

FLUORIDE ACCUMULATION IN FOODSTUFF AND DIETARY INTAKE IN A FLUORIDE-ENDEMIC AREA OF CHANDRAPUR DISTRICT, MAHARASHTRA

V. Dhurvey^{1*}, F. Karim¹, S. Dhawas², R. Urkude³, S. Katke⁴

¹Department of Zoology, RTM Nagpur University, Nagpur-440033, MS, India

²Department of Zoology, Shivaji Science College, Nagpur, MS, India

³Department of Chemistry, Shivaji Science College, Nagpur, MS, India

⁴Department of Zoology, B.B. Science college, SGB Amravati University, Amravati, MS, India

*varshadhurvey@yahoo.com

ABSTRACT

The present research was conducted to estimate fluoride (F) accumulation in foodstuff grown in the study area, Dongergaon village of Chandrapur district, Maharashtra, India and dietary intake of F among selected people living in this study area. Food samples like cereals and pulses grown in the study area were collected, the edible portion of the food sample was weighed, dried and ashed. The powdered and ashed food samples were used for analysis of fluoride content of food samples by Ion selective electrode method. Ten males and female adults were selected for the estimation of F intake through their diet whose food source was their own cultivated cereals, pulses and vegetables irrigated by local F-contaminated ground. Result showed that the F accumulation is found to be variable in collected food samples (Wheat, Sorghum, Red gram, Soybean, Bengal gram, Red chilly, Brinjal, and Tomato). Analysis of diet of selected 20 adults revealed that drinking water contributed 72.92%, cereals 16.67%, 4.66% pulses and vegetables 5.74% to the total mean F intake.

Keywords: Fluoride, Cereals, Pulses, Vegetables, Chandrapur district, Maharashtra

Introduction

Chronic F intoxication (Fluorosis) is a worldwide health problem (Choubisa, 2011; Yang et al, 2000; Srikanth et al, 2002; Chen et al, 1997; Binbin et al, 2004; Teotia et al, 1984). Endemic fluorosis has been identified in 20 states of India (Teotia et al, 1984; Choubisa, 2001). In India, people of nearly 22,400 villages of 196 districts of 19 states are drinking F contaminated water which is above the maximum allowed concentration (MAC) of 1.5 ppm recommended by WHO (Goswami, 2004). About 62 million people, including 6 million children are at risk in India from dental, skeletal, and non-skeletal endemic fluorosis (Carton, 2006). Although the primary etiological factor for causing fluorosis is undoubtedly consumption of water containing large amount of fluoride (Das and Wahabs 1995; Batra et al, 1995) it is not only source of exposure. Apart from drinking water, food grown in endemic regions also serves as source of F. Consequently, even though F absorption from food is generally less than from water, it is not valid to assume the daily F intake of a person will not exceed a certain standard by controlling only one of the F sources (Zhi and Jinsheng 1989; Kewei, 1999). Determining dietary F intake is therefore useful and

important for estimating the retention of F in man. Pathways and patterns of F excretion associated with different intakes of F have been described by various researchers (Kalayc and Somer 2003; Tomori et al, 2004; Siebert and Trautner 1985; 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 Warora tehsil of Chandrapur district of Maharashtra (Dhurvey and Dhawas 2014). Dongergaon village (20° 19' 40" N and 78° 57' 35.7" E) was selected as an appropriate area for conducting this research because people of this village are consuming fluoride contaminated water which content 0.66 to 5mg/l fluoride (Dhawas et al, 2013) and in some areas of Warora tehsil the nutritional status and living habit (Dhurvey and Dhawas 2014) where the fluorosis has been known to be prevalent for some years (Deshmukh et al, 1995; Dev et al, 1995). The total population of Dongergaon is about 1574 with 258 households. Apart from that study, no study of F accumulation in cereals, pulses and vegetables cultivated in the study area have been reported. This research is with the view of