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Investigation on Ensuring Non-Drinking Water Supply During Peak Demand; A Case Study Done at Madu Church in Sri Lanka**Bandara H.R.L.C.^{1*}, Weerasekara W.B.M.L.I.¹, Weragoda S.K.¹**

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Abstract

Madu church is a one of the most important sacred religious places of Sri Lanka located in Mannar district (N 8.8550° E 80.2028°). During festival seasons over one million of devotees visit Madu Church. National Water Supply and Drainage Board is responsible to fulfil both drinking and non-drinking water demand of visitors. Drinking water is currently supplied using the tube well and non-drinking water is provided by using an intake well which is located inside the Madu tank. However unpleasant odour and brownish yellow colour was observed in source water. Therefore, it was needed to find appropriate treatment method to remove bad odour and colour from the water in order to ensure safe and clean non- drinking water supply to the devotees. Water samples were collected from surface of the intake well, 15 feet depth of the intake well, surface of the tank (outside the well) and analysed for physical and chemical parameters such as Turbidity (Tur), pH and Electrical Conductivity (EC) using portable water testing equipment. Trihalomethane (THM) concentration was measured by using Gas Chromatography (GC) system. Turbidity (NTU) of the intake well surface, 15 feet depth of intake well and surface of the tank was 3.27, 3.04 and 0.12 respectively. pH of the above locations was 7.63, 7.36 and 7.41 respectively and EC ($\mu\text{S}/\text{cm}$.) of same locations was 478, 444 and 471 respectively. And Turbidity, pH and EC of the drinking water from Tube well were observed as 0.3 NTU, 7.73 and 1036 $\mu\text{S}/\text{cm}$ respectively. It was observed that tank was fully covered with lotus (*Nelumbo nucifera*). According to the field observation, decaying of the aquatic plants was the reason for high colour and odour of the tank water. During the study, a source water sample was aerated and treated with 10 mg/l chlorine dose as a site experiment. In laboratory test it was found formation of Total Trihalomethane (TTHM) was 1085.4 $\mu\text{g}/\text{l}$ and revealed that there was high organic content in tank water. Based on the study it was found that colour and odour can be removed with simple treatment steps as pre chlorination, aeration and roughening filtration for non-drinking uses. To further reduction of THM can be done by Granular Activated Carbon (GAC) filtration. As a long term solution after removing of all aquatic plants comprehensive Catchment Management Plan shall be implemented for the Madu Tank to improve the water quality and to maintain the tank for use as drinking water source.

Keywords: Madu Church, Non- drinking water, Organic pollution, THM