



## Remediation of Paddy Parboiled Effluent by Phytoremediation followed by Sand Filtration

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### Abstract

Parboiled rice is gaining more popularity among Sri Lankans, as it is healthier than raw rice. A huge amount of paddy is being parboiled now a day, creating continuous effluent generation that causes environmental problems. This study focuses on bioremediation solutions (Phytoremediation Through Sand Filtration Process) to overcome such issues to use that for irrigation purposes. Paddy parboiled effluent was collected and characterized the pollutant level of parboiled effluent to evaluate the performance of sand filtration technique during phytoremediation by measuring chemical parameters like Total Dissolved Solids (TDS) and Electrical Conductivity (EC) contents by HACH multimeter and HACH colorimeter. The growth of aquatic plants was an indicator, which was found to be inhibited in unfiltered parboiled effluent. During the phytoremediation process aquatic plants, which were absorbed nutrients from the effluent at a higher rate. It is an effective way of indicating of pollutant levels. The growth of all aquatic plants was initially inhibited because of high nutrient content and progressive anaerobic digestion. The bioremediation process was tested for further effluent treatment. In this study, the parboiled paddy effluent was filtered via a sand filter, and was aerated by supplying dissolve oxygen. When comparing the characteristics of sand-filtered effluent removal range was reduced to TDS 2500 -1700 mg/Lit and the EC value was reduced to 5.5 to 3.5 mS/cm of the pollutant than unfiltered effluent. Therefore, sand filtration process gives better survival for the plants. It is a simple way to the reduction of excess nutrient content in parboiled effluent. As a solution of that, filtration can be tested according to the result of the research, sand filtered parboiled paddy effluent with aquatic plants is an effective way of indicating pollutant reduction level up to TDS 1700 -1000 mg/Lit and EC value reduced to 3.5 to 1.5 mS/cm. Additionally, aeration causes to extend the survival rate of aquatic plants. After the bioremediation process, bio-remediated effluent can be used for irrigation.

**Keywords:** Bio-remediation, Parboiled effluent, Phytoremediation, Sand filtration

