



Investigations on the possible use of an economical and effective adsorbent material for a pesticide waste water treatment plant

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ABSTRACT

Pesticides have been used widely in agriculture since the 1950s, promoted as a tool without which developing countries could not develop and become self-sufficient. However, intentional and occupational poisoning from pesticides is a major problem in these countries, with millions of cases and hundreds of thousands of deaths occurring each year. This project was aimed at determining an economical and effective adsorbent material for a pesticide waste water treatment plant. In this study, pesticides which are reformulated in bulk quantities in Sri Lanka have been selected. The analytical methods were the use of UV-visible spectroscopy and the determination of Chemical Oxygen Demand. Pesticide (diazinon) samples were initially batch equilibrated with adsorbent material to determine the percentage of adsorption. The blank experiment was carried out at each equilibration process to determine the validity of the method. Based on the results, the column studies were done. Finally industrial effluent was passed through a column packed with adsorbent material to determine the percentage of adsorption. The percentage adsorption was calculated by using the UV spectra. According to batch equilibration studies, maximum removal of diazinon (67%) was observed with brick powder. The maximum removal of diazinon (53%) was observed with saw dust. It was 8% for sand and 67% for paddy husk. The maximum percentage adsorption of diazinon by feldspar was 60%. According to the results of column studies, brick powder adsorbed lower percentage of diazinon compared to feldspar. The percentage adsorption of pesticides increased with increasing pH of the column packed with feldspar. Feldspar adsorbed more pesticides which have low relative molecular mass. Chemical Oxygen Demand of the industrial effluent was reduced by 54 % in the column studies done with feldspar.