

A Comparative Study of Toothpaste Available in Same Brand: A Physio-Chemical Analysis

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Abstract

Toothpaste is a paste or gel useful to maintain dental health and preventing dental disease like cavities and promote oral hygiene it is an abrasive that aids in removing dental plaque and food from the teeth, assists in suppressing halitosis. It contains surfactants and active ingredients (most commonly fluoride) to help prevent tooth decay (dental caries) and gum disease (gingivitis). Large amounts of swallowed toothpaste can be toxic. Objective of this work is to perform the comparative study of three different toothpastes of the same brand which are available in local market and evaluate physical and chemical parameters. Different methodologies have been used for this work. We evaluate pH values, wetting property, foaming index, total solid content and their smell.

Keywords: Toothpaste, Physico chemical analysis, Total solid content

INTRODUCTION

Dental care needs more attention because of bad care of tooth may cause, tooth decay, bad breath, tooth sensitivity, periodontal gum disease and dental caries arise from microbial activity of Buccal cavity [1,9]. At present, the most common diseases in the world is dental caries. Causative organism who are responsible for dental caries is Streptococcus mutan. It convert carbohydrates to acid after that this acid combine with saliva and food debris and form plaque on the surface of tooth [2]. pH of the mouth to below 5.5 and demineralization of the teeth starts. Continuous demineralization at a definite site for a long period of time causes the formation of cavity at that site. In some severe cases Dental disease could be painful and the pain may be increased by cold heat, or food drinks and sweet [3]. Various synthetic chemical agents having antimicrobial activity into cosmetic products like toothpaste is a critical issue in our world today because of their adverse effect on human health [4]. Plants having good antimicrobial activity such as clove, turmeric etc and it can use as an substitute to synthetic chemicals to minimize the adverse effects like teeth staining, DNA damage, cancer and hypersensitivity reaction [5]. According to the Physician the lining inside the mouth are made up of mucous and has good absorption efficiency of approx. 90% [6] Toothpaste never be swallowed but it can automatically absorbed within a seconds through the mucous membrane in the mouth or through the skin on the lip. Oral fluids inside the mouth such as biofilm fluid and saliva contain Calcium (Ca) and Phosphate (P) in high concentrations which are the mineral composition of enamel. So these Ca and P ions are deposited on the surface of teeth known as enamel or they are redeposited on areas where enamel are lost. This is a natural mechanism basically done by the saliva to protect the mineral structure of enamel in the mouth [7,8].

MATERIAL AND METHODS

First of all we select three different type of toothpaste brand which is available in the local market such as Colgate, Pepsodent and Sebaka. Then we studied of different Physical, Chemical and Rheological Parameters

study of these selected samples by different methods of measuring. All samples were measured Physical and chemical properties three times for all parameters.

METHODS

- 1- pH-** We make 1% of sample solution for determine the pH or hydrogen ion concentration. Then we standardized the pH with buffer solution of pH 4 and pH 7. Then Immerse the Electrode in the solution under examination and measure the pH at the same temperature as for the standard solution. Measure the pH of the solution used to standardize the meter and the Electrode. All the samples were tested for 3 times and average of all three readings was used as final readings.
- 2- Foaming Capacity-** For the determination of Foaming Capacity (Index) we used Cylinder shake method. Firstly we prepare 1% of 50 ml dilute sample solution of toothpaste and kept in a 100 ml of Stoppard measuring cylinder and Shake well 10 times. The Total volume of Foam Content after 1 min of shaken was recorded the Height of the Foam generated was measured immediately. Then Evaluate the foam stability the procedure was performed and the foam volume after 10 min was observed.
- 3- Solid Content-** First of all we take known amount of sample into Evaporation disc then heat it into heating mental at 80⁰ C temperatures for 35 minutes. After that we measure the sample again and find the solid content value
- 4- Wetting Time-** For the determination of wetting time of the sample we take a Cotton cloth piece and cut into a 1 diameter disc shape and measure its weight. Then take dilute sample (1% solution) and cotton cloth piece placed on the sample. The disc was floated on the surface of 1 % sample solution and the stop watch was started. The time taken by the disc to float to Sink was recorded accurately and noted as the wetting time. The lower the time required for sinking, the greater the wetting Efficiency.
- 5- Turbidity-** The turbidity of the all samples was measured by using Turbidity meter. We prepare 1 %

sample solution and put into sample bottle and bottle placed into the Turbidity meter. Sample having more cloudiness it will show more turbidity while is clear and transparent will show less turbidity.

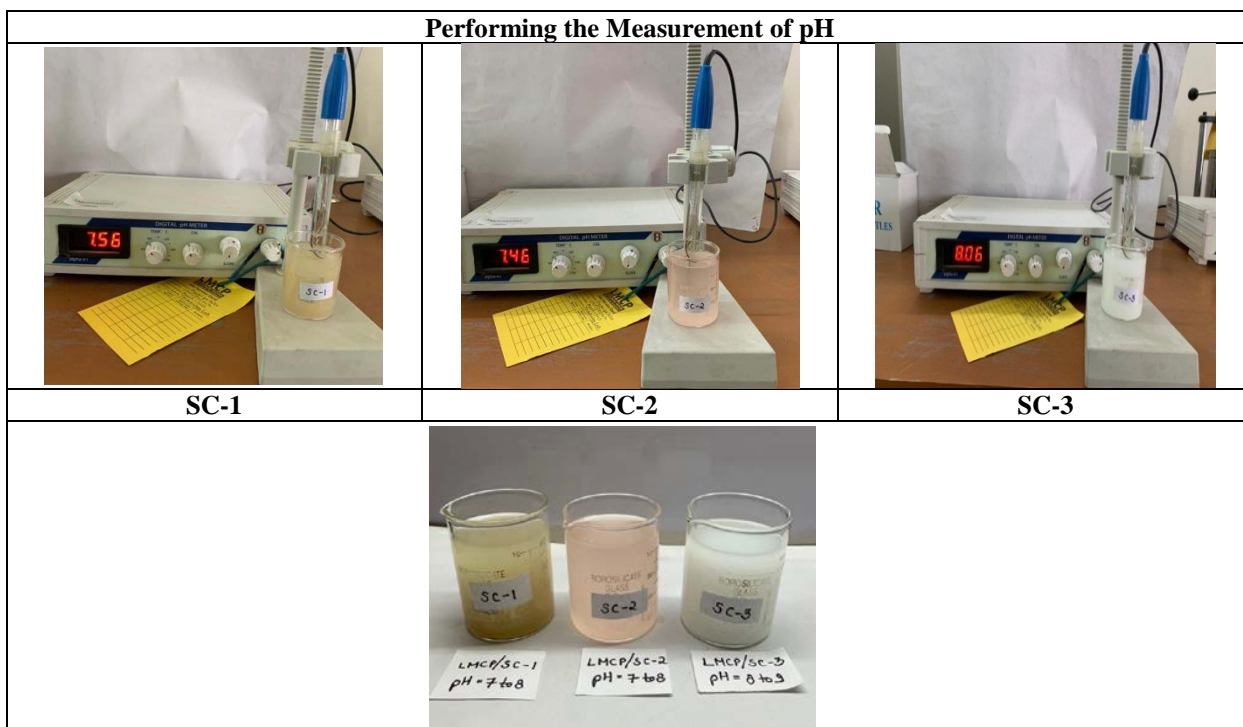
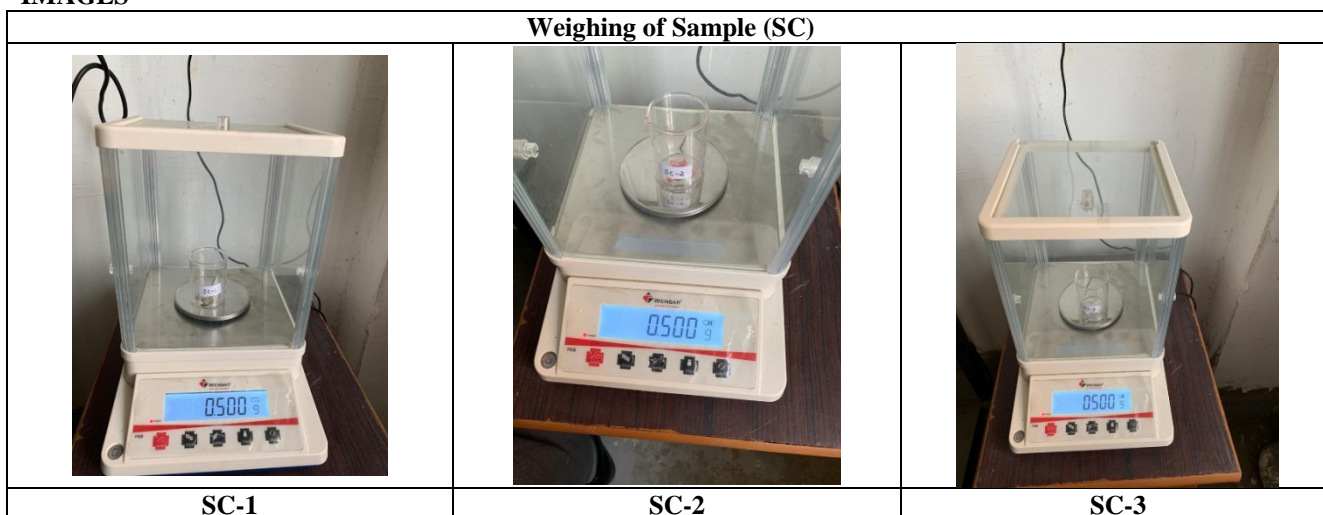
6- **Smell-** We Determined smell by using two procedures one is by heating sample on Hot Plate. Second is by Inhaling direct sample by 5 persons including male and female

RESULT & DISCUSSION

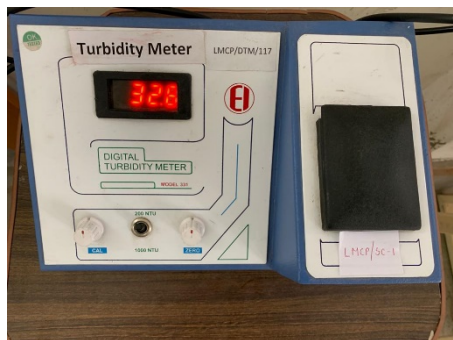
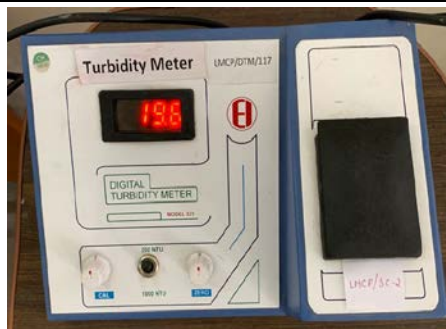
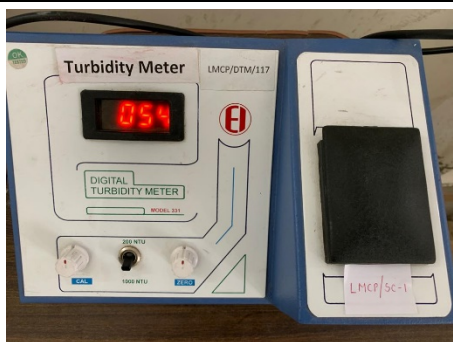
1. **pH-**Lower pH of toothpaste is better for the applying in oral cavity. In current scenario the pH plays very important role in toothpaste. all the sample evaluated in this research found with suitable pH range 7 to 9.
2. **Foaming Capacity** All toothpaste sample evaluated and all the sample range between 0 to 2.5. SC-3 contain more foam.

3. **Solid Content-** The Solid content of the all samples was measured and the result is shown in the table.
4. **Wetting Time-** Wetting is the one of the important parameters for any toothpaste and the result order is SC-2, SC-3 and SC-1 in the term of quick wetting time.
5. **Turbidity-** The turbidity of the all samples was measured by using Turbidity meter. And the result is shown in the table.
6. **Smell-** The Smell of toothpaste is play important role in current world. The smell of toothpaste may vary person to person or depends on gender but the strongness of smell will be measurable, so the sample number SC-1 is very triggerable in the term of smell or aroma.

IMAGES

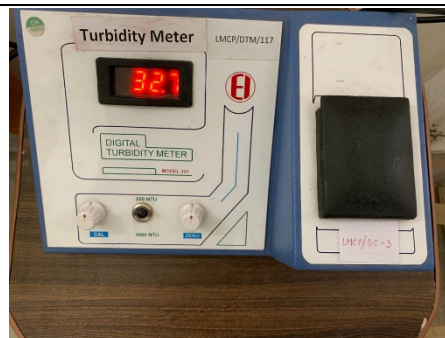
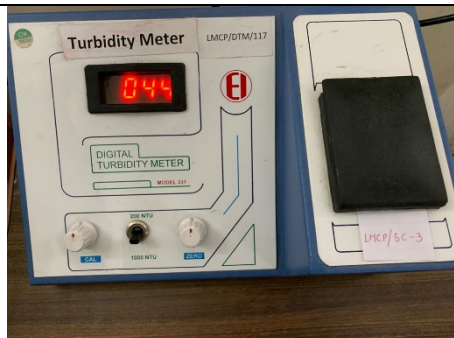


Performing the Measurement of Turbidity



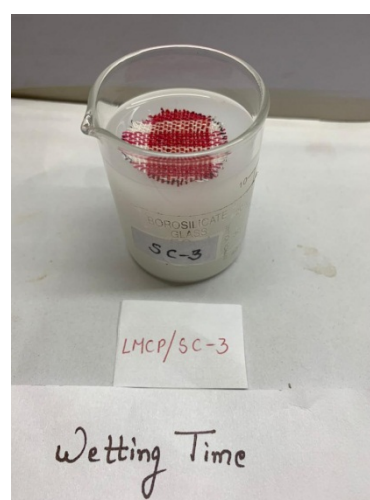
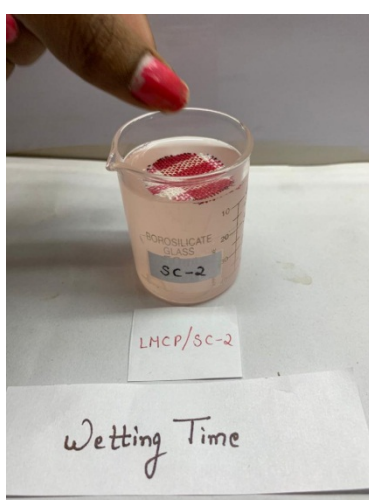
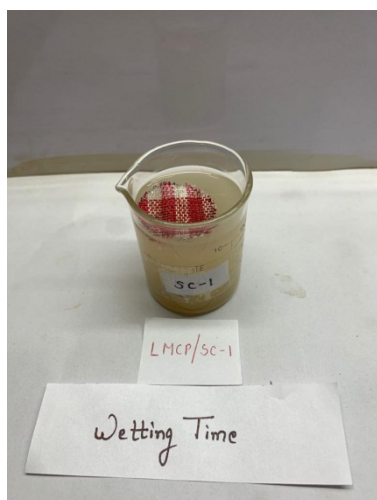
SC-1

SC-2



SC-3

Measuring of Wetting Time



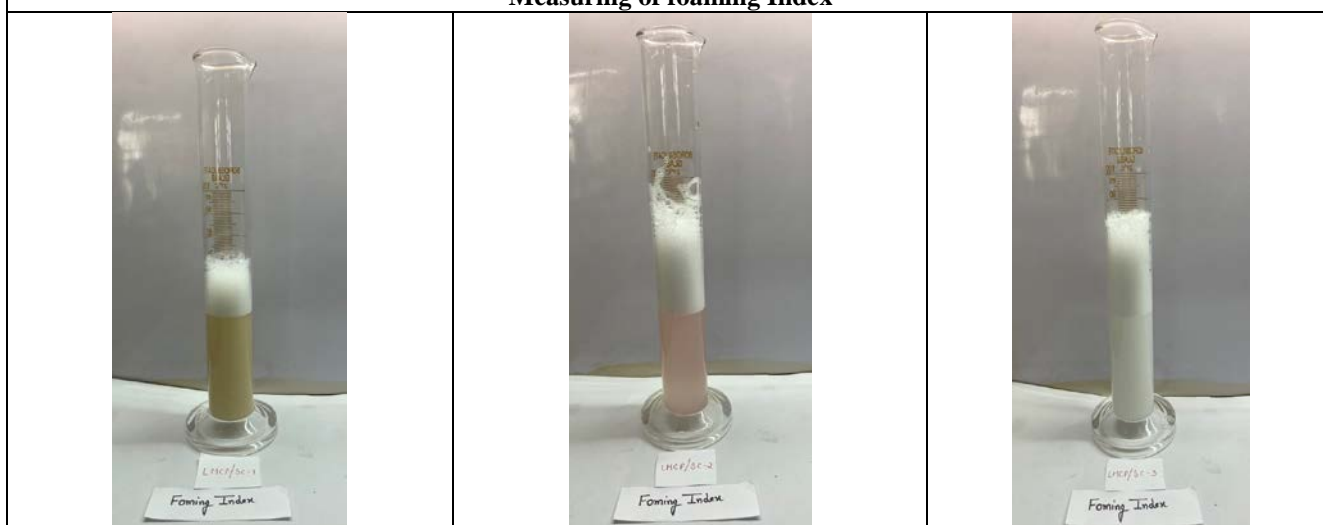
SC-1

SC-2

SC-3



Measuring of foaming Index



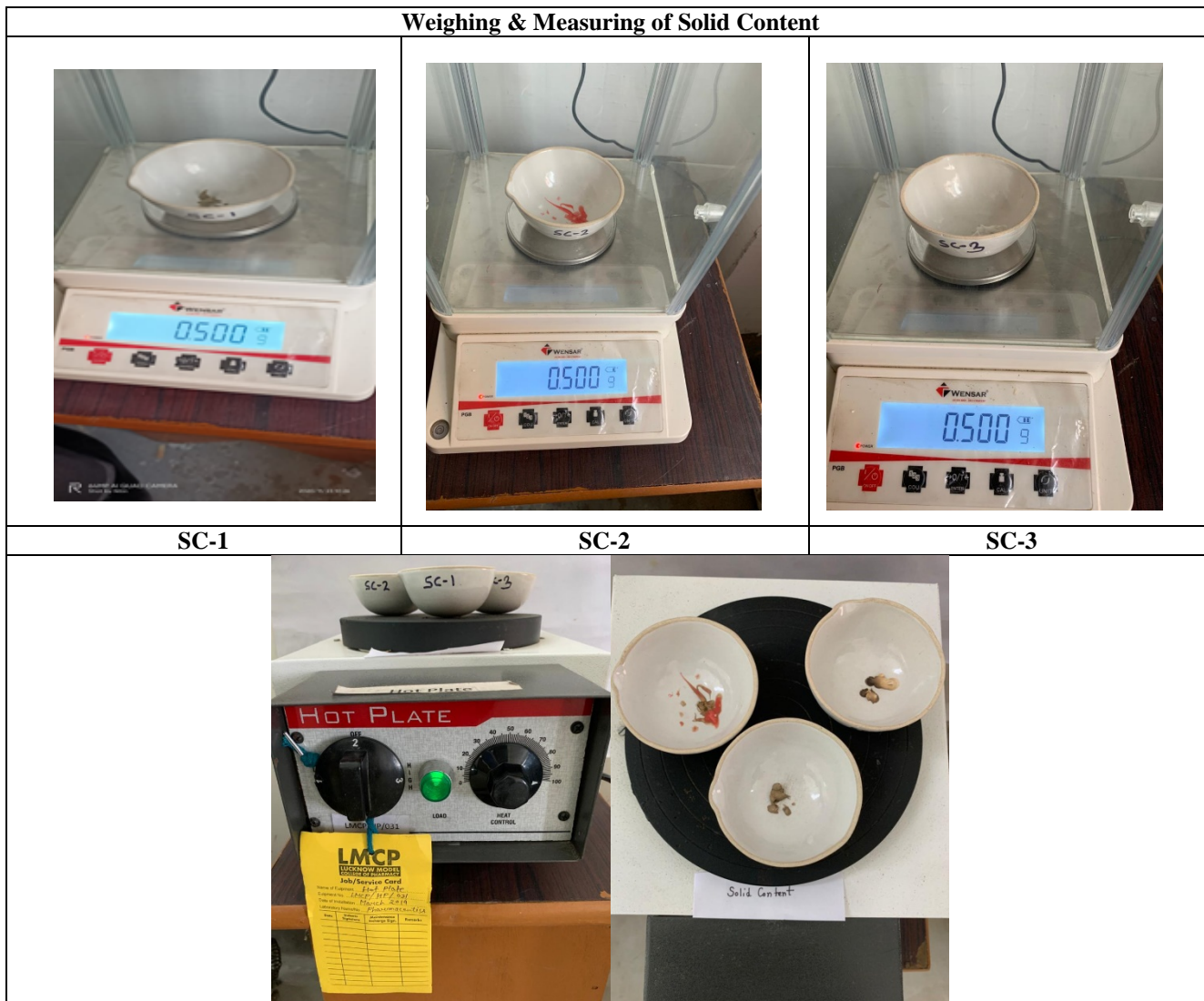
SC-1

SC-2

SC-3



Weighing & Measuring of Solid Content



TABLE

S.NO.	PARAMETERS	SC-1	SC-2	SC-3
1.	pH	7-8	7-8	8-9
2	Turbidity	100-054 200-32.8	100-020 200-19.6	100-044 200-32.7
3	Wetting Time	1.32 min.	12.97 sec	56.58 sec
4	Foaming Index	0.7	1.2	2.2
5	Solid Content	0.38	0.50	0.35
6	Smell	Very Strong	Pleasant	Fair

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