



STUDENT STUDY PROJECT

2019-2020



Title of the project: TO CHECK THE IONS PRESENT IN THE TOOTHPASTE AND DETERMINE THE QUALITY

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TO CHECK THE IONS PRESENT IN THE TOOTHPASTE AND DETERMINE THE QUALITY.

Theory

Every tooth paste contains the following ingredients: binders, abrasives, subsers, humectants, flavors, sweeteners, fluorides, tooth whiteners, a preservative and water. Binders thicken toothpaste- they prevent separation of the solid and liquid component, especially storage. They also affect the speed and volume of foam production, rate of flavor release and product dispersal, the appearance of toothpaste ribbon on the toothbrush. Some binders are gum solid alignate, methyl cellulose, carrageen and magnesium aluminum silicate.

Colour of the Paste-

EXPERIMENT	OBSERVATION	INFERENCE
Take a part of the solution and add MgSO ₄ solution.	Formation of white ppt.	CO ₃ confirmed
Take a part of the solution and add ammonium hydroxide(1-2 ml)	Formation of white ppt.	Ca confirmed
Take a part of solution and add magnesium mixture	Formation of white ppt.	PO ₄ confirmed.
(mixture of NH ₄ Cl and NH ₄ OH)		
Acidify a portion of aqueous solution with dilute HNO ₃ . Boil and cool and add AgNO ₃ .	A yellow ppt. is formed which is insoluble in NH ₄ OH	I is confirmed
Take a small quantity of solution and add oxalic acid	Smells like that of vinegar	CH ₃ COO absent
Prepare the paste of it with a few drops of water rub and smell.		
To one part of the solution add KI	No reaction	Pb absent
To one part of the solution and add solid NH ₄ Cl and NH ₄ OH in slight excess and then add ammonium phosphate	A white ppt is formed	Mg present

Chemical Reaction

- $\text{CO}_3 + \text{MgSO}_4 \rightarrow \text{MgCO}_3 + \text{SO}_4$ (white ppt.)
- $\text{CO}_3 + 2\text{CH}_3\text{COOH} \rightarrow (\text{CH}_3\text{COO})_2\text{Ca} + \text{H}_2\text{O}$
 $(\text{CH}_3\text{COO})_2\text{Ca} + (\text{NH}_4)_2\text{C}_2\text{O}_4 \rightarrow 2\text{CH}_3\text{COONH}_4 + \text{CaC}_2\text{O}_4$
- $\text{NaHPO}_4 + \text{MgCl}_2 + \text{NH}_4\text{OH} \rightarrow \text{Mg}(\text{NH}_4)\text{PO}_4 + 2\text{NaCl} + \text{H}_2\text{O}$

4. $I + AgNO_3 \rightarrow NO_3 + AgI$ (yellow ppt.)
5. $(COOH)_2 + 2CH_3COONa \rightarrow$ NO REACTION
6. $Pb + 2KI \rightarrow$ NO REACTION
7. $MgCl_2 + NH_4OH + (NH_3)_2HPO_4 \rightarrow Mg(NH_4)PO_4 + 2NH_4 + H_2O$

Test on Colgate

Colour of the Paste- White

EXPERIMENT	OBSERVATION	INFERENCE
Take a part of the solution and add $MgSO_4$ solution.	Formation of white ppt.	CO_3 confirmed
Take a part of solution and add ammonium hydroxide.	Formation of white ppt	Ca confirmed
Take a part of solution and add magnesia mixture(mixture of NH_2Cl and NH_4OH) and allow to stand	Formation of white ppt	PO_4 confirmed.
Acidify a portion of aqueous solution with dilute HCl . Boil and cool and add $AgNO_3$.	A yellow ppt. is formed which is insoluble in NH_4OH	I confirmed.
Take a small quantity of solution and add oxalic acid	Smell like that of vinegar	CH_3COO absent
Prepare the paste of it with few drops of water rub and smell		
Take one part of solution	No reaction	Pb absent
To one part of the solution and add solid NH_4Cl and NH_4OH in slight excess then add ammonium phosphate.	A white ppt. is formed.	Mg absent

IONS PRESENT: - Mg, I, PO_4 , Ca, CO_3

Chemical Reactions

1. $CO_3 + MgSO_4 \rightarrow MgCO_3 + SO$ (white ppt.)
2. $CO_3 + 2CH_3COOH \rightarrow (CH_3COO)_2Ca + H_2O$
 $(CH_3COO)_2Ca + (NH_4)_2C_2O_4 \rightarrow 2CHCOONH_4 + CaC_2O_4$
3. $NaHPO_4 + MgCl_2 + NH_4OH \rightarrow Mg(NH_4)PO_4 + 2NaCl + H_2O$
4. $I + AgNO_3 \rightarrow NO_3 + AgI$ (yellow ppt.)
5. $(COOH)_2 + 2CH_3COONa \rightarrow$ NO REACTION

6. $\text{Pb} + 2\text{KI} \rightarrow \text{NO REACTION}$

7. $\text{MgCl}_2 + \text{NH}_4\text{OH} + (\text{NH}_3)_2\text{HPO}_4 \rightarrow \text{Mg}(\text{NH}_4)\text{PO}_4 + 2\text{NH}_4 + \text{H}_2\text{O}$

Test on Close Up

Colour of the Paste- Red Gel

EXPERIMENT	OBSERVATION	INFERENCE
Take a part of the solution and add MgSO_4 solution.	Formation of white ppt.	CO_3 confirmed.
Take a part of solution and add ammonium oxalic(1-2 ml) and add little ammonium hydroxide	Formation of white ppt.	Ca confirmed.
Take a part of solution and add magnesia mixture(mixture of NH_2Cl and NH_4OH) and allow to stand	Formation of white ppt.	PO_4 confirmed
Acidify a portion of aqueous solution with dilute HNO_3 . Boil and cool and add AgNO_3 .	Formation of white ppt.	I is confirmed
Take a small quantity of solution and add KI	Formation of white ppt.	CH_3COO confirmed
To one part of the solution add KI	Formation of white ppt.	Pb is absent
To one part of the solution add solid NH_4Cl and add NH_4OH in slight excess then add ammonium phosphate.	Formation of white ppt.	Mg is absent

IONS PRESENT: - Mg, I, PO_4 , Ca, CO_3 , CH_3COO

Chemical Reactions:

- $\text{CO}_3 + \text{MgSO}_4 \rightarrow \text{MgCO}_3 + \text{SO}_4$ (white ppt.)
- $\text{CO}_3 + 2\text{CH}_3\text{COOH} \rightarrow (\text{CH}_3\text{COO})_2\text{Ca} + \text{H}_2\text{O}$
 $(\text{CH}_3\text{COO})_2\text{Ca} + (\text{NH}_4)_2\text{C}_2\text{O}_4 \rightarrow 2\text{CH}_3\text{COONH}_4 + \text{CaC}_2\text{O}_4$
- $\text{NaHPO}_4 + \text{MgCl}_2 + \text{NH}_4\text{OH} \rightarrow \text{Mg}(\text{NH}_4)\text{PO}_4 + 2\text{NaCl} + \text{H}_2\text{O}$
- $\text{I} + \text{AgNO}_3 \rightarrow \text{NO}_3 + \text{AgI}$ (yellow ppt.)
- $(\text{COOH})_2 + 2\text{CH}_3\text{COONa} \rightarrow \text{NO REACTION}$
- $\text{Pb} + 2\text{KI} \rightarrow \text{NO REACTION}$

7. $\text{MgCl}_2 + \text{NH}_4\text{OH} + (\text{NH}_3)_2\text{HPO}_4 \rightarrow \text{Mg}(\text{NH}_4)\text{PO}_4 + 2\text{NH}_4 + \text{H}_2\text{O}$

Conclusion

Hence after testing different samples of toothpaste, we find that Colgate has all necessary for stronger and whiter teeth.