

**FLUORIDE AND CHLORIDE ION CONCENTRATIONS IN DRINKING WATER
DUGWELLS NEAR SUNDARAPOLA GARBAGE DUMP SITE OF
KURUNEGALA DISTRICT, SRI LANKA**

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Increasing concentrations of chloride and fluoride in drinking water are major concerns associated with garbage dump sites. This study investigated the chloride and fluoride concentrations of drinking water dug wells located downstream of the municipal solid waste dumping site at Sundarapola in Kurunegala District, bi-weekly for a five-month period. The concentrations were compared with the World Health Organization (WHO) standards. Six drinking water dug wells were selected for water quality analysis, which were located at increasing distances of 150 m, 170 m, 250 m, 400 m, 500 m, and 800 m from the dump site and compared with a control sample located at 1.2 km from the dump site. Ion Chromatography analysis was carried out to determine the concentrations of anions. The results showed a significant increase in the mean values for the anions of chloride (493.64 ppm) and fluoride (0.68 ppm), which exceeds the WHO permissible levels of 250 ppm and 0.60 ppm, respectively. From August to December 2023, the pH, temperature, conductivity and precipitation (rainfall) varied in the range 5.74 ± 0.01 - 7.38 ± 0.01 , $26 \text{ }^\circ\text{C}$ - $25.7 \text{ }^\circ\text{C}$, $2053.33 \pm 0.16 \text{ } \mu\text{S/cm}$ - $371.33 \pm 0.16 \text{ } \mu\text{S/cm}$ and 88.2 mm - 371.8 mm , respectively. The chloride concentration varied from $1378.54 \pm 123.99 \text{ ppm}$ to $90.44 \pm 40.23 \text{ ppm}$, and fluoride concentration varied from $0.80 \pm 0.09 \text{ ppm}$ to $0.60 \pm 0.10 \text{ ppm}$ with respect to $20.32 \pm 0.09 \text{ ppm}$ to $9.62 \pm 0.07 \text{ ppm}$ and $0.56 \pm 0.01 \text{ ppm}$ to $0.43 \pm 0.03 \text{ ppm}$ in control samples. Four dug wells located closer to the dump site of the six dug wells investigated have exceeded the threshold values of fluoride and chloride ion concentrations. There was no correlation between rainfall, fluoride and chloride concentrations. The community should be aware, and appropriate measures must be carried out to purify the selected dug well waters before consumption.

Keywords: Chloride, Fluoride, Leachate contamination, Water quality