

Fluoride Contamination and Effects on Crops in North 24 Parganas, West Bengal, India

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Abstract : Fluoride contamination in water and its subsequent impact on agricultural practices is a growing concern in various regions worldwide, including North 24 Parganas, West Bengal, India. This study aimed to investigate the extent of fluoride contamination in the region's water sources and evaluate its effects on crop production and quality. A comprehensive survey of water sources, including wells, ponds, and rivers, was conducted to assess the fluoride levels in North 24 Parganas. Water samples were collected and analyzed using standard methods, and the fluoride concentration was determined. The findings revealed significant fluoride contamination in the water sources, surpassing the permissible limits recommended by national and international standards. To assess the effects of fluoride contamination on crops, field experiments were carried out in selected agricultural areas. Various crops commonly cultivated in the region, such as paddy, wheat, vegetables, and fruits, were examined for their growth, yield, and nutritional quality parameters. Additionally, soil samples were collected from the study sites to analyse the fluoride levels and their potential impact on soil health. The results demonstrated the adverse effects of fluoride contamination on crop growth and yield. Reduced plant height, stunted root development, decreased biomass accumulation, and diminished crop productivity were observed in fluoride-affected areas compared to uncontaminated control sites. Furthermore, the nutritional composition of crops, including micronutrients and mineral content, was significantly altered under high fluoride exposure, leading to potential health risks for consumers. The study also assessed the impact of fluoride on soil quality and found a negative correlation between fluoride concentration and soil health indicators, such as pH, organic matter content, and nutrient availability. These findings emphasize the need for sustainable soil management practices to mitigate the harmful effects of fluoride contamination and maintain agricultural productivity. Overall, this study highlights the alarming issue of fluoride contamination in water sources and its detrimental effects on crop production and quality in North 24 Parganas, West Bengal, India. The findings underscore the urgency for implementing appropriate water treatment measures, promoting awareness among farmers and local communities, and adopting sustainable agricultural practices to mitigate fluoride contamination and safeguard the region's agricultural ecosystem.

Keywords : agricultural ecosystem, water treatment, sustainable agricultural, fluoride contamination

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