

Microbes and citric acid assisted treatment of tannery effluents by *Lemna minor* and *Typha latifolia* in a constructed wetland: A lab scale study

DR. MUJAHID FARID, PHD¹, RAHAT ARSHAD², ZAKI UL ZAMAN ASAM² AND MOHSIN ABBAS²

¹Department of Environmental Sciences, University of Gujrat

²University of Gujrat, Hafiz Hayat Campus, Gujrat, 50700, Pakistan

Presenting Author: mujahid726@yahoo.com

Heavy metals (HMs) contamination is currently a major environmental concern, as most of the agricultural land is being irrigated from industrial discharge. Tannery effluents mainly consists of large concentration of chromium i.e., Cr⁺³ and Cr⁺⁶ along with other heavy metals like cadmium, nickle, lead and copper. Direct discharge of industrial effluents rich in heavy metal contaminate the water bodies. For heavy metals removal phytoremediation is considered as most sustainable and budget friendly technique. The present study was performed to evaluate the toxic effects of tannery effluents and performance of citric acid (CA) and chromium reducing bacterial strain on phytoextraction potential of *Lemna minor* L. and *Typha latifolia* L. in an artificial designed wetland. Different doses of tannery wastewater (0, 50 and 100%), CA (5 and 10 mM) and microbes were applied alone and in combinations to plants. The plants were collected from the nearby marshes of Gujrat and the data was recorded regarding agronomic traits, antioxidant enzymes, photosynthetic pigments, electrolytic leakage (EL), reactive oxygen species (ROS), and heavy metals uptake and accumulation. Our outcomes illustrated significance decrease in morpho-physiological and biochemical attributes of *L. minor* and *T. Latifolia* with the increasing concentration of applied wastewater. However, Concentration and accumulation of chromium in *T. Latifolia* plants was increased with application of CA while addition of *Staphylococcus aureus* further improved the rate of accumulation and concentration of chromium in plants. Our findings suggested that microbial assisted phytoextraction paired with chelating agent (Citric acid) can be a practical method to remediate heavy metal polluted site.