

# Determination of bioactive compounds and biological properties of olive fruit extract (*Olea europaea* L.)

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Received 25 December 2024; revised 15 May 2025

Olive (*Olea europaea* L.) fruit is an important plant that has been traditionally used for both nutritional and therapeutic purposes. However, the complete chemical profile of bioactive compounds found in olive fruit and their biological effects have not yet been fully elucidated. Therefore, detailed examination of the phenolic content and biological activities of olive fruit extract is of great importance for the discovery and use of naturally derived functional compounds. Polyphenols are known for their ability to mitigate the adverse effects of reactive oxygen species (ROS). This study aimed to determine the phenolic acid content of *Olea europaea* L. extract and investigate its biological properties, including antimicrobial, anticancer, and enzyme inhibition activities. Additionally, target gene prediction analyses for key phenolic compounds were conducted. The phenolic content was analyzed via liquid chromatography-mass spectrometry (LC-MS) which revealed high levels of oleuropein, protocatechuic acid, luteolin, and vanillic acid. Common target gene predictions for these phenolic acids were performed via the sRplot database. Enzyme inhibition and anticancer activity studies were carried out on MCF-7 and HCT-116 cells using the *Olea europaea* extract. The results showed that the *Olea europaea* extract at a concentration of 75  $\mu\text{M}/\text{mL}$  effectively inhibited the hCAI enzyme (IC<sub>50</sub>: 63.12 $\pm$ 11.37  $\mu\text{M}/\text{mL}$ ; Ki: 39.18 $\pm$ 4.02  $\mu\text{M}/\text{mL}$ ) and significantly inhibited the hCAII enzyme (IC<sub>50</sub>: 39.45 $\pm$ 7.02  $\mu\text{M}/\text{mL}$ ; Ki: 45.33 $\pm$ 5.11  $\mu\text{M}/\text{mL}$ ). Furthermore, the extract significantly inhibited acetylcholinesterase (AChE) (IC<sub>50</sub>: 52.30 $\pm$ 8.21  $\mu\text{M}/\text{mL}$ ; Ki: 34.50 $\pm$ 3.15  $\mu\text{M}/\text{mL}$ ). Notably, the extract had significant cytotoxic effects on the MCF-7 (78.19 $\pm$ 4.85  $\mu\text{g}/\text{mL}$ ) and HCT-116 (80.19 $\pm$ 7.03  $\mu\text{g}/\text{mL}$ ) cell lines. In conclusion, the *Olea europaea* extract is rich in phenolic acids, indicating strong antioxidant, antiangiogenic, anticarcinogenic, and anti-inflammatory properties. These findings can contribute to further investigations in new drug design.

**Keywords:** Acetylcholinesterase, Carbonic anhydrase, Anticancer activity, Antimicrobial activity, Phenolics

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