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NOTE

Defluoridation of Drinking Water by Tamarind Bark and its Leaves

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A simple and economic method of defluoridation of drinking water has been adopted as an adsorbent like tamarind bark and its leaves. The botanical name of tamarind is *Tamarindus indica*. It has the highest capacity of removing fluoride from drinking water.

Key Words: Defluoridation, Drinking water, Tamarind bark.

According to the Ministry of Health, Government of India, the maximum permisible limit for fluoride in drinking water[1-3] is 1.5 mg/L. Higher amount of fluoride in water can cause mottling of teeth, teeth decay, deformities in backbone and other parts of the body. In Vallioor Union 37 villages have been affected by fluorosis. People of these villages are dependent on ground water for their drinking purpose. The ground water is naturally contaminated with fluoride ion. The amount of fluoride present in the drinking water of these areas ranges from 1.4 to 6.0 ppm.

This paper describes the removal of excessive fluoride by using dry bark of *Tamarindus indica* and its leaves. This method is based on the principle of adsorption process.

Known weight of dry tamarind bark and leaves were boiled with known concentration and volume of standard solution of sodium fluoride[4] and allowed to stand for 24 h. It was filtered through Whatman No. 42 filter paper and the filtrate was used for fluoride analysis by spectrophotometer. The pH of the initial and after treatment of the solutions were measured by pH meter. The experiment was repeated by changing the weight of the adsorbents.

The experimental values are given in Table-1. The treatment of dry tamarind leaves reduced the fluoride concentration from 5 to 2 ppm, but pH of the resulting water changed from 7.59 to 6.26. But the water became pale green in colour and the smell of the water was not changed.

Under the treatment of wet tamarind leaves, it reduced the values of fluoride from 5 ppm to less than 1 ppm and pH of water changed from 7.59 to 3.76 and the water became more acidic *i.e.* 3.76. The colour of the

resulting water became green and smell of the resulting water was not much changed.

TABLE-1
DEFLUORIDATION OF DRINKING WATER BY USING TAMARIND BARK AND ITS LEAVES

Material used	Amount of material (mg)	Quantity of water (mL)	Fluoride content (ppm)		pH		Results of the use of adsorbents
			Initial	After treatment	Initial	After treatment	
Dry tamarind leaves	100	100	5	3.0	7.59	8.19	Colour of the water changed to pale green
	150	100	5	2.8	7.59	7.92	
	200	100	5	2.4	7.59	7.27	
	250	100	5	2.0	7.59	7.00	
	300	100	5	2.0	7.59	6.26	
Wet tamarind leaves	100	100	5	2.7	7.30	4.31	Colour of the water changed to green and water became acidic
	150	100	5	2.2	7.30	4.17	
	200	100	5	1.9	7.30	3.87	
	250	100	5	1.2	7.30	3.87	
	300	100	5	<1	7.30	3.76	
Wet tamarind leaves	100	100	6	3.6	7.30	4.49	Colour of the water changed to green and water became acidic
	150	100	6	3.0	7.30	4.24	
	200	100	6	2.4	7.30	4.16	
	250	100	6	1.8	7.30	4.28	
	300	100	6	1.1	7.30	3.87	
Dry tamarind bark	200	100	5	3.8	7.22	7.15	Colour of the water changed to dark brown
	200	100	6	4.6	7.22	7.10	
	200	100	7	4.1	7.22	7.14	
	200	100	8	5.2	7.22	7.10	
	200	100	9	5.8	7.22	7.14	
Dry tamarind bark	100	100	5	4.5	7.36	7.21	Colour of the water changed to brown
	100	100	6	4.0	7.36	7.21	
	100	100	7	5.0	7.36	7.21	

By the treatment of dry tamarind bark, the values of fluoride came down from 5 to 3.8 ppm and pH of water was in the range from 7.22 to 7.15 *i.e.* not much changed, but colour of the resulting water changed to brown.

Conclusion

All these experiments show better results. But the wet tamarind leaves gave the resulting water more acidic. South Indians use rice as the major diet with sambar and rasam. While using it they should add more dry tamarind fruit in view of defluoridation. Besides, another method to be followed is adding wood pieces of tamarind bark in open wells to get the maximum benefits.

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