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Thesis to obtain a master's degree in rangeland management

Investigation of phytochemical characteristics and bioactivity of Tanacetum parthenium rangeland during different phenological stages in Sarbisheh rangelands, South Khorasan province

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Abstract

Plants are an important source of secondary metabolites that have been used throughout history as drugs, pesticides, pigments, flavors and fragrances. This study investigated the phytochemical constituents and antioxidant, antibacterial properties of *Tanacetum parthenium* ethanolic extracts at different phenological stages. For this purpose, total phenols, total flavonoids, total alkaloids, and total anthocyanins were measured spectrophotometrically in the aeirial parts and root extracts of *T. parthenium*. The antioxidant activity of the extracts was measured using 2,2- diphenyl-1-picrylhydrazyl (DPPH) and antibacterial activity was evaluated by disk diffusion, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) mehtods. The results showed that the flowering stage of the *T. parthenium* had higher values of total phenol, total flavonoids, total alkaloids, and total anthocyanins than the vegetative and seeding stages. The maximum levels of total phenol (62.3 ± 1.2 mg gallic acid equivalents (GAE)/g dry weight), total flavonoids (35.7 ± 0.9 mg quercetin equivalents (QE)/g dry weight), total alkaloids (73.2 ± 0.6 mg atropine equivalent/g dry weight) and total anthocyanin (4.2 ± 0.3 mg cyaniding-3glicosideequivalants/ g dry weight) were measured in the aeirial parts extract of the studied species at the flowering stage. Results of the antioxidant activity evaluation showed that the aeirial parts extract at the flowering stage has the highest antioxidant activity (75.3 ± 0.7 %) and the lowest antioxidant activity (16.5 ± 0.9 %) was measured for root extract at the vegetative stage. According to the results of antibacterial investigation, maximum inhibiton zone (21 ± 0.3 mm) was observed for aeirial parts extract at folowering stage against *Staphylococcus aureus* and minimum inhibitory concentration (12.5 mg/mL) was recorded for aeirial parts extracts at vegetative and folowering stages against above mentioned bacteria. The minimum bactericidal concentration (25 mg/mL) was measured for aeirial parts extract at folowering stage against *Staphylococcus aureus*. Based on the results, the studied species extracts were more effective on gram positive bacteria than gram negative bacteria. According to the results of this study, it can be expressed that *T. parthenium* extract and in particular its flowering stage extract had considerable phytochemical compounds with appropriate antioxidant and antibacterial properties and it can be considered as an alternative source for synthetic antioxidant and antibiotic agents.

Keywords:

Total phenols, total flavonoids, total alkaloids, total anthocyanin, antioxidant activity, antibacterial activity, *Tanacetum parthenium*