J. Soils and Crops 34 (1) 85-88, June 2024

ISSN 0971-2836 (Print
ISSN 2582-2756 (Online

FLUORIDE CONTENT IN FOOD CROPS AND DIETARY INTAKE IN A FLUORIDE - ENDEMIC AREA OF PIJDURA VILLAGE OF WARORA TEHSIL, CHANDRAPUR DISTRICT, MAHARASHTRA

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ABSTRACT

The goal of this study was to determine the fluoride (F) content in the drinking water and crops grown in the Pijdura village in Warora tehsil, district Chandrapur of Maharashtra state and dietary F intake of selected adult individuals of residing area during the year 2018. Crop samples like Wheat, Sorghum, Soybean, Red gram, Bengal gram, Tomato and Brinjal cultivated in the village area were gathered and the crop's edible portion was weighed, dried and ashed. The fluoride content of food crop and drinking water was determined by the ion selective electrode method using the powered and ashed crop samples.Twenty adult males and females were chosen for the estimation of F intake from their food which was their self-cultivated crops (Wheat, Sorghum, Soybean, Red gram, Bengal gram, Tomato and Brinjal)watered by local fluoridated ground water. Result exhibited that the F content was determined to vary in the gathered crop samples and drinking water. An examination of the diets of twenty adults was chosen and drinking water was found to have 73.02%, cereals (Wheat and Sorghum) 15.27%, 4.66% pulses (Soybean, Red gram and Bengal gram) and vegetables(Tomato and Brinjal)5.74% to the overall mean intake of F.Upon analyzing current data of this study it was concluded that F not merely enter via drinking water however with food crops cultivated in endemic area which might be responsible for these verity of fluorosis. Thus, recent techniques for water defluoridation should be implemented properly in the research area with continuous checking.

(Key words : Fluoride, crop, drinking water, pijdura, chandrapur, Maharashtra)

INTRODUCTION

Fluoride (F) is the 13th most abundant element existing in the natural environment (Tian *et al*., 2021) and one of the 12th most hazardous elements in the biosphere (Kimambo *et al*., 2019; Toolabi *et al*., 2020). Fluoride overexposure leading to endemic fluorosis is an issue with public health in India due to chronic intoxication of F (Yang *et al.,* 2000; Choubisa, 2001; Srikanth *et al.,* 2002; Binbin *et al.,* 2004). People in around 22,400 villages spread across 196 districts and 19 states in India are consuming F-contaminated water, which is more than the WHO-recommended maximum permissible value 1.5 ppm (Goswami, 2004). Approximately 62 million individuals in India are at risk, six million of them are children for endemic dental, non-skeletal and skeletal fluorosis (Carton, 2006). Water of poor quality, such as sewage and other waste water, is used to supplement irrigation demands, especially in peri-urban regions, as excellent quality water becomes increasingly rare for agriculture (Raut *et al.,* 2018). Drinking water with high fluoride content is undoubtedly the primary cause of fluorosis development (Batra *et al.,* 1995), although exposure does not come from this source alone. In addition to drinking water, food crops cultivated in F endemic area also become a source of F. Although, F absorption from food generally less than drinking water, by limiting one of the F sources, it is invalid to assume that a person's daily intake of F won't exceed a particular limit (Kewei, 1999). To estimate the retention of F in humans, it is necessary and valuable to find dietary F consumption. Many researchers have documented the pattern and pathways of F excretion related with varying F intake (Tomori *et al.,* 2004; De *et al.,* 2008).

As our previous report on physico-chemical analysis of ground water special emphasis on F concentration (Kodate *et al.,* 2016), dental fluorosis (Dhurvey and Marganwar, 2013; Marganwar *et al.,* 2013) skeletal fluorosis (Dhawas *et al.,* 2013) and nutritional status and living habit on some villages of tehsil Warora in Chandrapur district of Maharashtra (Dhurvey and Dhawas, 2014). Pijdura village been chosen as a suitable area for this study because the residents of this village drink water polluted with fluoride which contain 0.66 to 5 mg l^{-1} fluoride (Dhawas *et al.,* 2013). Moreover, it was noted that fluorosis

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