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Quality of Olive Oil Obtained by Regulated Deficit Irrigation

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Abstract: Olive oil is one of the basic products in the Mediterranean diet, and, due to its nutritional value, it is becoming more and more widespread in the world. Even though it has traditionally been a rainfed crop, farmers are currently transforming their plantations into super-high-density orchards to increase production. However, the increasingly acute drought in Mediterranean countries forces the establishment of water control mechanisms that allow restriction the contribution of water without undermining the properties of the products obtained. Under this concept, hydroSOS crops and products arose. This study aims to analyze the influence of the application of deficit irrigation on the olive oil obtained from the *Arbequina* and *Arbosana* varieties. The sensory parameters descriptive profile and consumers satisfaction degree were measured using trained and consumers’ panels, and the chemical parameters peroxide index, fatty acids, and volatile profile were analyzed using the methods from the International Olive Oil Council and gas chromatography. The experimental results showed that applying this type of irrigation leads to an oil that is more valued by consumers, with a higher concentration of aromatic compounds related with a greener aroma (hexanol, *trans*-2-hexen-1-ol, hexanal), a higher content of polyunsaturated fatty acids, and greater antioxidant capacity. Deficit irrigation strategies led to environmentally friendly olive oil with high acceptance by Spanish consumers.

Keywords: *Olea europaea*; *Arbequina*; *Arbosana*; consumer study; sensory analysis; hydroSOS



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1. Introduction

Olive oil is one of the most recognized Spanish products worldwide. In 2021, the olive grove harvested area in Spain occupied 2.62 million ha, representing 52% of the total harvested surface in the European Union and 25% worldwide [1]. Olive production is located mainly in the Mediterranean basin due to its good adaptation to climatic conditions of this region [2]. The olive oil sector is a fundamental pillar in the Spanish agri-food system, as indicated by the fact that the Spanish olive oil production accounts for 70% and 45% of European and world productions, respectively. Olive oil represents 93% of the total olive production, with the other 7% belonging to table olives [3]. Olive oil consumption has increased worldwide due to its beneficial health properties (e.g., healthy fatty acids profile and high content of antioxidant compounds) [4]; this reputation has led the Food and Agriculture Organization of the United Nations to recommend its consumption [5].

In last years, the olive oil cultivation system is suffering changes, from traditional rainfed orchards to super-high-density orchards, which have high needs of irrigation

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