

Chapter 3

A Comprehensive Review of Olive Oil Extraction Processes and the Environmental Impact of Margins

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ABSTRACT

In recent years, the olive oil business has created much more marginal effluents due to the increased demand for olive oil, which has been linked to improved human health and cancer therapy. These margins are discharged directly into the receiving environment without prior treatment. As a result, they destroy the environment, inflicting massive damage to the water, soil, and plant systems. These effluents exacerbated Morocco's water problem and decimated aquatic flora and fauna. The purpose of this study is to explain and discuss the many steps of olive oil extraction, as well as the influence of margins on the environment in general and surface waters in particular.

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1. INTRODUCTION

Olive oil production has increased in recent years due to its importance for human health and its beneficial effects against cancer and cardiovascular disease, thanks to the phenolic compounds contained in margines (Eddaoukhi et al. 2023; Esmail et al. 2014). In addition, these industries produce highly innovative economic activity that generates considerable income, particularly for rural populations (Zahari, Tazi, and Azzi 2014). However, this increase in production has contributed catastrophically to environmental pollution since the liquid by-product is highly polluting and generates micropollutants. These have a negative impact on the environment when they are discharged directly into receiving environments (wadis, lakes, rivers, seas, and soils) without any prior treatment (Sbai and Loukli 2015). These crude marginal effluents are highly acidic and contain organic and suspended matter, as well as a high concentration of oil (Eddaoukhi et al. 2023). Excessive oxygen consumption causes eutrophication, which degrades the quality of the water into which they are discharged and harms aquatic flora and fauna. The spreading of raw margins rich in nitrogenous elements can also result in another type of nitrate pollution of groundwater in or around the spreading area, compromising drinking water quality (Eddaoukhi et al. 2024). Margines, which are made up of lipids, can affect surface waters by forming a film on river surfaces and edges that prevents light and oxygen from reaching lower levels (Mounia Achak et al. 2008). Margines also clog soils, lowering their quality. This hinders germination and leads to plant mortality (Eddaoukhi, Berradi, El Rhayam, et al. 2023). Regulations mandate a reduction in these micropollutants, which must be removed in accordance with current treatment standards before being discharged into the natural receiving environment (Berradi and El Harfi 2017; Wang, Shao, and Westerhoff 2017). The aim of this review is to provide a general overview of olive tree cultivation, the various stages involved in processing olives into olive oil, and their impact on the environment and human health.

2. INTERNATIONAL OLIVE SITUATION

2.1. International distribution of olive trees

Olive trees are classified as members of the Oleaceae family. There are approximately thirty species worldwide. The olive tree is the most common fruit species cultivated in Mediterranean countries due to its capacity to grow, produce, and develop in a wide range of growth environments, including the most extreme climatic conditions. Olive farming is also a Mediterranean tradition. It is both a pleasure to have olives and olive oil on one's table and a symbol of civilization for Mediterranean peoples (Eddaoukhi, Berradi, El Yacoubi, et al. 2023).

To reach production targets, Mediterranean countries have implemented agricultural programs that include the planting of millions of olive trees each year. Every Mediterranean olive oil-producing country grows around a hundred species of olive trees, the most common of which are wild olives and cultivated “*Oléa europaea sativa*” (Majdouline Larif et al. 2012). Today, the olive tree is planted in practically every country in the world, including California, Mexico, Brazil, Argentina, Chile, Australia, and even China, before extending to Japan and South Africa. The Mediterranean has over 850 million olive trees distributed across an area of around 8.16 million hectares, accounting for 95% of the world's olive-growing heritage, with olive production anticipated at 2 million tons for the 2021-2022 season Conseil oléicole

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