

Arisarum Vulgare: Bridging Tradition and Science through Phytochemical Characterization and Exploring Therapeutic Potential via in vitro and in vivo Biological Activities

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Abstract : Arisarum vulgare, a member of the Araceae family, is an herbaceous perennial widely distributed in the Mediterranean region. A. vulgare is recognized for its medicinal properties and holds significant traditional importance in Algeria for the treatment of various human ailments, including pain, infections, inflammation, digestive disorders, skin problems, eczema, cancer, wounds, burns and gynecological diseases. Despite its extensive traditional use, scientific exploration of A. vulgare remains limited. The study aims to investigate for the first time the therapeutic potential of A. vulgare ethanolic extract obtained by ultrasound-assisted extraction. The chemical composition of the extract was determined by LC-MS/MS analysis. For in vitro phytopharmacological evaluation, several assays, including DPPH, ABTS, FRAP and reducing power, were employed to evaluate the antioxidant activity. The antibacterial activity was assessed against Escherichia coli, Salmonella typhimurium, Staphylococcus aureus, Enterococcus faecium by disk diffusion and microdilution methods. The possible inhibitory activity of ethanolic extract was analyzed against the cholinesterases enzymes (AChE and BChE). The DNA protection activity of A. vulgare ethanolic extract was estimated using the agarose gel electrophoresis method. The capacities of the extract to protect plasmid DNA (pBR322) from the oxidizing effects of H₂O₂ and UV treatment were evaluated by their DNA-breaking forms. The in vivo wound healing potential of a traditional ointment containing 5% of A. vulgare ethanolic extract was also investigated. The LC-MS/MS profiling of the extract revealed the presence of various bioactive compounds, including naringenin, chlorogenic, vanillic, caffeic, coumaric acids, trans-cinnamic and trans ferrulic acids. The plant extract presented considerable antioxidant potential, being the most active for Reducing power (0.07326 ± 0.001 mg/ml) and DPPH (0.14 ± 0.004 mg/ml). The extract showed the highest inhibition zone diameter against Enterococcus faecium (36 ± 0.1 mm). The ethanolic extract of A. vulgare suppressed the growth of Staphylococcus aureus, Escherichia coli and Salmonella typhimurium according to the MIC values. The extract of the plant significantly inhibited both AChE and BChE enzymes. DNA protection activity of the A. vulgare extract was determined as 90.41% for form I and 51.92% for form II. The in vivo experiments showed that 5% ethanolic extract ointment accelerated the wound healing process. The topical application of the traditional formulation enhanced wound closure ($95,36 \pm 0,6$ %) and improved histological parameters in the treated group compared to the control groups. The promising biological properties of Arisarum vulgare revealed that the plant could be appraised as a potential origin of bioactive molecules having multifunctional medicinal uses.

Keywords : arisarum vulgare, LC-MS/MS, antioxidant activity, antimicrobial activity, cholinesterases enzymes inhibition, dna-damage activity, in vivo wound healing

Conference Title : ICMPS 2024 : International Conference on Medicine and Pharmacological Sciences

Conference Location : Istanbul, Türkiye

Conference Dates : March 11-12, 2024