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Determination of the Beneficial and Harmful Ions in Commercially available Toothpaste for Kids of 2-6 Years Age Qualitatively

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Abstract: Tooth paste is primarily used to maintain the aesthetics of oral health. Majority of tooth paste are safe to use but they might contain fluorides and lead which show toxicity specially in kids. Keeping in view participation of undergraduate students in this project the qualitative analysis of some of the ions which are beneficial for oral health and the ions which are hazardous for young children of age group 2-6 years is performed.

Keywords: Qualitative analysis, Hazardous, Kids Oral health, Fluorides, Lead.

I. INTRODUCTION

Commercially tooth paste is available in two forms Paste and Gel. It is used to prevent Tooth decay and also maintains the Gum health. Generally, tooth paste should contain Calcium, Phosphate, Sulphate ions. But to increase the efficiency Fluoride ions are added which is hazardous for kids if ingested. Some tooth paste might contain Lead which is toxic. Therefore the qualitative analysis of the tooth paste samples available commercially is carried out. This analysis gives an idea about the different ions present in the tooth paste samples taken.

A. Significance

- 1) Very less amount of sample is used to carryout the Qualitative analysis.
- 2) Reagents used are non hazardous.
- 3) Effluents of the test were discarded after neutralization.
- 4) Beneficial ions like calcium and phosphate are analysed qualitatively.
- 5) Hazardous ions like lead and fluoride are analysed too.

pH	TEST	OBSERVATION	INFERENCE
Colgate (2-5 years) kids	Toothpaste solution + pH strip	Change in colour occurs and reading reaches to 7.5	More alkaline
Dentoshine (upto 6 years) kids	Toothpaste solution + pH strip	Change in colour occurs and reading reaches to 7	Neither acid nor base(neutral)

B. Methodology: Some of the commercially available tooth paste for kids 2-6 years of age are analyzed

TEST FOR CALCIUM	TEST	OBSERVATION	INFERENCE
Colgate (2-5 years) kids	Toothpaste solution + $\text{NH}_4\text{Cl} + (\text{NH}_4)_2\text{CO}_3$.warm and keep aside for 5 minutes Add $(\text{NH}_4)_2\text{C}_2\text{O}_4$	Brick red colour is absent	Ca^{+2} ion absent
Dentoshine (upto 6 years) kids	Toothpaste solution + $\text{NH}_4\text{Cl} + (\text{NH}_4)_2\text{CO}_3$.warm and keep aside for 5 minutes Add $(\text{NH}_4)_2\text{C}_2\text{O}_4$	Brick red colour is present	Ca^{+2} ion present

TEST FOR FLUORIDE	TEST	OBSERVATION	INFERENCE
Colgate (2-5 years) kids	Sand + Dil. H_2SO_4 + toothpaste heat expose a glass rod dipped in distilled water near mouth of test tube	More waxy layer	F^- ion is present
Dentoshine (upto 6 years) kids	Sand + Dil. H_2SO_4 + toothpaste heat expose a glass rod dipped in distilled water near mouth of test tube	Very less waxy layer	F^- ion is present

TEST FOR PHOSPHATE	TEST	OBSERVATION	INFERENCE
Colgate (2-5 years) kids	A. Toothpaste solution + NH_4OH + NH_4Cl + (Mg mix)	White ppt	PO_4^{3-} ion suspected
	B. Toothpaste + Conc. HNO_3 Partial heat + $(NH_4)_6Mo_7O_{24}$	Canary yellow ppt	PO_4^{3-} ion confirmed
Dentoshine(upto 6 years) kids	A. Toothpaste solution + NH_4OH + NH_4Cl + (Mg mix)	White ppt	PO_4^{3-} ion suspected
	B. Toothpaste + Conc. HNO_3 Partial heat + $(NH_4)_6Mo_7O_{24}$	Canary yellow ppt	PO_4^{3-} ion confirmed

TEST FOR LEAD	TEST	OBSERVATION	INFERENCE
Colgate (2-5 years) kids	Toothpaste + drops of H_2O + add KI	No ppt	Pb^{+2} ion absent
Dentoshine (upto 6 years) kids	Toothpaste + drops of H_2O + add KI	No ppt	Pb^{+2} ion absent

II. SUMMARY AND CONCLUSION

The qualitative analysis performed gives us a fair idea about the efficacy of the tooth paste samples taken. A tooth paste having pH neutrality is considered beneficial therefore Dentoshine holds a better chance in maintaining oral hygiene in kids. Beneficial ions like Ca^{+2} and PO_4^{3-} are present in both the samples. Whereas the waxy coating found in Colgate was comparatively more than in Dentoshine indicating higher concentration of F^- in Colgate sample. Considering all the parameters Dentoshine is found to contain all the beneficial ions and very less amount of toxic ions.

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