

**GEOLOGICAL AND ANTHROPOGENIC
INFLUENCES ON DISTRIBUTION OF
FLUORIDE AND NITRATE IN
GROUNDWATER:
CASE STUDY IN EIGHT AREAS, SRI LANKA.**

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by

KRESHAANTH SETHURAMAN

**Mineral Resources and Technology Degree Program
Uva Wellassa University, Sri Lanka**

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Abstract

Consumption of water with excessive fluoride and nitrate in groundwater is becoming a crucial issue on human health in Sri Lanka. Dental fluorosis & Skeleton fluorosis are the major health impacts based on excessive amount of fluoride as well as hypothesis on causing chronic kidney disease (CKD), fluoride toxicity is found as a major liable cause. On the other hand the excessive usages of nitrate and unplanned disposal of wastages are increased nitrate levels significantly in many countries, including Sri Lanka. Particularly, nitrogenous compounds in groundwater for drinking have been considered as a possible risk factor for oesophageal cancer and blue baby syndrome. Having lack of understanding on the actual need of fertilizer, farmers usually tend to apply surplus amount increasing nitrogen pollution. Accordingly, this research was conducted to deepen the understanding on distribution of fluoride and nitrate in groundwater in the dry zone and geological and anthropogenic influences..

Hence, groundwater quality was analysed in eight areas which have been recognized mostly as agricultural districts in Sri Lanka; namely Anuradhapura, Puttalam, Mannar, Jaffna, Trincomalee, Nuwara Eliya, Batticaloa and Hambantota. Thirty (30) well water samples were collected from each district. The colorimetric method was used for the detection of nitrate and fluoride concentrations in the field. The field analysis results were further confirmed by analytical laboratory at Toyama Prefectural University, Japan,

Among the eight areas, Kalpitiya area was found for the most polluted groundwater by NO_3^- , ranged from (0-366) mg/L as NO_3^- . In addition, NO_3^- concentration in Anuradhapura, Jaffna and Nuwara Eliya were reported as ranging from (0- 131), (0 - 50)and (0- 76) mg/L as NO_3^- respectively. On the other hand, F^- was found highest in Anuradhapura as average 1.2 mg/L and also significant in Mannar (0.5 mg/L), Trincomalee (0.8 mg/L) and Hambantota (0.9 mg/L). The research clearly indicates the abundance of fluoride in groundwater especially in the dry zone. The major sources are fluoride bearing minerals in bedrock and soil zone. Due to the flushing by rainfall, low concentration of fluoride in groundwater is experienced in Nuwara Eliya. In addition to that, influence of agriculture, excessive nitrate levels in groundwater is apparent irrespective to climatic zones.