REMOVAL OF FLUORIDE FROM DRINKING WATER USING ALUMINUM HYDROXIDE COATED STRAW ASH – A CASE STUDY FROM BADULLA AREA

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ABSTRACT

Excessive amount or less amount of fluoride in drinking water has an effect on teeth and bones. According to the WHO recommended limits greater than 1.5mg/L is cause for dental 'skeletal and crippling fluorosis and less than 0.5mg/L is cause for dental caries. Not only in Sri Lanka but also in some parts of the world groundwater fluoride is major problem. In Sri Lanka several districts are affected with excess fluoride in groundwater. The most abundant areas are Anuradhapura, some parts of Badulla, Hambanthota, Kurunagala, Ampara and Medawacchiya. The problem is aggravated due to the lack of appropriate and user friendly defluoridation technology. The common methods used for the removal of fluoride from drinking water are divided in the following four categories; Precipitation, Adsorption and ion exchange, Membrane filtration processes, Distillation. Several fluoride removal techniques are reported in Sri Lanka. They are using activated alumina, charcoal, brick and etc. Most methods are based on adsorption technique. However a simple cost effective technology is not available for widespread use in many affected areas. Therefore novel cost effective defluoridation method introduced. That is based on surface modification of straw ash by coating Aluminium hydroxide. Langmuir Isotherm was used to prove that the surface was evenly coated to straw ash. Straw ash was obtained by burning straw. Straw ash is an available and is an inexpensive raw material. For the defluoridation adsorption technique was used in this method. Column experiment was used to get the final results. SPADNS solution was the fluoride measuring chemical. The results showed excellent fluoride removal efficiency and the adsorption capacity is very high.