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Analysis of Fluoride Content in Coffee Available in Nagercoil Market of Kanyakumari District (Tamil Nadu)

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Fluoride is a disease caused by the excessive ingestion of fluoride. Intake of coffee is a routine affair every day for most of the population and some people have it as a diet, not as a beverage. This shows the necessity and urgency to carry out the investigation. This work involves the determination of fluoride level in whole range of the locally available coffee powder.

Fluoride is found in man's natural environment and under normal condition it is present in food, water, soil, air and vegetation. Endemic fluorosis is a form of chronic intoxication resulting from ingestion of excessive quantities of fluoride through drinking water. Enamel fluorosis of the permanent teeth results from ingestion of water containing about one ppm of fluoride and above during the first ten years of life. Mottling of teeth occurs only when fluoride is absorbed before eruption of teeth while the tissue is still developing[1].

Fluoride reduces absorption of calcium from the gut and enhances its removal from the bone[2]. The effective control and prevention of fluorosis can be achieved by providing low fluoride drinking water from ultimate sources and also by improving the nutritional status by advocating a balanced diet. Investigation suggests that intake of tea and coffee can represent a threat to health because they contain large amount of fluoride.The works carried out to determine the fluoride content in coffee are very limited, both nationally and internationally.

About seventeen varieties of coffee labelled as C1 to C12 were used for this study. Extracts were prepared in three different ways and thus the fluoride content of a particular coffee powder was determined three times. In the case of instant coffee (IC1–IC5) extract prepration is simply by dissolving the given sample in hot water, since once added to water, all the available fluoride comes into the extract. The water used for extract preparation contained practically no fluoride. The different ways adopted to prepare the extracts of coffee are as follows:

Method 1: 1 g of the sample was added to 150 mL of water and boiled for thirty minutes. The extract was filtered, cooled and then made up to 200 mL in a standard measuring flask.

Method 2: 1 g of the sample was added to 150 mL of water and boiled for five minutes. The extract was filtered, cooled and then made up to 200 mL in a standard measuring flask.

Method 3: 1 g of the sample was added to 150 mL of boiling water and stirred well. The extract was filtered at once, cooled and then made up to 200 mL in a standard measuring flask.

For instant coffee, 1 g of the sample was dissolved in 200 mL of hot water.

The concentration of fluoride was determined in parts per million (ppm) using Fluoride Meter Model CL-352. (Elico Private Ltd.).

The results are presented in Table-1. The results revealed that the concentration of fluoride was less than one ppm when the infusion was made just after boiling for most of the brands and was greater than one ppm for most of the brands when the infusion was made after 5 min.of boiling and also after $\frac{1}{2}$ h of boiling. In conclusion it is considered that when at least four cups of coffee are consumed every day, then the amount of fluoride intake by one individual ranges between 1.10 to 1.2 mg of fluoride without any doubt, even if the coffee is prepared by just boiling. So it is clear that daily intake of coffee is not desirable as it adds considerable amounts of fluoride and also because of its cumulative nature.

TABLE 1
FLOURIDE CONCENTRATION IN COFFEE INFUSION

No.	Name	F^-/200 mL in mg		
		Just after boiling	After boiling for 5 min	After boiling for 30 min
1	C1	1.3	1.9	2.1
2	C2	0.4	1.6	1.8
3	C3	0.3	1.4	1.9
4	C4	0.8	1.2	1.5
5	C5	1.1	1.3	2.0
6	C6	0.3	0.8	1.2
7	C7	1.3	1.9	2.1
8	C8	0.2	0.6	0.7
9	C9	0.3	1.0	1.4
10	C10	1.5	2.1	2.7
11	C11	1.0	1.4	2.6
12	C12	0.3	1.2	2.3

TABLE 2
FLOURIDE CONCENTRATION IN COFFEE INFUSION

No	Name	F^-/200 mL in mg
1	IC1	0.040
2	IC2	0.220
3	IC3	0.400
4	IC4	0.160
5	IC5	0.520

REFRENCES

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