

عنوان مقاله:

Investigating the effect of seasonal changes on the phenolic compounds profile in *Phragmites australis* plant from areas contaminated with heavy metals in the city of Samawah, Iraq

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خلاصه مقاله:

Plants naturally produce various types of secondary metabolites known as polyphenols. The plant's production process of polyphenols can be altered due to environmental stressors such as climate change and the accumulation of heavy metals in the soil or water it relies on. *Phragmites australis*, also called the common reed, is a perennial grass species that thrives in wetland and riparian habitats. This study aims to quantify the impact of seasonal variations and fluctuations in heavy metal concentrations on the production process and yield of plant products in the selected plant. Additionally, it seeks to evaluate the plant's ability to remediate pollutants through phytoremediation. To achieve this objective, soil and plant samples were collected from three distinct locations in the vicinity of Samawah city. Among these, two areas were identified as being polluted with high levels of heavy metals, while the third area was found to be uncontaminated. The sampling was conducted over the course of a year, encompassing all four seasons, in order to assess the impact of seasonal variations. The quantity of heavy metals, specifically lead, chromium, mercury, and cadmium, present in plant samples and the sediment surrounding the plant was determined using atomic absorption spectrometry. Polyphenols were quantified using high-performance liquid chromatography (HPLC), while photosynthesis pigments were determined using spectrophotometry. The findings revealed notable correlations between specific polyphenols and distinct heavy metals, indicating possible interactions and adaptations of the plant in reaction to stress caused by metals. The results showed that Apigenine- γ -O-glucoside exhibited the highest polyphenol concentration, which was more than 9000 mg/kg DW in both autumn and spring at the Samawah site, followed by caffeic acid showed the highest amount (more than 3000 mg/kg DW) in all seasons at the Kader site. Furthermore, the findings indicated that the plant's phytoremediation capacity varies across various seasons and regions. There was no discernible pattern in the levels of polyphenols or the efficacy of heavy metal removal in response to climate change. The findings of this study indicate that the *Phragmites australis* plant may possess phytoremediation capabilities.

کلمات کلیدی:

Common reed, Environmental contamination, HPLC, Phytoremediation, Al Muthanna, Common reed, Environmental contamination, HPLC, Phytoremediation, Al Muthanna

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