ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 10| Issue: 11| November 2024|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2024: 8.402 || ISI Value: 1.188

HERBAL SYNERGY A STUDY ON THE COMBINED EFFECT OF NEEM, CLOVE AND POMEGRANATE

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ABSTRACT

The ingredients used to make herbal tooth powders are many and easily found on the market. The use of modern methods that focus on these aspects is therefore advantageous for the standardization of herbs and their creations. Maintaining oral hygiene, which includes avoiding tooth decay and preserving breath freshness, is the main goal of dentifrices. To keep your mouth healthy all day, you can use a variety of dentifrices made from natural and synthetic substances. To manufacture the tooth powder, a number of plant ingredients with cooling, antibacterial, and antiseptic properties were used. Herbal ingredients Camphor, zindatilishth oil, miswak powder, Tulsi powder, clove powder, cinnamon powder, peppermint powder, neem powder, rock salt, turmeric powder, pomegranate powder, orange powder, amla powder, and camphor.

KEYWORDS: *Herbal toothpowder, Oral hygiene, Toothpowder.*

INTRODUCTION

The herbal dental care products are made to help clean the oral cavity and teeth. Tooth decay and bad breath can be avoided by using tooth powder as a preventative dental cosmetic. In order to help eliminate the minerals and food particles that have accumulated on the teeth, toothpaste and powder are applied and rubbed against the teeth. Tooth powder is used in conjunction with a toothbrush to maintain oral hygiene, which includes breath freshness and tooth decay prevention. The herbal dental care products are made to help clean the oral cavity and teeth. Tooth decay and bad breath can be avoided by using tooth powder as a preventative dental cosmetic.

Maintaining good oral hygiene is crucial for maintaining one's beauty, confidence, and personal image. The crown and the root are the two different types of teeth. Enamel, the hard tissue in the mouth, covers the tooth's crown. Saliva and teeth make up the oral cavity, which facilitates easy meal consumption. The key substance suggested to lubricate meals and preserve a suitable oral environment is saliva.

The teeth powder was made with a number of herbal ingredients that have antiseptic, cooling, and antibacterial properties. They come in both crystalline and amorphous forms. They are regarded as the most traditional and straightforward type of dosing.

Dental issues are prevalent in nations that are becoming more globalized. Poor eating habits and ignorance of oral hygiene are the main causes of common dental issues such gingivitis, halitosis (bad breath), tooth discoloration, and plaque or tartar buildup. Periodontal disease, dental caries, and dental plaque are the three categories of dental issues.

Dental plaque is a sticky substance that can harbor bacteria and covers teeth. Poor dental hygiene and foul breath might result from leaving this layer in place.

1. When gingivitis is not treated, inflammation develops around the tooth, resulting in periodontal disease. This inflammation causes infections and spaces between teeth and gums. The infection causes the gums, bones, and tissues that support teeth to deteriorate, which makes the teeth loose and causes them to fall out.
2. The Latin term for dental caries is "rot" or "rotten." An area of rot is referred to as a "carious lesion," and rotten teeth are symptoms of a condition known as "dental caries" or "tooth decay." This condition affects the calcified tissue of the teeth and is characterized by the breakdown of the organic material of the tooth and the remineralization of the inorganic component.
3. Many trace minerals, antimicrobial herbs, and calcium can be found in herbal tooth powder. The herbs have antimicrobial qualities and promote blood flow to the gums, while calcium and trace minerals aid in the restoration of dental enamel.

Types of Tooth Powder

1. Whitening tooth powder
2. Natural tooth powder
3. Herbal tooth powder
4. Homemade tooth powder

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1. Whitening Tooth Powders
   - Its purpose is to freshen teeth, help heal gums and help to reduce gums inflammation in the mouth. It can also polish and whiten teeth.
   - They may contain abrasive ingredients that gently whiten and remove stains. It can also polish and whiten teeth.
2. Natural tooth powders
   - Natural tooth powder uses naturally derived ingredients.
   - They would contain harsh chemicals and generally safe for people with sensitive teeth.
   - Ingredients like sea salt, which acts as an abrasive natural chalk. It contains essential oils like peppermint and eucalyptus.
3. Herbal tooth powders
   - Herbal tooth powder is beneficial or sore or bleeding gums.
   - It has been around for centuries, and many believe it to be as essential part of any teeth cleaning regimen.
   - It can have variety of ingredienst.
   - Baking soda, powdered chalk, and white clay are common.
4. Homemade tooth powder
   - These powders can be made at home.
   - It can be easily formulated by using organic neem powder, baking soda, sea salt, clove powder, fennel seed powder are weighed and mixed well and applied.

Dental: - Teeth taken from rural hospital.
Rural hospital: - Shelke clinic, Jalna.

Global Scenario of Dental Caries

While oral and pharyngeal malignancies as well as diseases in the oral tissue are also serious health concerns, dental caries is the most prominent oral health issue in the world[1].

In their permanent teeth, about 2.43 billion people (36% of the world's population) suffer from dental caries. Nine percent of the population, or over 620 million people, are affected by baby teeth. In South Asia, the Middle East, and Latin America, the disease is most common; in China, it is least common[2]. With a prevalence at least five times higher than asthma, dental caries is the most prevalent chronic pediatric illness in the US[3]. Children's tooth loss is primarily caused by this pathology[4]. From 29% to 59% of adult over the age of fifty experience caries[5].

Classification of Dental Caries

Caries can be categorized according to location, hard tissue damage, and rate of advancement. These classification schemes can be used to describe a specific instance of dental decay in order to more properly depict the disease to others and to show how severely the tooth has been destroyed[6].

Sr.no	On the basis of	Classification	Description
1	Rate of Progression	Acute	Signifies a quickly developing condition
		Chronic	Signifies an extended time to developing condition
2	Affected Hard Tissue	Enamel	Early in its development and may affect only enamel
		Dentinal	The extant of decay reaches the deeper layer of dentin
		Cementum	The decay on roots of teeth
3	Location	Class I	Pit and fissure caries (anterior or posterior teeth)
		Class II	Approximal surface of posterior teeth
		Class III	Approximal surfaces of anterior teeth without incisal edge involvement
		Class IV	Approximal surfaces of anterior teeth with incisal edge involvement
		Class V	Gingival/cervical surfaces on the lingual or facial aspect (anterior or posterior)
		Class VI	Incisal edge of anterior teeth or cusp height of posterior teeth

Stages of Dental Caries

1 White Spot Stage

The mineral matrix of teeth is dissolved by the acid that is created by the bacteria and yeast in tooth plaque. A chalky white spot on the tooth is the first sign of dental caries. At this point, the underlying lesion is reversible, and the surface is undamaged. It can be challenging to differentiate between white spots caused by developing caries and developmental hypocalcification. Additionally, the black staining stage replaces the white spot[7].

2 Cavity Stage

The surface eventually breaks or becomes "cavitated" if the mineral loss from acid challenge persists, and the damage cannot be undone. A significant portion of the tooth may be lost if the condition worsens. Typically, active cavitated lesions have a

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golden-brown color. Lesions that have been there for a long time are darker, often almost black. Since halted decay is frequently the darkest, color depth is not a reliable indicator of the severity of the lesions[7].

MATERIAL AND METHOD

Sample Collection and Preparation

Samples were taken from the oral cavity using sterile cotton swabs and a dietary media from 33 donors of each donor. Swabs were collected four times per person, including after breakfast, after using toothpaste, after rinsing with water, and after waking up.In accordance with the donors, this was carried out. The swabs were immediately brought to the lab to be grown on the proper growth media.

Three different types of culture media were utilized in this experiment: Mannitol salt agar medium for the detection of Staphlococcus bacteria, MacConkey agar for the detection of interobactereaceae, and nutrient agar for the estimation of the total number of microbes. The media were prepared according to the manufacturer's instructions on the packaging, and they were autoclave sterilized for 15 minutes at 121 °C and 15 lb/inch2 of pressure. After that, the culture media was kept at lab temperature until it solidified. Plotting the donor swabs directly onto the culture media allowed researchers to identify the type of bacteria present in the samples. An incubator set to 37 °C for 24 hours was used for the incubation process.

Bacterial Antibiotic-Resistance Test

Following colony activation, the antibiotics' resistances were assessed using the diffusion method on agar plates. Table 2 lists the antibiotic kinds, along with their code and concentration.

Table (2) Antibiotics and their concentration

Name	Code	Concentration/mcg
Doxycycline	DO	10
Mastdiscs	TS	25
Ceftriaxone	CRO	10
Tobramycine	TOB	10
Mastdiscs	T	30
Gentamycine	CN	10

Bacterial Isolation

The investigation included identifying the oral cavity's microbial composition while a number of male and female smokers and non-smokers went about their regular lives. There were 33 donors in all, with ages ranging from 25 to 35. According to Table 3, which displays the distribution of donor categories and percentages, there were 14–11 non-smokers and smokers, who made up 42.4 and 33.3 percent of the study samples, respectively, while there were 8–0 non-smokers and smokers who were female, making up 24.2 and 0.6 percent of the study samples, respectively.

The laboratory test results demonstrated that every sample exhibited positive development across the several phases of oral cavity isolation, with variations in the quantity and kinds of bacteria isolated across the identical donor category. This discrepancy results from the influence of different behaviours and routines during the phases of isolation, including breakfast, toothbrush use, mouthwash, and water washing.

Because of the high oral content of microorganisms, the results were consistent with those of Mahmood (2009) and Hussein (2018), who were able to isolate various bacterial species from all study samples[8].

Table (3) Distribution of Donor Categories.

Isolation Samples		NO.	%
Male	Non-Smoking	14	42.4
	Smoking	11	33.3
Female	Non-Smoking	8	24.2
	Smoking	0	0
Total		33	100

Pathophysiology

Enamel

When the enamel loses minerals, it develops several distinct zones: the translucent zone, dark zones, body of the lesion, and surface zone[9]. The translucent zone coincides with a 1/2% loss of minerals[10], while the dark zone is a slight remineralization of enamel. The body of the lesion experiences the greatest de-mineralization and destruction, while the surface zone remains relatively mineralized until the loss of tooth structure results in a cavitation[11]. Caries demineralizes enamel in the direction of the

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enamel rods, creating various triangular patterns between pit and fissure, and smooth-surface caries[12].

Dentine

The distinct regions of dentine that are impacted by caries are the zone of destruction, the zone of bacterial penetration, and the advancing front, which extend from the deepest layer to the enamel[9]. A zone of acid-demineralized dentine, devoid of microorganisms, is represented by the advancing front. The bacterial invasion sites and, eventually, the dentin breakdown are known as the zones of bacterial penetration and destruction. The bacterial population in the zone of destruction is more diverse, and the organic matrix has been degraded by proteolytic enzymes[11].

Cementum

Cemental caries is more common in older persons because gingival slump, a chronic condition that produces a wide, shallow lesion and gradually invades the cementum of the root and eventually the dentin to cause a chronic infection of the pulp, can be caused by trauma or periodontal disease[13].

Signs and Symptoms of Dental Caries

Depending on the degree and location of cavities, several indications and symptoms may be present. when there may be no symptoms at all and a cavity is just starting. The following indications and symptoms could appear as the deterioration gets worse:

- Tooth sensitivity is the term for toothache and mild to severe discomfort when consuming hot or cold, sweet foods or beverage[14].
- Teeth with obvious pits or holes[15].
- Any surface that has brown, black, or white discoloration of tooth[15].
- Bad breath and foul tastes[16].
- Fever, chills, abscess, and trismus (www.rightdi-agnosis.com).

Complications

- Ludwig angina with cavernous sinus thrombosis can be fatal[17].
- Dental diagnosis, tooth loss, pulpitis, and toothache (www.rightdiagnosis.com). Drugs

Diagnosis of Dentalcaries

Primary Diagnosis

A small chalky patch (smooth surface caries) may be the first appearance, but it could gradually grow into a big cavitation. Examine every surface of the teeth that is visible with an explorer, dental mirror, and a bright light source. For less noticeable tooth regions, such as cavities in between teeth, dental radiography, or X-rays, are utilized.

Nowadays, interproximal decay (between teeth) can also be detected with lasers that don't emit ionizing radiation. In order to identify pit and fissure caries, dentists commonly use visual and tactile inspection in addition to radiography[18]. By removing moisture and altering the optical characteristics of the unmineralized enamel, blowing air across the suspicious surface is a common method for diagnosing early, uncavitated caries[19].

Differential Diagnosis

Dental caries is caused by dental fluorosis and tooth developmental abnormalities, such as decreased tooth mineralization and tooth hypoplasia[19].

Drugs

- Tulsi
- Neem
- Orange peel
- Pomegranate peel
- Miswak
- Turmeric Powder
- Camphor
- Rocksalt
- Zindatelismath
- Amla
- Clove
- Cinnamon
- Mint

Treatment

Preservation of the tooth's structure and prevention of more tooth damage are the objectives of treatment. Above all, whether the carious lesion is cavitated or not affects how it is managed.

Non-Cavitated Lesions

It can be stopped, and remineralization can take place, if broad dietary modifications are made, such as cutting back on refined carbohydrates[20]. Through tooth remineralization, it can be treated non-operatively.

Tooth Remineralization

Minerals are restored to the tooth's molecular structure through a process known as tooth remineralization. Damaged tooth structure does not completely heal, but if dental hygiene is maintained at its best—twice daily brushing with fluoride toothpaste and flossing, as well as frequent topical fluoride application—remineralization of very minor carious lesions may take place. This kind of care for a carious lesion is known as "nonoperative treatment"[19].

Cavitated Lesion

Is far more difficult to restore, and a dental restoration is typically recommended, especially if dentin is involved. This type of care for a carious lesion is called "operative treatment."

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Other Measures

Prevention And Control

Oral Hygiene

Personal hygiene care consists of correct brushing and flossing everyday[16]. correct brushing and flossing are to remove and prevent the production of plaque or dental biofilm. Professional hygiene care consists of frequent dental examinations and professional prophylaxis (cleaning)[20].

Dental Sealants

The molars' chewing surfaces are coated with a thin substance that resembles plastic to keep food from becoming stuck in cracks and pits[21].

Dietary Modification

It is advised to cut back on snacking because it provides a steady flow of food for the oral bacteria that produce acid. It is advised to clean your teeth after meals since chewy, sticky items (such sweets or dried fruit) tend to stay on your teeth longer. For kids, the American Diabetes Association and the American Paediatric Association advise minimizing the number of sugar-filled beverages consumed and avoiding feeding babies bottles while they are sleeping. Reducing dental biofilm is facilitated by chewing gum that contains the sugar alcohol xylitol.[20]

CONCLUSION

The Significant issues for the person may arise from substantial caries damage, which could impair their functional and aesthetic quality of life. Their understanding of oral health care can be improved by raising their awareness of and familiarity with dental caries in general. Being able to recognize potential risk factors for health issues, such as lifestyle, ethnicity, health status, and social determinants linked to oral health status risk, allows healthcare professionals to actively participate in health screening to determine whether clinical preventive services, including dental preventive services, are necessary. Health care providers who possess the necessary information and practice good oral hygiene can be valuable contributors to the education of individuals and organizations about oral health and serve as role models for patients, friends. Oral health is a component of overall health. Therefore, preventing dental cavities is a crucial part of public health initiatives.

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