

REMOVAL OF FLUORIDE BY USING DRUMSTICK BARK AND ITS LEAVES

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Key words : Sodium fluoride, Drumstick bark, pH meter, Spectrophotometer.

ABSTRACT

This paper deals with studies on the removal of fluoride by using bark of drumstick and its leaves. The above said adsorbents are effective defluoridating agents and therefore used in the diet through cooked leaves and its vegetables.

INTRODUCTION

In Vallioor union of Tirunelveli district, majority of the villages are dependent on ground water for their drinking purpose. But ground water is contaminated with dissolved inorganic substance which renders the water unsafe for drinking. Fluoride is one of the constituents found in ground water of these villages causing dental fluorosis and traces of skeletal fluorosis.

Small amount of fluoride (<1ppm) in drinking water helps in preventing dental carries, high amounts of fluoride cause the disease called 'Fluorosis' which is characterised by mottled teeth, stiffening of joints and hardened bones.

The removal of excessive fluoride present in drinking water by defluoridating agents is known as defluoridation. Fluoride content of natural waters can be brought down to safe limit by various methods. In the present study adsorption method has been adopted for the removal of fluoride.

EXPERIMENT

Known weight of drumstick bark and leaves were boiled separately with 100ml of standard solution of sodium fluoride. Allowed to stand for 24 hours and filtered through Whatman No. 42 filter paper. The filtrate was used for the analysis of pH and fluoride by pH meter and spectrophotometer. The experiment was repeated by changing the weight of adsorbent.

Table 1
Removal of fluoride by Drumstick bark and its leaves

Sl. No.	Material used	pH	Fluoride content (ppm)				Results of the use of adsorbents
			Amount of material	Quantity of water in mL	Initial	After treatment	
1.	Wet Drum Stick leaves	100mg	100	5	2.8	7.59	Colour of the resulting water changed to dark green and smell was also slightly changed
		150mg	100	5	2.4	7.59	
		200mg	100	5	1.9	7.59	
		250mg	100	5	<1	7.59	
		300mg	100	5	<1	7.59	
2.	Dry drum stick leaves	100mg	100	5	2.4	7.40	Colour of the resulting water changed to pale green smell was not much more changed
		150mg	100	5	2.0	7.40	
		200mg	100	5	1.4	7.40	
		250mg	100	5	<1	7.40	
		300mg	100	5	<1	7.40	
3.	Dry Drum stick bark	1g	100	5	2.2	7.30	Colour of the changed pale yellow and smell was changed
		1g	100	6	2.8	7.30	
		1g	100	7	3.4	7.30	
		1g	100	8	3.9	7.30	
		1g	100	9	4.1	7.30	
4.	Dry Drum stick bark	2g	100	5	2.0	7.30	Colour of the water was changed pale yellow and smell was also changed.
		2g	100	6	2.7	7.30	
		2g	100	7	3.1	7.30	
		2g	100	8	3.2	7.30	
		2g	100	9	3.9	7.30	

RESULTS AND DISCUSSION

The experimental values are shown in the Table 1. By the treatment of wet drumstick leaves, 5ppm of fluoride in water was reduced to less than 1ppm and pH of water changed from 7.59 to 8.02. The resulting water became dark green in colour, smell of the water was also changed.

By the treatment of dry drumstick leaves, 5ppm in the fluoride concentration of water was reduced to less than 1ppm and pH of water changed from 7.40 to 6.30. The resulting water became pale green in colour and smell of the water was not much changed.

By the treatment of dry drumstick bark, 5ppm of fluoride in water was reduced to 2.2 ppm and pH of water changed from 7.30 to 6.02. The colour of resulting water became pale yellow and water changed into unpleasant smell.

CONCLUSION

All the areas under analysis where drumsticks are used as defluoridating agent show better results. Hence people living in fluorotic areas are advisable to take drumstick leaves and vegetables in their diet. As a result the concentration of fluoride comes down and thereby fluorosis can be prevented.

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REFERENCES

- Bhakuni, T.S. 1965. Fluoride in water and its removal, Central Public Health Engineering Research Institute, Nagpur. 141.
- Instruction Manual for pH meter (VSI - Electronic Pvt. Ltd.). Instruction Manual for Digital spectrophotometer Model 30IE.
- Kudesia, V.P. 2000. *Environmental Chemistry*. Pragati Prakashan Publication, 1st Edition. 386 - 388.
- Ramamohana Rao, N.V. and Rajalakshmi, K. 1974. Endemic Fluorosis in Andhra Pradesh suggested measures for prevention and control. *Proc. of the Sym. on Fluorosis, Hyderabad*. 480.
- Saxena, M.M. 1990. *Environmental Analysis of Water, Soil and Air India*, 2nd Ed. 48 -50.
- Susheela, A.K. 2001. A treatise on fluorosis" Delhi, 101.
- Tokunaga Etal, S. 1995. Removal of fluoride ions from aqueous solutions by multivalent metal compounds. *Indian J. Environmental Studies*. 48: 1-28.
- Viswanadham, C.R., Purushottam, D., Rao, G.R., Vaidyanadham, D. and Francis, P.O. 1974. A comparative study of the various materials used for defluoridation of waters. *Sym. on Fluorosis, Hyderabad*. 218.

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