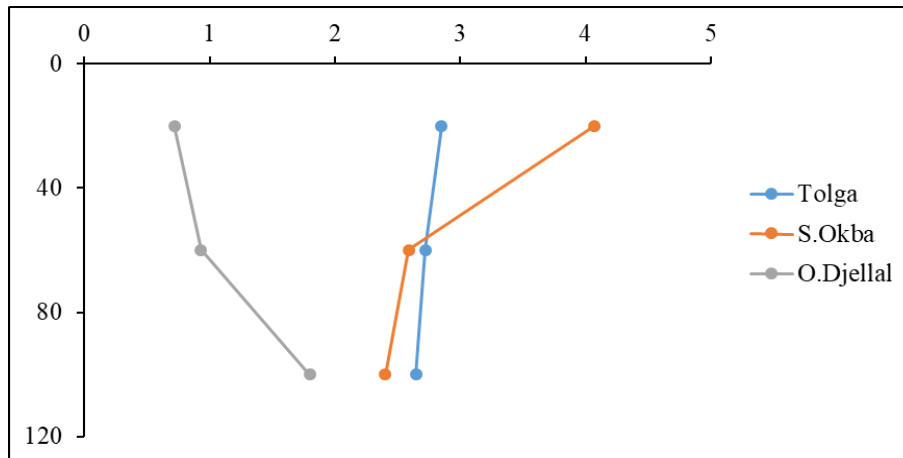


FIGURE 7. Salinity of soil.

- **Analysis of the Relationship Between the Parameters Studied (Principal Component Analysis)**

The Figure 8 represents the correlation between the characteristics chosen on the factorial plane F1/F2, which has the highest inertia (75.85%). On the F1 plane, we find a strong positive correlation between the water salinity and the total sugar content and a strong negative correlation between the water salinity and : the length, diameter, weight and water content of dates.

For axis F2, there is a strong negative correlation between the salinity of the soil and the diameter of the dates.

These results are also confirmed by the studies of [12,13], on Deglet Nour dates in the Ouargla region.

According to [14], the biological energy of plants, used in the production of biomass will be consumed to extract water from the saline solution of the soil which has a high osmotic pressure. This results in the production of poor quality dates.

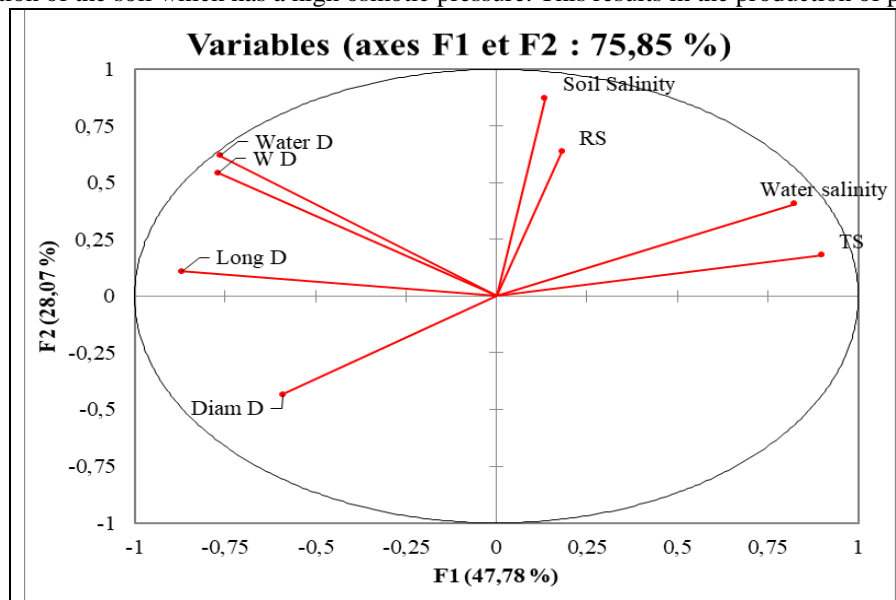


FIGURE 8. Principal Component Analysis of studied parameter.

CONCLUSION

The results of this study show that the Deglet Nour dates of Biskra have the characteristics that give them a good marketability. However, the high salinity of water and soil can affect this quality in the long term.

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