
POTENTIAL USE OF LOCALLY PRODUCED ACTIVATED CHARCOAL USING PALMYRAH FRUIT NUTS WITH ZEOLITE AND PUROLITE RESIN AS A FILTER MATERIAL FOR SELECTED WELL WATER FROM KAYTS DIVISIONAL SECRETARY DIVISION IN JAFFNA PENINSULA

K.Jeyakumar¹, T. Yathurshan^{2*}, S. Sayanthan², M.Prabhakaran³

¹ Department of Agricultural Chemistry, Faculty of Agriculture, University of Jaffna

² Department of Biosystems Technology, Faculty of Technology, University of Jaffna

³ Department of Agricultural Engineering, Faculty of Agriculture, University of Jaffna

* Yyathu956@gmail.com

Water has become a challenging limited natural resource. Jaffna Peninsula lies in the northern part of Sri Lanka is struggling to meet the water demand and quality of available water also threatened by pollutants. Jaffna peninsula consists of seven islands that are surrounded by seawater, therefore most of the time the groundwater of this area is in risky condition due to the chances of seawater intrusion in the dry season leading to groundwater quality degradation. Considering these issues a study was conducted to purify the selected well water from Kayts divisional secretary area by reducing the hardness along with other impurities using purolite resin (PR), zeolite (Z) & locally produced activated charcoal using Palmyrah fruit nuts (AC). The experiment was conducted in two factors factorial design with the factors of retention time and filter materials. Well, water was treated with different combinations of filter materials and retention time as 15 minutes, 30 minutes, and 45 minutes and non-treated water was allowed to be with the time mentioned above as a control experiment. There were three treatments with three replicates. Treatment 1 - Combination of Z + AC (17g/ L water), Treatment 2 - Combination of PR + AC (17g/ L water) Treatment 3 - Combination of Z + PR + AC (17g/ L water). The Z+ AC combination effectively changes the pH by 5.36%, reduce the turbidity by 65.98%, PR + AC combination effectively change the color by 18.8% and NaCl by 11.8%, and the Z + PR + AC combination effectively reduce the TDS by 34%, TSS by 70.8%, EC by 40.4% hardness of water by approximately 15%. The Z + PR + AC combination treatment showed higher removal efficiency than the other two treatments for hardness and other water quality parameters. It reduced the value to nearly SLS 614:2013 permissible level. The research study concludes that selected filter materials have the potential nature to purify the water by reducing the hardness and other impurities.

Keywords: Activated charcoal, Groundwater quality, Resin, Zeolite