

**STUDY OF MANGANESE ACCUMULATION AND
TEMPORAL VARIATION OF WATER QUALITY
IN BADULU OYA**

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ABSTRACT

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 and ferrous concentration of water samples and soil 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). There was a significant difference of Fe concentration in the reservoir with the time ($p < 0.05$) and with the location ($p < 0.05$). Average pH value of reservoir and average temperature of reservoir were recorded as 7.35 and 25.4°C respectively in effective time period. Nutrient composition in reservoir was increased with the beginning of wet season. High Mn and Fe concentration of soil in reservoir were recorded in soil sample of reservoir (111.1 mg/L, 584.1 mg/L respectively). 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. Manganese which present of soils in reservoir will be agitated with the time and it may be the reason for highest manganese concentration in reservoir. But more studies are needed to find out reason(s) for reservoir has higher Mn concentration.