

INVESTIGATION OF TRIHALOMETHANES FORMATION IN GREATER KANDY WATER TREATMENT PLANT AND ITS DISTRIBUTION



A dissertation submitted to the
Faculty of Science & Technology
Uva Wellassa University

In partial fulfillment of the requirements for the award of the
Degree of Bachelor of Mineral Resource and Technology

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2014

ABSTRACT

No doubt that chlorination has been successfully used for the control of water borne infections diseases for more than a century. Halogenated trihalomethanes (THMs) and haloacetic acids (HAAs) are two major classes of disinfection byproducts (DBPs) commonly found in waters disinfected with chlorine. Chlorination remains as one of the simplest and cheapest disinfection methods used in water treatment. Moreover, chlorine is unique in providing residual effect. However, it has become a questionable technique, after identifying the potential for formation of trihalomethane in chlorinated water.

The formation of the Trihalomethanes (THMs) was investigated in GWKTP and distribution system, located in the middle province of Sri Lanka, which serve drinking water to Sri Lankan population. Water samples were taken from storage tank of GWKTP of the National Water Supply and Drainage Board (NWS & DB), covering selected water quality and operational parameters that have direct influence on THM formation. In addition THM formation at the distribution extremities were also studied. The THMs were analysed using GC-ECD coupled to pre-concentrating technique. In this study investigate four major primary trihalomethanes. Such as Chloroform (CHCl_3), Bromodichloromethane (CHCl_2Br), Dibromochloromethane (CHClBr_2) and Bromoform (CHBr_3).

Initially mean TTHMs was $17.09 \mu\text{g/L}$ when the initial dose of chlorine of 1.85 mg/L . When doubling the reaction time formation of THMs were increased and finally it become $40.72 \mu\text{g/L}$ when reaction time become 64 hours. In addition, TTHMs formation in distribution system were studied in 32 samples and encountered that mean TTHMs concentration is $18.16 \mu\text{g/L}$ and range from $11.28 \mu\text{g/L}$ to $22.976 \mu\text{g/L}$. During the period of study, the observed TTHM concentrations in the investigated distribution networks were below the WHO and United States Environmental Protection Agency (USEPA) guideline value for drinking water.

Based on data collected, linear regression model was developed to predict TTHM formation at storage tanks.