SECTION 2

EXECUTIVE SUMMARY OF THE PROJECT

Effluents released from industries contain many hazardous materials which are harmful to the environment as well as to the human being, and consequently, the removal of such materials from the environment has become a priority. In this context, the study is based on the removal of heavy metal ions, anions and textile dyes from industrial effluents using naturally available materials, such as rice husk, brick clay, coir dust, saw dust, dolomite and feldspar, which can be used to develop cost-effective and eco-friendly effluent treatment procedures. Metal ions commonly present in effluents of metal finishing industries, such as Cd(II), Cr(III), Cu(II), Ni(II), Pb(II) and Zn(II); commonly present anions, such as Cl^-, NO_3^- and PO_4^{3-}; and a mixture of textile dyes were specially considered for their removal.

This project was mainly based on the investigation of sorption of industrial pollutants on selected natural substances through parameter optimization, adsorption isotherm studies, kinetics under static conditions, and extending toward dynamic experiments. Further optimization of bed height of and flow rate was performed as an initial step of the prototype treatment system. As the final step, prototype (medium scale) treatment system was constructed for the removal of Zn(II) from synthetic effluents. Among two different flow rates of the prototype treatment systems, a flow rate of 100 cm^3 min^{-1} was selected at which the treatment system achieved 100 % removal efficiency at the beginning, more importantly, the sample concentrations at the discharging point of the system remain below the CEA guidelines for a long time period of more than 3 days.

It is evident that the higher efficiency in pollutant removal is resulted in by natural substances which have higher absorbents sites on their surface. The implemented prototype treatment system could be further modified for the removal of many other pollutants. Modification of the surfaces of absorbents fallowed by further adjustment by parameters could be possible as a future expansion for treatment of industrial effluents on large-scale.