



Improvement of Phytoremediation Potentiality of Artificial Polluted Water by Increasing Coagulating Protein Production from Syrian Rue (*Peganum Harmala* L.) under *in Vitro* Conditions

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Abstract : Harmal (*Peganum harmala* L.) is an abundant flowering plant in the Middle East and North Africa which grows in semi-arid conditions and is of Central Asian origin. In this study, *P. harmala* shoots were regenerated on MS medium supplemented with 3 mg L⁻¹ BAP, 30 gL⁻¹ sucrose and 0.8% agar. The effect of different additives with different concentrations on protein production *in vitro* was investigated with the aim of further utilization in precipitating lead (Pb) and cadmium (Cd) pollutants/ flocculants in artificial contaminated water. Results showed that the media supplemented with 200 mg L⁻¹ tryptophan, 200 mg L⁻¹ tyrosine or 20 mg L⁻¹ pyruvic acid enhanced protein production. 0.2 ppm Pd and 20 ppm Cd added to double distilled water were flocculated using NaOH and turbidity was measured after protein samples were added to determine coagulation efficiency of proteins extracted from plants of each treatment. Protein coagulation was induced on pH 6, 5, 4 and 3, subsequently and extracted proteins were quantified and analyzed using sodium dodecyl sulfate-polyacrylamide gel electrophoresis. The gels were showed 63 bands that were of high polymorphism among the accessions with noticeable differences observed in the 90.94 KDa area which is responsible to precipitate heavy metals. Results showed that adding 200 mgL⁻¹ tryptophan to the culture medium resulted in the highest value of this protein (96.7 KD protein) which afterwards precipitated heavy metals in water more efficiently compared to the other additives.

Keywords: Phytoremediation Potantialty of Artificial Polluted Water, Coagulating Protein Production, Syrian Rue (*Peganum Harmala* L.).

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