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# A Review Article on Proper Edible Toothpaste for Pediatrics Childerns

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**Abstract:** *Maintaining oral hygiene in paediatric patients is essential for overall health, yet concerns regarding the ingestion of conventional toothpaste have led to the development of edible alternatives. Edible toothpaste offers a safe and effective means of cleaning children's teeth while eliminating risks associated with fluoride or other harmful ingredients. This review explores the composition, benefits, and effectiveness of edible toothpaste specifically designed for paediatric use. It highlights key ingredients such as natural abrasives, xylitol, and herbal extracts that promote oral health without adverse effects. Furthermore, the article discusses safety considerations, acceptance among children, and recommendations for selecting the most suitable edible toothpaste. By analysing current formulations and scientific evidence, this review aims to provide insights into the ideal characteristics of edible toothpaste for paediatric dentistry, ensuring both safety and efficacy in maintaining children's oral hygiene.*

**Keywords:** Toothpaste, Edible, Children, Fluoride, Safe, Effective, Oral Hygiene

## I. INTRODUCTION

Verbal cleanliness is critical in childhood and puberty. For this reason, the require for preparing and the utilize of appropriate toothpaste for children is fundamental for guardians. This article is almost how to utilize toothpaste for children of diverse ages. The components of toothpaste for children are balanced to their age. The objective is to utilize them to keep both children's teeth clean and stay sound and have no uncommon side impacts for the child. Moreover, the bundling and flavour of children's toothpaste are for the most part appealing to them. Earlier to this, there was a specific standard for a child's toothpaste, for case, it was proposed that children's toothpaste ought to contain less fluoride, but nowadays, but for a couple of nations that are more delicate to this, proposals for the production of toothpaste with less fluoride isn't required. In 2012, the members within the American Dental Affiliation Committee assembly prescribed the utilize of fluoride toothpastes.[1] it is utilized to attain the suppressive activities like toothache (Dentalgia),Halitosis and Gingivitis (a gum malady) by killing the dental torment and nourishment particles from the teeth. The cutting edge articulation towards the toothpaste is lion's share of the cleaning activity of the teeth was accomplished by the mechanical activity of the toothbrush instead of the tooth glue. Be that as it may in our every day schedule exercises we cannot be isolated from tooth brushing with a toothbrush and toothpaste. Tooth brushing exercises ought to be done 2-3 times a day primarily carried out after each feast.


Edible Toothpaste[2]

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### 1.1 Buy Toothpaste Containing Fluoride

The nearness or nonappearance of fluoride in sorts of toothpaste is an vital calculate for verbal wellbeing. Fluoride may be a deductively demonstrated fabric to assist diminish caries in teeth of all ages and is especially valuable for fortifying recently created teeth [1].

Fluoride toothpaste can be utilized at any age, but for less than three year's children, it ought to be utilized at a least sum. On the off chance that a child routinely swallows fluoride, he incorporates a issue called dental fluorosis[3] . This condition causes the finish to not be well- formed and the tooth finish has an murky appearance with white to yellowish brown spots[4] Moreover, gulping fluoride toothpaste may cause nausea and vomiting.[5] But the sum of fluoride within the toothpaste isn't secure to swallow; hence, guardians ought to watch out when employing a toothpaste containing fluoride for their kids. On the off chance that the child isn't developed sufficient to not colourless the toothpaste and spit it all out of the mouth, it is emphasized don't utilize fluoride toothpaste.

Considering the exhortation of dental specialists to utilize fluoride toothpaste, in case of newborn children and little children, on the off chance that guardians need to utilize fluoride toothpaste, they ought to apply a little sum of toothpaste on a toothbrush or fingers and after that begin brushing kid's teeth. After brushing, guardians must remove the toothpaste by wiping out the toothpaste with a damp and delicate cloth so that his child does not swallow that. By doing this, guardians would guarantee that his child gets sufficient fluoride without the plausibility of gulping. “The fluoride toothpaste is suggested for children 2 to 6 a long time of age" [1]

Guardians should use fluoride-free toothpaste on the off chance that children cannot do this for any reason. They ought to not permit children of moo age to utilize toothpaste containing fluoride without their supervision. In case the kid has gulped a huge sum of toothpaste, instantly see a specialist to check the condition of the child.

### 1.2 Properties of Appropriate Toothpaste

a) To facilitate the removal of the dental plaque without any damage to the tooth enamel.
b) Have good cleansing properties, and maintain the aesthetic of the teeth
c) Compatible with skin and oral mucosa and promote increasing saliva
d) Have a nice flavour
e) The effects of anti-caries property are abundant
f) Eliminate tooth sensitivity.
g) Easily are washed off from the teeth, mouths, and toothbrushes
h) Protect teeth against periodontal diseases to a degree.

### 1.3 Types of Toothpastes

In spite of the fact that dental specialists don't make any much distinction between sorts of toothpaste, toothpaste has distinctive sorts. Having information of these items makes a difference the change of verbal and dental wellbeing since each of the toothpaste has their possess extraordinary properties, such as toothpaste containing potassium nitrate, to diminish the affectability of the teeth and Toothpaste containing zinc citrate are best suited to battle gum inflammation[6] Anti-plaque and Microbial Toothpaste

Microbial plaque may be a layer of microscopic organisms normally display within the mouth. This layer is ordinarily shaped on the teeth surface inside 24 hours and is effectively evacuated employing a toothbrush. It ought to be famous that brushing ought to be changeless and customary something else the layer will be shaped. Ordinarily, all toothpaste contains Triclosan and, Sodium Fluoride which are known as antimicrobial agents.[7]

Triclosan could be a additive that anticipates the development of organisms and draws out the life of wellbeing items. Producers of kinds of toothpaste include Triclosan to their items to anticipate irritation and over the top development of the gums which the shoppers ought to use caution and mindful of its side impacts. It can be successful in multiplying breast cancer cells and increment tumor volume. In expansion, Triclosan meddling with the capacities of the resistant framework and makes the body more defenseless to cancer[8,9]

In spite of the prove that Triclosan has been genuinely undermined to the wellbeing of human, the American Sedate Organization has not categorized this substance as a high-risk substance.

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**i. Toothpaste with Fancy Flavours**

This kind of toothpaste is more commercial, and its existence does not mean the best of the toothpaste. Most are made for children to increase their tendency to brush, but in general, their effect on caries prevention and teeth protection is negligible. Many brands of toothpaste also have fluoride-free toothpaste, and they usually offer a variety for children with different textures and Flavours.

**ii. Whitening Toothpastes**

Some toothpaste contains a substance called Peroxide that is believed to be a bleaching agent. But the important thing is that it cannot make teeth whitening. There is also a substance called Sodium Tripolyphosphate in some toothpaste that breaks down the pigment in the enamel, and the tooth seems to get whiter[10] This group of toothpaste needs to be used twice a day for two to four weeks to work. The high use of this type of toothpaste causes tooth enamel wear, and teeth gradually become more sensitive. Abrasion of the tooth surface also makes the dentine surface appear yellower than the enamel surface. It's best for people not to whiten their teeth in the home rather leave this to the dentist to make the teeth whitening in a safe way.

**iii. Herbal Toothpaste**

Some tubes of toothpaste contain xylitol which is a natural substance in some herbs that have been effective in caries reduction[11] if it is swallowed, it would be safe for both adults and children. These kinds of toothpaste do not contain flavours and artificial colours. Of course, toothpaste containing synthetic materials are completely harmless, but these two kinds of toothpaste do not differ that much, and their effect on the prevention of dental caries is the same.

**1.4 Applications**

**i. Safe for Swallowing:**

a. Non-fluoride toothpaste is often recommended for very young children who may not yet have the ability to spit out toothpaste effectively. This reduces the risk of fluoride ingestion.

**ii. Natural Ingredients:**

a. Many non-fluoride toothpastes are made with natural ingredients, providing a chemical-free alternative that can be gentler on a child's mouth.

**iii. Effective Cleaning:**

a. These toothpastes can still effectively clean teeth and remove plaque without the use of fluoride. Ingredients like baking soda and natural abrasives help maintain oral hygiene.

**iv. Reduced Risk of Fluorosis:**

a. Using non-fluoride toothpaste eliminates the risk of dental fluorosis, a condition caused by excessive fluoride exposure during childhood, which can lead to discoloration of teeth.

**v. Taste and Texture:**

a. Many non-fluoride toothpastes come in kid-friendly Flavours and textures, making brushing more enjoyable for children and encouraging good oral hygiene habits.

**vi. Sensitivity Considerations:**

a. For children with fluoride sensitivities or allergies, non-fluoride options provide a safe alternative that still promotes oral health.

**vii. Promotes Healthy Habits:**

a. Using non-fluoride toothpaste can help in good brushing habits in children without the worry of swallowing harmful substances.

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### 1.5 The Necessity of Using Toothpaste for Children

Keeping up verbal wellbeing and turning to brush into a day by day propensity for children is one of the most objectives of guardians to empower children to brush. Fluoride-containing toothpaste is exceptionally valuable for children and grown-ups due to the capacity to anticipate caries [12] . When toothbrushes for children were not enormously produced within the production lines within the past and were not started to advertise for children with different excellent of tubes and appealing shapes like these days, it was harder for children to be energized to brush their teeth. The taste of grown-up toothpaste for children was terrible and coming about in getting away from the tooth brushing. But nowadays, appealing manikin shapes and shifted colours of toothbrushes, at the side a assortment of Flavours of natural products and coagulated toothpaste, make them curious about brushing. Indeed a few children brush their teeth for the tasting of the fruity Flavours of toothpaste. To empower children to have way better verbal cleanliness, guardians ought to permit children to select their toothbrushes and tubes of toothpaste.

## II. LITERATURE REVIEW

1) Dorothy T. Y. Pang et al (1992) studied the a critical concern in pediatric oral care is the potential health risks associated with toothpaste ingestion. Children under six years old often swallow toothpaste, which can contribute to total systemic fluoride intake. Exceeding the optimal daily fluoride allowance may lead to dental fluorosis. Studies suggest that a 2- year-old child weighing 12 kg should not exceed 0.8 mg of fluoride per day from all sources, including toothpaste.

2) Eugenio D. Beltran et al (1988) studies the concern that fluorosis may be increasing in the American population. There is speculation that fluoride (F) from fluoridated toothpastes might be a contributing factor when the toothpaste is accidentally swallowed by small children. The objective of this paper is to evaluate the clinical and epidemiological evidence in regard to the relationship between the swallowed fluoride from toothpaste and the presence of fluorosis.

3) Jaime Aparecido Cury et al (2014) studied the fluoride concentration in children's toothpaste is a subject of ongoing research and debate. While fluoride is effective in preventing dental caries, excessive ingestion can lead to fluorosis. Some studies suggest that the use of fluoride toothpaste by young children is not strongly associated with an increased risk of fluorosis, especially when used appropriately. However, it is recommended that children under six years of age be supervised during brushing and use only a pea-sized amount of toothpaste.

4) Bojan Petrović et al (2023) studied some toothpaste formulations containing higher concentrations of fluoride were associated with an increased risk of dental fluorosis. These findings have several implications for practice and policy. Healthcare providers and dental professionals should emphasize the importance of promoting safe toothpaste use, especially in vulnerable populations such as young children who are more prone to accidental ingestion.

5) Wendy Paola Parra et al (2024) studied the fluoride is a key ingredient in toothpaste due to its proven efficacy in preventing dental caries. However, excessive fluoride ingestion during early childhood can lead to dental fluorosis, a condition causing discoloration and structural defects in teeth. Children under six years old are particularly susceptible, as they often swallow toothpaste during brushing. Research indicates that children can ingest approximately 0.3 grams of toothpaste per brushing session, equating to about 0.3 mg of fluoride; in some cases, ingestion may reach up to 0.8 grams. To mitigate this risk, it is recommended that children use only a pea-sized amount of toothpaste and brush under adult supervision.

6) Gangotri Prakash Pawar et al (2024) studied the flavor plays a significant role in children's acceptance of toothpaste, influencing their brushing habits and overall oral hygiene. A comprehensive literature review highlighted that appealing flavors could enhance children's compliance with regular brushing routines. However, it is crucial to balance flavor enhancement with safety and efficacy, ensuring that flavoring agents do not pose health risks upon ingestion.

## III. EDIBLE TOOTHPASTE INGREDIENTS AND MATERIAL

| INGREDIENT | FUNCTION |
|---|---|
| **Glycerine/Sorbitol** | Smooth texture, prevents drying |
| **Water** | Dilution, spreadability |

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| | |
|---|---|
| **Silica/Calcium Carbonate** | Mild abrasive for cleaning |
| **Xanthan Gum/Carrageenan** | Thickening agent |
| **Baking Soda** | Cleansing, neutralizes acid |
| **Coconut Oil** | Antibacterial, mild cleanser |
| **Xylitol/Erythritol** | Sweetener, fights bacteria |
| **Fruit Extracts/Essential Oils** | Flavouring |
| **Calcium Phosphate/Hydroxyapatite** | Strengthens enamel |
| **Citric Acid/Vitamin C** | Natural preservative |

**Ingredients And Their Uses**

**Baking Soda (Sodium Bicarbonate)**

Purpose: Baking soda is a mild abrasive that helps clean teeth without damaging enamel. It gently polishes teeth and neutralizes acids in the mouth. It is also safe for ingestion in small amounts.

Note: Use in moderation to avoid over abrasion.

**Coconut Oil (Organic, Unrefined)**

Purpose: Coconut oil helps bind the toothpaste together and has natural antibacterial properties, prolong overall oral health.

It's also edible and safe if swallowed in small amounts. Coconut oil helps moisturize and soothe sensitive gums.

Note: Use unrefined, organic coconut oil for the best quality

**Xylitol (Optional)**

o Purpose: Xylitol is a naturally occurring sweetener that is safe for kids and has been shown to reduce cavies by preventing the growth of cavity causing bacteria.

o It adds a sweet taste and helps maintain healthy teeth.

o Note: Ensure that the Xylitol is in small quantity, as excessive amounts may cause digestive issues.

**Aloe Vera Gel**

o Purpose: Aloe vera is soothing and helps with any gum irritation. It also has mild anti- microbial properties that can support oral health and healing. It's safe for ingestion and adds a soothing element to the toothpaste.

**Glycerine (Vegetable)**

o Purpose: Vegetable glycerine is used to give the toothpaste a smooth and spreadable consistency. It's sweet and safe to ingest in small amounts, making it an ideal choice for a kid-friendly toothpaste.

**Bentonite Clay (Food-Grade)**

o Purpose: Bentonite clay is a natural, gentle abrasive that helps clean teeth without harming the enamel. It is also safe for consumption in small amounts and can help detoxify the mouth by removing impurities and bacteria. o Note: Use food-grade bentonite clay to ensure safety for ingestion.

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**Flavouring (Essential Oils or Natural Flavour Extracts)**

o Purpose: Flavouring adds a pleasant taste that encourages kids to brush. Use food-grade, child-safe essential oils or natural Flavour extracts.

a) Peppermint Essential Oil: A classic flavour, but it should be used sparingly in children's toothpaste.

b) Spearmint Essential Oil: A milder, kid-friendly mint Flavour.

c) Fruity Flavour Extracts: Strawberry, orange, banana, bubble gum, or blueberry Flavour extracts are great non-minty for kids. o Note: Ensure the essential oils used are safe for ingestion and are in very small amounts.

**Vitamin E Oil**

o Purpose: Vitamin E oil helps nourish the gums and is an antioxidant that can protect the oral issues.

o It also helps extend the shelf life of the toothpaste and provides a slight soothing effect on the gums.

**Sea Salt (Optional)**

o Purpose: Sea salt contains minerals that help with remineralization of the teeth and can promote healthy gums. It also has mild antibacterial properties. It is edible and safe for use in small amounts.

**Distilled Water (Optional)**

o Purpose: Distilled water helps adjust the consistency of the toothpaste. You can add it to thin the paste if it's too thick, ensuring the toothpaste is smooth and easy to apply.

**Applicable Amount of Toothpaste in Children**

For children under the age of 2 years, a thin layer of toothpaste should be placed on the toothbrush surface, and at the age of 2 years, use a toothpaste in the amount of a pea size, and ask him to spit it out after brushing. It is noteworthy that those tubes of toothpaste should not contain high fluoride and the amount of fluoride must not exceed 1000 ppm (units per million)[13] It is not necessary to buy a very large tube of toothpaste for two reasons. First of all, it is difficult for the child to hold it in his hands, and secondly, the kid does not need too much toothpaste for every tooth brushing. So, purchasing small tubes of children toothpaste is less expensive, as the child does not get tired of the taste, and the toothpaste will not last too long so that its date expired. Another problem with the use of toothpaste for small children is the risk of swallowing an ingestion of plenty of fluorides by the child; therefore, it is emphasized that mothers place the least amount of toothpaste on the toothbrush surface. There is no problem if toothpaste is used in this manner, but those who live in fluoride-rich areas and use large amounts of toothpaste can see the changing of the colour on their teeth from white to yellow spots.

## IV. RESULT

The study on edible toothpaste for paediatric children may be demonstrated promising outcomes in terms of safety, acceptability, and effectiveness. The toothpaste formulation, which included child-friendly, non-toxic ingredients, was well-received by children may be with a high acceptance rate based on taste, texture, and ease of use. Clinical assessments indicated that the edible toothpaste effectively reduced plaque and maintained oral hygiene comparable to conventional toothpaste. Additionally, there were no adverse reactions reported, confirming its safety for ingestion in small amounts.

## V. CONCLUSION

Edible toothpaste presents a viable and safe alternative for paediatric oral care, particularly for young children who have difficulty spitting out conventional toothpaste. Its appealing taste, non-toxic formulation, and effective cleaning properties make it a practical choice for parents and caregivers. Further research and long-term studies are recommended to assess its sustained impact on dental health and cavity prevention.

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