World Academy of Science, Engineering and Technology
International Journal of Pharmacological and Pharmaceutical Sciences
Vol:17, No:11, 2023

Investigating the Antibacterial Properties and Omega-3 Levels of Evening Primrose Plant Against Multi-Drug Resistant Bacteria

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Abstract : Evening primrose (Oenothera biennis L.) is a biennial and herbaceous and one of the most important species of medicinal plants in the world. due to the production of unsaturated fatty acids such as linoleic acid, alpha-linolenic acid, etc. in its seeds and roots, and compounds such as kaempferol in its leaves, Evening primrose has important medicinal efficiency such as reducing premenstrual problems, acceleration of wound healing, inhibiting platelet aggregation, sedation of cardiovascular diseases, and treatment of viral infections. The sap of the plant is used to treat warts, and the plant itself is used as a charm against mental and spiritual diseases and poisonous animals. Its leaves have significant antibacterial activity against yellow staphylococci. It is also used in the treatment of poisoning, especially the toxication caused by the consumption of alcoholic beverages, in the treatment of arteriosclerosis and diseases caused by liver cell insufficiency. Low germination and production speed are the problems of evening primrose growth and propagation. In the present study, extracts were obtained from four components (flowers, stems, seeds, leaves) of the evening primrose plant using the Soxhlet apparatus. To measure the antibacterial properties against MDR bacteria, microbial methods, including dilution, cultivation on a plate containing nutrient agar culture medium, and disc diffusion in agar, were performed using Staphylococcus aureus and Escherichia coli bacteria on all four extracts. The maximum antibacterial activity related to the dilution method was obtained in all extracts. In the plate culture method, antibacterial activity was obtained for all extracts in the nutrient agar medium. The maximum diameter of the non-growth halo was obtained in the disc diffusion method in agar in the leaf extract. The statistical analysis of the microbial part was done by one-way ANOVA test (SPSS). By comparing the amount of omega-3 in extracts of Iranian and foreign oils available in the market and the extracts extracted from evening primrose plant samples with gas chromatography, it is shown that the stem extract had the most omega-3 (oleic acid) and compared to the extract of the mentioned oils, it had the highest amount of omega-3 overall. Also, the amount of omega-3 in the extract of Iranian oils was much higher than in the extract of foreign oils. It should be noted that the extract of foreign oils had a more complete composition of omega-3 than the extract of Iranian oils.

Keywords : antibacterial activity, MDR bacteria, evening primrose, omega-3
Conference Title : ICBSAATAR 2023 : International Conference on Broad-Spectrum Antibiotics, Antibiotic Therapy and Antimicrobial Resistance
Conference Location : Amsterdam, Netherlands
Conference Dates : November 06-07, 2023