Review literature on Toothpaste

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Abstract:

The objective of this study was to develop Toothpaste formulations. Toothpaste is a paste or gel dentifrice used with a toothbrush to clean and maintain the aesthetics and health of teeth. Toothpaste is designed to target specific issues inside the mouth, like whitening teeth, eliminating the chances of cavities, freshening breath and reducing sensitivity. Sensodyne offers the wide range of toothpaste and toothbrush for long lasting protection from tooth sensitivity. Toothpaste is a key part of your daily oral hygiene routine. Along with your toothbrush and floss it helps to remove food debris and plaque from your teeth and gums. Flavoring. Artificial sweeteners, including saccharin, are often added to toothpaste to make them taste better. Colgate toothpaste brand owned by American Colgate Palmolive Company and one of the most trusted brand in India for oral hygiene products.

Keywords- Oral hygiene, Sensitivity, Toothpaste, Methyl parabene.

Introduction:

The formulated herbal toothpaste compared with marketed preparation. Toothpastes are daily oral care products, the chemical composition of which is constantly changing due to manufacturer's competition. Toothpastes are recognized as the best source of fluoride, which most effectively protects both deciduous and permanent teeth from caries[(1)]. Moreover, for those clinical decisions for which there is no defined scientific-based evidence, dentists should ally their patients needs with their clinical experience to achieve the best possible treatment considering the evidence available. Numerous product launches in the oral care market in general, are expansions of recognized brands. Marketers realize that there is more demand for products that provide whitening and odour-fighting benefits[(2)].

Consumer behavior is stated as the behavior that consumer display in searching for, purchasing, using, evaluating, and disposing of products, services and ideas that they expect will satisfy their needs. Toothpastes are daily oral care products, the chemical composition of which is constantly changing due to manufacturer's competition. One of the fastest growing a segment in the FMCG sector has been the toothpaste segment. As per Euro monitor India, 'the toothpaste industry in India is over Rs.6000 crore in 2013[(2,3)].

Advantage:

1. The traditional role of toothpaste is primarily cosmetic, in aiding the cleaning of teeth and producing fresh breath.
2. Toothpaste aids in prevention against gingivitis and tooth decay, which leads to more severe dental issues.
3. Toothpaste comes in many flavors and helps to leave your mouth and breath feeling fresh after brushing. It can also masks any scents from strong-flavored foods like garlic or onions.

4. Toothpaste is not necessary to make your teeth clean or healthy. Studies have shown that brushing without toothpaste is just as effective in removing plaque and in some cases it's more effective.
5. It should confirm to the standards of the EC cosmetic directive which states that it is not liable to cause damage to human health when used under normal conditions[4-6].

History:

The first civilization historians have documented using a toothpaste-like mixture to brush their teeth is the Egyptians. It is believed to have been used as early as 5,000 BC, though the first recorded formula dates back to 4 AD. Their simple mixture contained: Crushed rock salt. Egyptians are believed to have started using a personal-made paste in order to clean their teeth around 5000 BC. Going down the line, Greeks and Romans are also known to have used a type of toothpaste, as well as people in China and India first using toothpaste around 500 BC[7]. The first commercially produced, nice-smelling toothpaste was launched by Colgate and sold in a jar. 1892: Dr. Washington Sheffield is the first person to put toothpaste in a collapsible tube. It has been suggested that this version of toothpaste is the most similar to today's version[8].

William Nebergall, Who Invented Toothpaste and Cavity Prevention. The first mass-produced toothbrush was madeby William Addis of Clerkenwald, England, around 1780. The first American to patent a toothbrushwas H. N. Wadsworth, (patent number 18,653,) on Nov. 7, 1857. The development of the kind of toothpaste we're used to began in the 1800s. Before the 1850s, toothpaste was a powder. Early versions in the 1850s contained soap or chalk. Betel nut was included in toothpaste in England around the 1800s[4]. In 1873, Colgate started the mass production of toothpaste in jars. Colgate introduced its toothpaste in a tube similar to modern-day toothpaste tubes in the 1890s. Toothpaste today typically contains fluoride, coloring, flavoring, sweetener, and ingredients that make the toothpaste smooth, foam and stay moist[9].

Material & Method:

Formulation of clear gel and opaque toothpaste-

In this study, 4 gel and 4 opaque toothpastes were formulated. Three formulations of each type had thyme oil and one in each type contained methyl and propyl parabene. The amounts of oil used in the formulations were based on microbial studies and measurement of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). The formulated toothpastes were packaged in laminate tubes[7,10].

Stability-

The stability study was performed by soring formulations in three different temperatures and humidity conditions, viz. 4°C, 25°C± 2°C/60% ± 5% RH, 40°C ± 2°C/75% ± 5% RH for a period of 6 months considering ICH guidelines[11].

Formulation-

1. ***Polishing Agents / Abrasive Agents:*** The abrasives or the polishing agents are used to polish the teeth and remove food debris adhered to the surface of the teeth. They are used in concentration of about 20 - 50% of the total formulation[11].
2. ***Foaming Agents / Surfactants:*** They are also known as wetting agents. The mechanism of cleansing action is by reducing the surface tension at the interface of the adhered material and enamel of the teeth[12].
3. ***Humectants:*** Humectants are used in order to prevent the rapid drying of dentifrices. They prevent excessive moisture loss from the product. They may additionally impart plasticity to the final product. The concentration of the humectant used in the formulation may vary from 20% to 40%[13].
4. ***Ceiling/ Binding Agents:*** The binding agents are used in order to hold the solid and the liquid components together to form a smooth paste and maintain its property, particularly during storage. They prevent bleeding from the paste and also add up to the body and viscosity of the final formulation[14].
5. ***Flavouring Agents:*** Flavouring agents may comprise the most proprietary and most crucial part of the formulation essential to meet the consumer preferences. They are generally a mixture of edible volatile oils consisting of spearmint and peppermint oil as major components[12].
6. ***Preservatives:*** Preservatives are used in the formulation in order to maintain the properties of the product throughout the storage period and to improve the shelf-life of the product. Generally, a mixture of 5% methyl paraben and 0.02% propyl paraben is the most effective and commonly used combination preservatives[14].

Preparation of toothpaste-

1. Dry Gum Method

- In this method, all the solid components of the formulation like abrasive agent, binding agent etc., except the surfactants are mixed together in a dry mixer.
- The mixer may be an agitation mixer which consists of slow rotating blades.
- The liquid components such as the humectants and water are gradually added to the dry mix.
- The mixing process is carried out till a smooth paste is formed.
- The remaining ingredients like the surfactants and the flavouring agents are added to the homogenous paste under vacuum[12,15].

2. Wet Cum Method

- In this method, all the liquid components are mixed together to form a liquid phase.
- The binding agent is then mixed with the liquid phase with uniform stirring in order form mucilage.
- The solid ingredients excluding the surfactants are then gradually added to the mucilage with uniform mixing in an agitation mixer, in order to form a homogenous paste.
- The remaining ingredients i.e., the surfactants, the flavoring agents, coloring agents are added under vacuum the homogenous paste[16,17].

Evaluation:

1. *Tests for Abrasive Character:*

The cleansing action of dentifrices mainly depends on their abrasive property. The abrasion should not lead to any damage to the enamel and hence the test for checking the abrasive property has been done on the extracted teeth. The teeth are brushed by mechanical means with paste or powder and the effect of dentifrices on the teeth is studied by comparing the results before and after brushing[18].

2. *Determination of Particle Size:*

Particle size determination is important as the cleansing nature and abrasive property of the dentifrice mainly depends on the particle size. The particle size can be determined by using microscopical techniques or by involving the method of sieving[19].

3. *Determination of the Test for the Special ingredient:*

The use of therapeutic ingredients may lead to certain incompatibilities and hence specific tests are done in order to determine the effect of the specific ingredients such as antiseptics, enzymes etc[20,21].

4. *Limit Test for Heavy Metals:*

The test is done in order to check the presence of any heavy metals such as arsenic and lead which may lead to toxicity. The occurrence of these metals can be avoided by carrying out the limit tests for heavy metal, for raw materials, which may reduce usage of these materials[22,23].

5. *Determination of pH of the Product:*

A 10% solution of the paste in water is made and the pH of the dispersion is measured using a pH meter. The pH should be in the range of 6.8 to 7.4 in order to maintain the consistency of the product[23].

Conclusion:

Toothpastes have evolved immensely since their earliest forms, when they served primarily as a toothbrush aid to attempt to make the teeth less yellow and freshen the mouth. Toothpaste was made long ago. The most important ingredient in toothpaste is fluoride. There are lots of chemicals in toothpaste. The texture, fragrance, and color helps the toothpaste, because without these things toothpaste wouldn't be as pleasing.

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