University of Zabol

Management of Graduate Education

Faculty of Basic Sciences

Biology Department

Master's thesis in the field of biology, majoring in plant physiology

Investigation of chemical compounds, antioxidant and antimicrobial properties of olive (Olea europaea L.) in two different climatic conditions

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Abstract:

In this reserch, phytochemical compounds as well as antioxidant and antimicrobial properties of olive fruit and leaves from two regions of Zabul and Zahedan were investigated. The amount of total phenol was measured by Folin Ciocaltio method and the results were expressed as mg of gallic acid per gram of dry plant. The amount of total flavonoids was also measured by aluminum chloride colorimetry and expressed as mg of quercetin per gram of dry plant. DPPH free radical scavenging method was used to study the antioxidant properties of the target organs. Inhibitory properties of aqueous-alcoholic extracts were studied against some Gram-positive and Gram-negative pathogenic bacteria and fungal strains. The content of total phenol and total flavonoid were ranged from 1.32 to 2.07 mg of gallic acid equivalent per gram and 0.262 to 0.344 mg of quercetin equivalent per gram of dry plant organ, respectively. The highest and lowest amounts of phenol were found in Zahedan fruit and Zabul leaf, respectively. The highest and lowest amounts of flavonoid were observed in Zahedan leaves and Zabul fruit, respectively. IC_{50} values ranged from 5.27 to 128.03 μg/ml, the highest and lowest antioxidant activities were observed in the methanolic extract of Zahedan leaf and fruit, respectively. The antioxidant activity of leaves and fruit of Zabul city showed no significant difference, but the antioxidant activity of olive leaves and fruits collected from Zahedan showed a significant difference. No inhibitory activity was observed at the highest concentration level of the extracts against the Gram-negative strain of *E. coli* and two Gram-positive strains of *B. cereus* and *S. epidirmidis* and *A. fumigatus* fungus. Most of the extracts were able to prevent the growth of *Fusarium oxyprom* strains, but the growth of *Pseudomonas aeruginosa* strain was inhibited only by Zabul fruit extract. Extracts of Zahedan leaf and Zabul fruit showed a wider range of inhibitory effects while consistent with their antioxidant properties. These two extracts have good antimicrobial and antioxidant potential and can be used in the treatment of microbial infections and diseases caused by oxidative stress.

Keywords: Olea europaea L, Total phenol content, Total flavonoid content, Antioxidant capacity, Antimicrobial properties