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Enzymatic Dewaxing of olive pomace oil using lipases: An Eco-friendly approach for oil refinement

KALLEL Khouloud[1], OMRI Rebh[2], ZARAI Zied [1]

[1]*Laboratory of Biochemistry and Enzymatic Engineering of Lipases, National School of Engineering of Sfax, University of Sfax, Sfax 3038, Tunisia.*
[2] *CHO Laboratory (LAHAL), Sfax, Tunisia*

Email 1 - Khouloudkallel92@gmail.com
Email 2 - *zied.zarai@isbs.usf.tn*
Email 3 - rebh.omri@cho.com.tn

Introduction :

The presence of high levels of waxes and non-glyceride components in olive pomace oil, a by-product of olive oil extraction, has a negative effect on the clarity, stability, and commercial value of the oil [1]. Conventional dewaxing techniques depend on the utilisation of solvent-based or physical refining processes, which are energy-consuming and detrimental to the environment [2]. This study explores using lipase for the enzymatic dewaxing of olive pomace oil as a more eco-friendly and selective alternative [3,4].

Résultats :

In this study, lipase from *Rhizopus Oryzae (ROL)* was applied to crude olive pomace oil under optimized conditions of 37 °C, pH 8.0, and 160 rpm for 24 hours [9].

The analysis of wax esters was carried out by gas chromatography using a capillary column equipped with a flame ionization detector (GC-FID) revealing a significant **reduction of 43% in total wax content** , which are responsible for the turbidity and poor cold stability of the oil.
the fatty acid composition showed improved cold stability in the enzymatically treated oil, with

The **free acidity**, measured by titration with potassium hydroxide, remained stable post-treatment (0.8% oleic acid equivalent), showing that the enzymatic process resulting an increase in the acidity value [6].

The **fatty acid composition**, analyzed by gas chromatography (GC-FID), showed no significant alteration in major components (oleic, linoleic, palmitic acids), indicating selective action of the enzyme toward non-glyceridic wax esters rather than fatty acids from triglycerides [5,6].

Similarly, the **sterol composition**, determined using GC after saponification and derivatization, remained unchanged, confirming that phytosterols were preserved during the enzymatic process [1, 2].

Finally, the **UV absorption coefficient** (K270), which reflect conjugated dienes and trienes formation, showed only a slight increase within acceptable regulatory limits, confirming minimal oxidative modification during enzymatic treatment [1].

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Conclusion :

The results show that using lipase to catalyse dewaxing is a promising, sustainable method for refining olive pomace oil[3,5].This environmentally friendly approach offers high specificity and reduced environmental impact while preserving the quality of the oil[1,6], making it suitable for industrial-scale applications in the culinary and cosmetic industries[2].

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