

Effect of Catalytic Carbon on Efficiency of Chloramine Removal

A.T. Shanadi¹, S. Jayakody², A.G.A.W. Alakolange¹ and H.M.S.K. Herath¹

¹*Department of Export Agriculture, Uva Wellassa University, Sri Lanka.*

²*Haycarb PLC, Colombo 10, Sri Lanka*

Chlorine and chloramine are the famous disinfectants that are mostly used in water treatment applications. Due to adverse effects of chlorination, an increasing number of public water suppliers are moving from chlorine to chloramine and therefore, the latter has become an alternative disinfectant. Chloramine level less than 4 ppm is considered safe for drinking water. High concentration affects the quality of the water in terms of taste and smell while leading to health risks. Also, chloramine is a contaminant that is difficult to be removed at the point of use. Activated charcoal can be used as a solution for this issue. Because, the activated catalytic carbons has very high reaction kinetics for the removal of chloramines from drinking water given the high static and dynamic adsorption capacity. The objective of the present study was to find out the most efficient Haycarb catalytic carbon type for removing chloramines from drinking water. For this purpose, six different varieties of Haycarb catalytic carbon (HC/MCA/01, HC/MCA/02, HC/MCA/03, HC/MCA/04, HC/MCA/05 and HC/MCA/06) were tested feeding with 30 ppm chloramine solution under three different laboratory conditions (powder static adsorption test, granular static adsorption test and dynamic adsorption test). Adsorption capacity of the catalytic carbon was also calculated. According to the results, the sample HC/MCA/05 showed significantly ($P < 0.05$) higher chloramine adsorption capacity compared to the other five samples: powder static adsorption capacity: 491 mg g^{-1} , granule static adsorption capacity: 260 mg g^{-1} , dynamic adsorption capacity: 900 mg g^{-1} at 25 ml min^{-1} flow rate with 60s Empty Bed Contact Time. In conclusion, the sample HC/MCA/05, which is a surface modified wood based Haycarb catalytic carbon, is the best variety that can be efficiently used for removing the chloramine in drinking water.

Keywords: Chlorine, Chloramine, Activated carbon, Catalytic carbon, Drinking water