

“MONITORING THE FLUORIDE CONCENTRATION IN VARIOUS TOOTH PASTE”

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Abstract :

Study reports provide a wide ranging review for the fluoride concentration in different tooth pastes. It investigates the positive and negative effects of fluoride on health. Tooth paste is used to promote oral hygiene. It is an abrasive that helps in removing dental plaque and food from the teeth, and assists in suppressing halitosis, and delivers active ingredients most commonly fluoride. It also helps to prevent tooth decay (dental carries) and gum diseases. Study reveals that the need of hour for oral health with point of view for all age groups. Fluoride concentration should be continuously investigated to ensure human safety and good health. Present investigation gives the concentration of fluoride in each separate brand.

Keywords: Plaque, Dental carries, Gum disease, Oral health.

Introduction:

Fluoride may be associated with skeletal fluorosis, Dental fluorosis however; studies with such findings are limited to naturally occurring areas where fluoride levels are extremely high and combined with indoor burning of fluoride rich coal. There are suggestions of lower overall risk of bone fracture in areas where of fluoride is below 1.1 mg/L with little or no fracture risk or decrease in bone mass density. Possibilities exist of an association with bone fracture.

Fluoride concentration is continuously and rigorously investigated to ensure human safety and for good health. Safe levels of fluoridation are advised by: EU (European Union) directive, World Health Organization, Environmental Protection Agency, United States Department of Health and Human Services.

In the first half of the century, epidemiological studies confirmed that naturally occurring fluoride in water could have a beneficial effect by reducing dental caries and also detrimental effects on dental health, fluorosis (Parnell *et al.*, 2009).

Elevated fluoride intakes can also have more serious effects on skeletal tissues. Skeletal fluorosis (with adverse changes in bone structure) may be observed. Crippling skeletal fluorosis usually develops only where drinking water contains over 10 mg of fluoride per litre (IPCS, 1984). The US EPA (1985b) considers a concentration of 4 mg/litre to be protective against crippling skeletal fluorosis. The relation between exposure and response for adverse effects in bone has been considered by IPCS (2002). Peterson P.E., Lennon M.A., 2004.

Under this study we observed and assess fluoride concentration in tooth paste for healthy life.

Experimental work:

Collection of branded toothpaste:

Select 5 different brands of toothpaste for this study are as follows:

1. Babool
2. Colgate
3. Colgate Cibaca
4. Pepsodent
5. Amway glister

Procedure for preparing of fluoride toothpaste solution:

1. Babool :

Take 1 gm Babool tooth paste in beaker. Then take 100 ml distilled water in measuring cylinder. Add 100 ml distilled water in beaker of toothpaste. Continue stirrer with glass rod for dissolve toothpaste in distilled water. From this solution take 1 ml for the observation of fluoride on Spectrophotometer. Take absorbance on Spectrophotometer on 570 nm.

2. Colgate :

Take 1 gm Colgate tooth paste in beaker. Then take 100 ml distilled water in measuring cylinder. Add 100 ml distilled water in beaker of toothpaste. Continue stirrer with glass rod for dissolve toothpaste in distilled water. From this solution take 1 ml for the observation of fluoride on Spectrophotometer. Take absorbance on Spectrophotometer on 570 nm.

3. Colgate Cibaca :

Take 1 gm Colgate Cibaca tooth paste in beaker. Then take 100 ml distilled water in measuring cylinder. Add 100 ml distilled water in beaker of toothpaste. Continue stirrer with glass rod for dissolve toothpaste in distilled water. From this solution take 1 ml for the observation of fluoride on Spectrophotometer. Take absorbance on Spectrophotometer on 570 nm.

4. Pepsodent :

Take 1 gm Pepsodent tooth paste in beaker. Then take 100 ml distilled water in measuring cylinder. Add 100 ml distilled water in beaker of toothpaste. Continue stirrer with glass rod for dissolve toothpaste in distilled water. From this solution take 1 ml for the observation of fluoride on Spectrophotometer. Take absorbance on Spectrophotometer on 570 nm.

5. Amway glister :

Take 1 gm Amway glister tooth paste in beaker. Then take 100 ml distilled water in measuring cylinder. Add 100 ml distilled water in beaker of toothpaste. Continue stirrer with glass rod for dissolve toothpaste in distilled water. From this solution take 1 ml for the observation of fluoride on Spectrophotometer. Take absorbance on Spectrophotometer on 570 nm.

The results finding by calibration curve by plotting graph on graph paper. (Concentration of fluoride in mg/lit on x-axis and absorbance on y-axis)

Result and discussion:**Result:**

The main objective of this project is aimed Assessment and Monitoring of Fluoride (F) concentration in various toothpastes. In this work we select five brand of toothpaste. The name of these branded toothpaste are as follows:

1. Babool 2. Colgate 3. Colgate Cibaca 4. Pepsodent 5. Amway glister

All the results are find out by preparing standard calibration curve in the range of 0.0 to 1.4 mg/lit by diluting appropriate volume of standard fluoride solution in Nessler Tubes by SPANDS method. The results and findings are in Table-1, Table-2 & Table-3. Comparative results of fluoride concentration are shown in following Graph.

Table 1: For ph

Sr. No.	Brand of Tooth Paste	pH
1.	Babool	9.5
2.	Colgate	9.5
3.	Colgate cibaca	9
4.	Pepsodent	8.38
5.	Amway glister	8.9

1. pH in Babool tooth paste is found to be 9.5 i.e. it is alkaline in nature from table 1.

2. pH in Colgate tooth paste is found to be 9.5 i.e. it is alkaline in nature from table 1.

3. pH in Colgate Cibaca tooth paste is found to be 9.0 i.e. it is alkaline in nature from table 1.

4. pH in Pepsodent tooth paste is found to be 8.38 i.e. it is alkaline in nature from table 1.

5. pH in Amway glister tooth paste is found to be 8.9 i.e. it is alkaline in nature from table 1.

All brands are alkaline in nature so it is good for health.

Table 2: Observation table for standard calibration curve:

Sr. no	Concentration (mg/lit) Fluoride	Absorbance
1	0.2	1.32
2	0.4	1.34
3	0.6	0.85
4	0.8	1.10
5	1.0	1.42
6	1.2	1.35
7	1.4	1.31

Table 3: Observations for branded tooth paste:

Sr. No.	Brand of toothpaste	Absorbance	Concentration	Concentration of fluoride in various tooth paste for 200 gm tooth paste tube	WHO recommended for fluoride in tooth paste 1000 ppm to 1500ppm
1	Babool	1.38	0.97 mg/lit	194 g/lit	
2	Colgate	1.31	0.92 mg/lit	184 g/lit	
3	Colgate Cibaca	1.28	0.90 mg/lit	180 g/lit	
4	Pepsodent	1.24	0.87 mg/lit	174 g/lit	
5	Amway glister	1.28	0.90 mg/lit	180 g/lit	

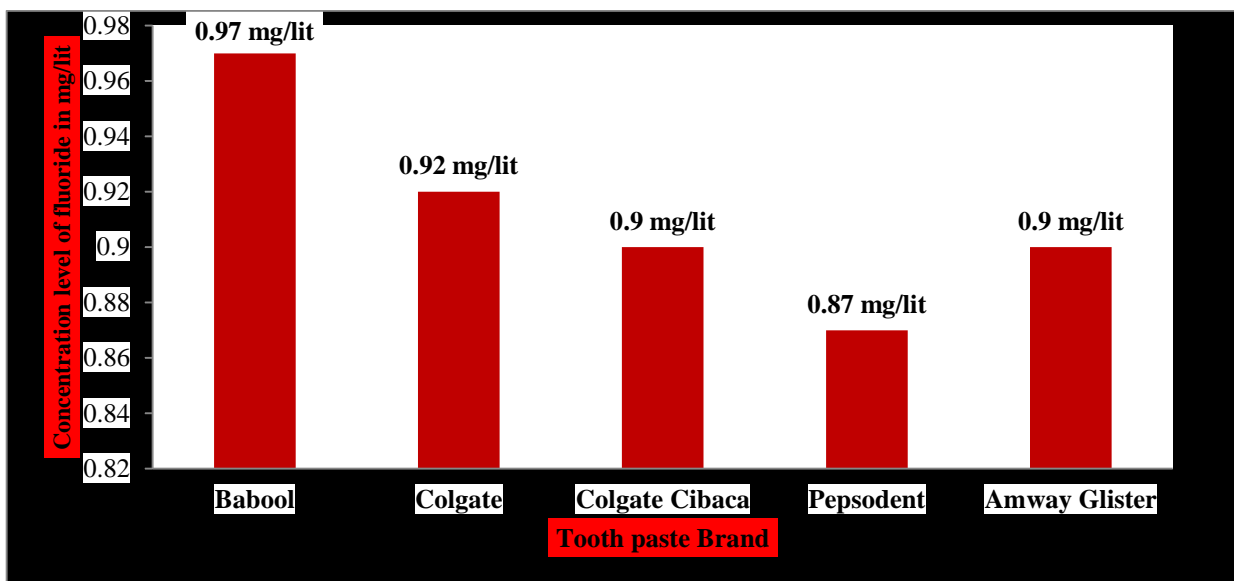


Fig: Graphical comparison of fluoride concentration of branded tooth paste

1. Fluoride concentration in **Babool tooth paste** is found to be **0.97 mg/lit.** from standard calibration curve of fluoride and shown in Fig. (Table-2 & Table-3)
2. Fluoride concentration in **Colgate tooth paste** is found to be **0.92mg/lit.** from standard calibration curve of fluoride and shown in Fig. (Table-2 & Table-3)
3. Fluoride concentration in **Colgate Cibaca tooth paste** is found to be **0.90mg/lit.** from standard calibration curve of fluoride and shown in Fig. (Table-2 & Table-3)
4. Fluoride concentration in **Pepsodent tooth paste** is found to be **0.87mg/lit.** from standard calibration curve of fluoride and shown in Fig. (Table-2 & Table-3)
5. Fluoride concentration in **Amway glister tooth paste** is found to be **0.90mg/lit.** from standard calibration curve of fluoride and shown in Fig. (Table-2 & Table-3)

Discussion:

The manner in which fluoride toothpaste is used has an important influence on its effectiveness in caries prevention. The primary function of fluoride toothpaste is to bring the fluoride ion into contact with enamel, dental plaque and in the case of adults, exposed root dentine.

Several recent studies have been shown that frequency of use of fluoride toothpaste is inversely related to caries incidence and the method of rinsing (fluoride) base with water following brushing has also been shown to affect caries inhibition. (Pamella and O. Mullane, 2013).

So the use of fluoride based toothpaste is a public health measures and as a awareness purpose everyone should be encouraged to brush daily with a fluoride toothpaste is positively related to caries prevention in every person.

From the public point of view we take this consideration for study point of view taken this into consideration we select 5 branded toothpaste i.e., mouth fresh toothpaste for study point of view.

Selected toothpaste was commonly used in our country from lower class to higher class public i.e., general public.

All observed values was compared with standard WHO recommended fluoride values i.e. 1000 ppm in 200 gm toothpaste tube for all aged groups (public) as a oral health point of view. The observation was in following way.

1. Babool toothpaste:

In Babool toothpaste the observed value was 0.97 mg/lit (ppm) in 1 gm toothpaste. The fluoride concentration in 200 gm toothpaste i.e., Babool was 194 mg/lit (ppm) and the recommended value was 1000 ppm. Marinho *et al.*, 2004

2. Colgate toothpaste:

Colgate toothpaste commonly used in our country India and more in demand. Common people used this toothpaste as a mouth freshener so this is also selected for study point of view. The more demanded toothpaste fluoride value (concentration in ppm) is 0.92 mg/lit in 1 gm toothpaste. Then we calculated and observed in 200 gm toothpaste. The fluoride concentration in 200 gm Colgate toothpaste was 180 mg/lit. Twetman *et al.*, 2003

3. Colgate Cibaca toothpaste:

In this study we observed in 1 gm toothpaste the fluoride concentration was 0.90 mg/lit (ppm) from graph 1 observation table B and fig then observed and calculated the level and concentration a fluoride in 200gm toothpaste tube of cibaca brand was 180 mg/lit. Richards *et al.*, 1992

4. Pepsodent toothpaste:

This brand was also in demand for mouth fresh common public also selected and used for oral freshness. The observed concentration of fluoride in Pepsodent was 0.87 ppm (mg/lit). Then calculated in 200 gm toothpaste tube was 174 mg/lit (ppm) and compared with standard WHO value of fluoride i.e., 1000 ppm. It was low in 200 gm toothpaste. Baysan *et al.*, 2001

5. Amway glister toothpaste:

This toothpaste is very famous and used in higher class society. The observed fluoride concentration in 1 gm was 0.90 ppm (mg/lit) by graph observation table-3 and in 200 gm toothpaste it is 180 mg/lit (ppm) its also show low concentration of fluoride in this brand. From the above observations it was state that the concentration of fluoride in all branded toothpaste level was low when compared with standard WHO Levels (1000ppm) behind 200 gm toothpaste for all age group people. Downer,2007.

The results were compared within brand of tooth paste are shown in graph. The concentration of fluoride in Pepsodent is 0.87 ppm in 200 gm toothpaste tube. 174ppm concentration was found in Pepsodent tooth paste tube i.e., very low concentration as compared to other thooth paste. The recommended WHO level for fluoride in tooth paste is 1000 to 1500 ppm. Higher concentration level of fluoride was in Babool toothpaste i.e., 194 ppm was good as compared to other tooth paste. (Graphical representation and observations in Table-3). Mullane, R. J. Bred, 2016.

Conclusion:

Fluoride toothpaste are a highly effective means of caries control, improving oral health, the proper level or concentration of fluoride in toothpaste can prevent dental problems and other effects on gums, etc.

The fluoride estimation in toothpaste was the need of hour for oral health point of view for all. The above study and the overall observation are observed in low fluoride concentration so it was suggested to increase the frequency of using fluoride toothpaste brushing and rinsing teeth minimum 3 times in 24 hrs. for all age group peoples. Applied more amount of tooth paste on the brush also increases the fluoride recovery in saliva (Olga Jensen, 2013) and preventing dental caries.

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