

## **Removal of nitrate from drinking water using rice-hull ash**

Nitrate is a ubiquitous pollutant in drinking water arising from human sewage and fertiliser run-offs and is a serious environmental problem. Although there are some biological treatment methods, no low-cost technologies are available for its removal. We have developed a simple method to remove nitrate using rice hull ash and the results are described.

Rice hull ash was prepared by heating paddy husk in an electric furnace for 2h at the following temperatures; 400, 500, 600, 700 and 800°C for 2 h. A packed column of the material was first washed well with water and aliquots of varying nitrate concentration from 2-20ppm were passed through the column. The resultant concentrations of nitrate in the effluent were determined using the cadmium reduction method.

The results show that up to 90% of the nitrate is removed from the water samples containing nitrate depending on the temperature used in the firing. The highest nitrate removal efficiency was observed for samples fired at 700°C where the percentage removed was 80-90% while those fired at all other temperature showed lower activity. There was no significant difference with concentration implying that the capacity of these packed column has not been a limiting factor.

Rice hull contains up to 40% silica and both carbon from the combustion of organic matter and porous silica can act as adsorption sites for inorganic ions and organic compounds from water. The adsorption mechanism involve both physical entrapment and surface adsorption via hydroxyl groups.