

Possibilities for expanding the use of Wastewaters for Olive Irrigation

Zebing Zhu*

Department of Civil Engineering and Architecture, East China Jiao Tong University, Nanchang, China

Description

Olive trees are a symbol of the Mediterranean landscape and have recently spread to other parts of the world with similar climates. Although irrigation benefits olive oil production, wastewaters will likely play a larger role in supplementing irrigation water requirements in light of a shifting climate and erratic precipitation patterns. However, wastewaters pose difficulties for sustained, long-term use in olive production due to their relatively low quality. All municipal effluents, agricultural drainage, animal production facilities, agricultural processing, and industrial processes are considered wastewaters. This review focuses on the advantages and disadvantages of using wastewater from various sources to sustain olive oil production in the Mediterranean. Concerns regarding salinity, sodicity, metals and trace elements, nutrients, organics, and pathogens are the primary obstacles to using such wastewaters. The effluents' organics and plant nutrients typically have beneficial effects, but the amounts vary. Saline wastewaters have been successfully used to irrigate olives in Greece, Israel, Italy, Jordan, and Tunisia, according to numerous studies. However, olive varieties and rootstocks may respond to salinity in different ways, affecting oil quality in different ways [1].

To ensure that soil physical conditions are not altered and that salts and trace elements do not accumulate year after year, plants and soil must be monitored. When deciding whether or not a food industry's effluent can be reused, it is necessary to weigh the advantages (such as the addition of nutrients), disadvantages (such as the presence of salts or other limiting chemicals), and costs. It is likely that the long-term accumulation of trace elements and metals will make it more difficult to make use of industrial effluents if there aren't treatment processes to get rid of the toxic components before they can be used again. As a result, the long-term potential for reusing wastewater from numerous industries that has not been treated is currently limited. High concentrations of polyphenols, which may be phytotoxic and toxic to soil microbial populations, raise concerns about the application of olive mill wastewater, which may be agronomically and economically advantageous, particularly as a local disposal solution. Due to the fact that fruits are not picked from the ground, processing itself eliminates pathogens, and the irrigation season typically ends days or weeks before the harvest (depending on the climate), the risk of contamination of table olives and olive oil is extremely low in terms of human safety. Finally, olive trees seem like good candidates for using recycled water as an irrigation source because of their physiological, nutritional, and intrinsic characteristics [2].

In the Mediterranean, olive trees are a cultural and historical symbol. Olives are frequently mentioned in Greek mythology, and olive orchards in

Spain, Italy, Greece, and Tunisia produce the vast majority of the world's olive oil. Olive cultivation dates back thousands of years to the early Bronze Age. The global demand for this healthy oil continues to rise in tandem with the growing popularity of using olive oil for cooking and consumption. Additionally, olive oil production has recently expanded far beyond the Mediterranean to California and a number of southern hemisphere nations, including Australia, Argentina, Peru, and Chile, as a result of this growing popularity. Olive oil production has become increasingly dependent on irrigation, which has been shown to improve oil production while maintaining quality, whereas olive orchards have thrived for centuries solely on rain. Water, on the other hand, is scarce in the Mediterranean, as it is in other semi-arid climates, and climate change is expected to make water scarcity even worse by making precipitation patterns more uncertain, resulting in more frequent and severe droughts, and reducing overall rainfall in the region. Because of this uncertainty and the likely future reduction in precipitation in the Mediterranean, supplemental water supplies become not only appealing, but they are also necessary for the region to maintain its historical importance in olive oil production [3].

Recycled wastewater, of which a great deal is currently unused, is most likely the likely source of the additional water that is required for olive irrigation. There are numerous opportunities to utilize wastewaters from various sources, including treated wastewater from municipalities and wastewaters from agricultural production (e.g., olive mills, canneries, vineyards, food processing plants, drainage waters, etc.). Since groundwater in the Mediterranean region is already over-depleted, it is unlikely that a sustained increase in groundwater extraction from wells will occur, particularly in coastal areas that are experiencing salinization as a result of seawater intrusion. However, the quality of wastewaters typically is lower than that of the water used to make the waste. It may be difficult to use this low-quality water for olive production for an extended period of time. Industrial wastewaters from oil production and textile processing that contain high concentrations of heavy metals and/or organic fractions that pose health risks are especially problematic. The advantages and disadvantages of using wastewater from various sources to sustain olive oil production in the Mediterranean will be discussed in this analysis. The review is divided into sections with specific categories that identify sources and the characteristics of those sources that can either limit or increase water use [4,5].

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Conflict of Interest

None.

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*Address for Correspondence: Zebing Zhu, Department of Civil Engineering and Architecture, East China Jiao Tong University, Nanchang, China, E-mail: hitzb@126.com

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