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Dadasaheb Jotiram Godse Arts,Commerce,Science Collage Vaduj

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Department Of Chemistry
(B.Sc. III)

Project Name

Identification of Ions

Present In ToothpasteAnd

Determine the Quality

Under the Guidance of

Miss. Nandgaonkar P.S

Submitted By

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2) Harale Aashish Rajendra
3)Chavan Sohan Subhashchandra

CERTIFICATE

This is to certify that **Ingale Mayur Subhash, Harale Ashish Rajendra, Chavan Sohan Subhashchandra** of class **T.Y.BSc** has successfully completed his investigatorory project on the topic "**Identification of Ions Present In Toothpaste And Determine the Quality**" during academic year **2022-23**.

This project is absolutely genuine and does not indulge in plagiarism of any kind. The references taken in making this project have been mentioned at this project.

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Dadasaheb Jotiram Godse Arts,Commerce & Science Collage Vaduj

"Identification of Ions Present In Toothpaste And Determine the Quality"

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Ingale Mayur Subhash

Harale Ashish Rajendra

Chavan Sohan Subhashchandra

Introduction

There's a wide variety of toothpastes and related products available today in the market for oral hygiene. However, for a common man, differentiation on the basis of quality is really difficult with all the fancy advertisements and offers. A toothpaste contains a mildly abrasive substance such as calcium carbonate and a detergent or soap, some sweetening agent other than sugar and flavouring oils to make it pleasant to taste and smell. Some toothpastes contains fluorides which make the enamel surface of the tooth more resistant to bacterial activity and act against microorganisms as a metabolic poison. Generally any standard toothpaste contain calcium carbonate, sodium monofluoro phosphate, sodium lauryl sulphate, zinc sulphate, alum, some flavouring oils are also added.

This project basically deals with the detection of various ions in toothpaste that determine its quality, and thus, a comparison between the prominent toothpaste brands.

AIM

TO DETECT THE PRESENCE OF DIFFERENT ANIONS AND CATIONS IN DIFFERENT BRANDS OF TOOTHPASTE AND DETERMINE IT'S QUALITY.

Theory

In qualitative analysis, the given compound is analyzed for the radicals, that is, cations and anions that it contains. The common procedure of testing on unknown salt is to make its solution and then test this solution for the ions present in it. Then Preliminary tests such as color, odour, dry heating, flame test etc. are performed. These tests are common for all samples under salt analysis. Further, there are separate procedures for detecting cations and anions.

IDENTIFICATION OF ACID RADICAL (ANION)

After the preliminary tests are over with, to identify the anion, three indicatory tests are carried out. They can be divided in to three categories each with separate group reagent. Therefore anion may be identified by performing the following tests in the order given. Dilute H_2SO_4 test Concentrated H SO_4 test Independent Group (SO_4^{2-}, PO_4^{3-}) After an anion is indicated, confirmatory tests are carried out, corresponding to the anion.

IDENTIFICATION OF BASIC RADICALS (CATION)

To identify the cations, we have been using the flame test (a preliminary test) for indication. Whichever cation is indicated, it is confirmed on the basis of corresponding tests.

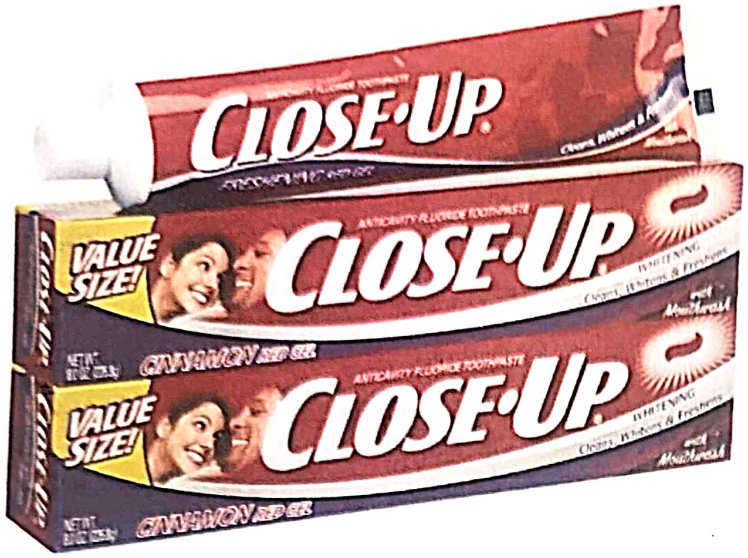
Requirements

Toothpaste(s):

Colgate, Close-UP.

Chemicals:

Hydrochloric acid, dilute Sulphuric acid, concentrated Sulphuric acid, Barium chloride, Ammonium chloride, Ammonium hydroxide, Ammonium carbonate, Acetic acid, Nitric acid, Silver nitrate, Calcium chloride, Pottasium Ferrocyanide, H_2S gas. Test tubes, Beakers, Flasks, flame, spatula etc.


CLOSE-UP
VALUE SIZE!
CLOSE-UP
CLOSE-UP
VALUE SIZE!
CLOSE-UP

Close-Up


MESWAK
Pepsodent
Pepsodent
DANT KANTI
DANT KANTI
Colgate
Cavity Protection
Colgate
Cavity Protection
close-up
DEEP ACTION
SENSODYNE
REPAIR
Dabur
RED
Dabur
RED

Tests for different samples

COLGATE

TEST FOR ANION

S.NO.	EXPERIMENT	OBSERVATION	INFERENCE
1	Preliminary Tests		
	Colour	White	
	Odour	Minty smell(of Colgate)	
	Dry heating	Colourless, Odourless gas.	CO_3^{2-} may be Present
	Flame test	Reddish Flame	Ca^{2+} may be Present.
2	Dil H_2SO_4 test- To the sample, Added some drops Of Dil H_2SO_4	Colourless, Odourless gas.	CO_3^{2-} may be Present.
3	Confirmatory Tests		
	To the sample Added $MgSO_4$ Solution.	A white ppt	CO_3^{2-} confirmed
	Took an O.S, Added dil HCl	Brisk Effervescence.	CO_3^{2-} confirmed
4	Conc. H_2SO_4 test- To the sample added some drops of conc.H_2SO_4	No change	Conc. H_2SO_4 group absent
5	Independent Tests		
	For SO_4^{2-}		
	To the sample	White ppt.	SO_4^{2-}

	added $BaCl_2$ solution.		confirmed
	To the sample added Lead acetate soln.	White ppt.	SO_4^{2-} confirmed
	For PO_4^{3-}		
	Added conc HNO_3 to O.S and boiled. Added ammonium Molybdate soln in excess and again boiled.	Deep yellow colouration.	PO_4^{3-} confirmed.

TEST FOR CATION

S.NO.	EXPERIMENT	OBSERVATION	INFERENCE
6	Group 0- To the sample added NaOH and heated	No change	Group 0 Absent
7	Group-1 To the sample added dilute HCl	No change	Group I absent
8	Group-II To the above test tube added H_2S	No change	Group II Absent
9	Group-III To the sample added NH_4Cl, boiled, cooled, added NH_4OH in excess.	No change	Group III Absent

10	To the above filtrate of group-III added add H_2S	No change	Group IV Absent
11	Group-V To the sample added NH4OH, and $(NH_4)_2CO_3$ Solution.	A white ppt	Group V Present.
	Dissolved the ppt. in CH_3COOH and divided the solution into 3 Parts.		
(a)	To the first part added K_2CrO_4solution	No change	Ba^{2+}absent
(b)	To the second part added $(NH_4)_2SO_4$	No change	Sr^{2+}absent
(c)	To the third part added $(NH_4)_2C_2O_4$ and NH_4OH sol.	A white ppt	Ca^{2+}confirmed.
13	Group-VI Took the filtrate of above step and added a few drops of amm. oxalate solution, boiled, filtered. Took the ppt, boiled, added NH_4OH and NH_4Cl in excess. Add $(NH_4)_2HPO_4$ and	A white ppt	Mg^{2+} confirmed

	rubbed with a glass rod.		

IONS PRESENT: CO_3^{2-}, Ca^{2+}, SO_4^{2-}, PO_4^{3-}, Mg^{2+}

CLOSE-UP

TEST FOR ANION

S.NO.	EXPERIMENT	OBSERVATION	INFERENCE
1	Preliminary Tests		
	Colour	Red	
	Odour	Menthol smell of Close up.	
	Dry heating	Suffocating smell	SO_3^{2-} may be Present
	Flame test	Reddish Flame	Ca^{2+} may be Present.
2	Dil H_2SO_4 test- To the sample, Added some drops Of Dil H_2SO_4	Colourless, pungent smell, turned acidified $K_2Cr_2O_7$ solution green.	SO_3^{2-} may be Present.
3	Confirmatory Tests		
	To the O.S added $BaCl_2$ solution.	A white ppt	SO_3^{2-} confirmed
	To the ppt from above step added $KMnO_4$ solution.	Pink colour discharge	SO_3^{2-} confirmed
4	Conc. H_2SO_4 test- To the sample added some drops of conc.H_2SO_4	No change	Conc. H_2SO_4 group absent

TEST FOR CATION

S.NO.	EXPERIMENT	OBSERVATION	INFERENCE
5	Group 0- To the sample added NaOH and heated	No change	Group 0 Absent
6	Group-1 To the sample added dilute HCl	No change	Group I absent
7	Group-II To the above test tube added H_2S	No change	Group II Absent
8	Group-III To the sample added NH_4OH and NH_4Cl	A brown ppt	Group III Present, Fe^{3+} detected
	Dissolved the ppt. in dilute HCl and added Potassium Ferrocyanide.	prussian blue colour	Fe3+ confirmed
9	Group-IV To the above test tube add H_2S	No change	Group IV Absent
10	Group-V To the sample added NH4OH, and $(NH_4)_2CO_3$ sol.	A white ppt	Group V present.
	Dissolved the ppt. in CH_3COOH and divided the		

	solution into 3 parts.		
(a)	To the first part added K_2CrO_4 solution	No change	Ba^{2+} absent
(b)	To the second part added$(NH_4)_2SO_4$	No change	Sr^{2+} absent
(c)	To the third part added $(NH_4)_2C_2O_4$ and NH_4OH sol.	A white ppt	Ca^{2+}confirmed.
13	Group-VI Took the filtrate of above step and add a few drops of amm. oxalate sol, boiled, filtered .Took the ppt, boiled, added NH_4OH and NH_4Cl in excess. Add $(NH_4)_2HPO_4$ and rubbed with a glass rod.	No change	Mg^{2+} absent

IONS PRESENT: Ca^{2+}, SO_3^{2-}, Fe^{3+}.

Conclusion

Comparative Inference Table

TOOTHPASTE	$2+$	SO_3^{2-}	$3+$	$2+$	SO_4^{2-}	CO_3^{2-}	PO_4^{2-}
Colgate	YES	NO	NO	YES	YES	YES	YES
Close-Up	YES	YES	YES	NO	NO	NO	NO

On the basis of the comparative inference table, we see that COLGATE is the best of all toothpastes as it contains a majority of the essential constituents (anions and cations) of a toothpaste.

Precautions

1. Handle the chemicals carefully.
2. Use test tube holder to hold the test tube.
3. Never add water to conc. Acids.
4. Never touch any chemical with hands directly.
5. Use a dropper for concentrated Acids.
6. Don't smell the vapours from too close.

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