Study of Manganese Accumulation and Temporal Variation of Water Quality in *Badulu Oya*

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Demand of safe drinking water is gradually increasing with rising of population in Sri Lanka as a basic need of human. *Badulu oya* is the main water source for drinking water in Badulla District, Uva province. Recently manganese (Mn) concentration in Demodara reservoir which was made for the purpose of water treatment facility year-round has increased unsteadily from the Sri Lankan Standards for drinking water (0.1 ppm). Therefore, the present study was conducted to determine Mn accumulation in the reservoir and to identify temporal variation of physico-chemical parameters of water. Sixteen locations from disparate upper tributaries and the reservoir were selected for sampling and that was carried out from October 2018 to December 2018. Manganese concentration of water samples were determined using Atomic Absorption Spectrometer and other water quality parameters; Turbidity, TDS, Alkalinity, Hardness were measured using standards methods. Data were statistically analyzed using SPSS 23.0 package. There was a significant difference of Mn concentration in the reservoir (06°54'47.0016" N, 081°03'38.0016" E) with the time ($p<0.05$) and with the location ($p<0.05$). Average Mn concentration in the reservoir (0.12 ppm) was significantly higher than the average Mn concentration of all other sampling sites (0.02 ppm). Average turbidity of the reservoir was correlated with average turbidity of all other sampling sites ($r=0.855$). Average TDS (53.25 ppm), Alkalinity (36.40 ppm), and Hardness (44.22 ppm) of reservoir were lower than the average value of all other sampling sites (60.96 ppm, 51.22 ppm, 49.77 ppm respectively). The results of this study will be helpful to take necessary actions to mitigate accumulated manganese of reservoir. Agricultural and industrial activities as mining of quarries may cause to adversely change the water quality parameters of Demodara reservoir. But more studies are needed to find out reason(s) for reservoir has higher Mn concentration.

Keywords: Drinking water, Water treatment, Physico-chemical parameters