ORIGINAL RESEARCH PAPER

Dentistry

DARK CHOCOLATE-PROMISING AGENT IN CARIES PREVENTION

KEY WORDS:

Abarna P. S CRI Adhiparasakthi Dental College And Hospitals

ABSTRACT

Cocoa is one of the key ingredients in chocolate. It is claimed that certain anti-cariogenic compounds are present in extracts from this cocoabean husk. It has been demonstrated that the husks of cocoa beans have two different modes of action, one of which exhibits antiglucosyltransferase (GTF) activity and the other antibacterial activity. They work to prevent bacterial adherence to the tooth surface, which reduces microbial development. Several compounds have been found, and efforts have been made to incorporate them into products like toothpaste, mouthwash, and others. The purpose of this review is to highlight the most current developments in the use of cocoa bean extracts in dentistry.

INTRODUCTION:-

Does "healthy" food have to be bland or flavorless? No, it isn't always the case. Some of the nourishing meals that may be discovered in nature are not only wholesome but also tasty. Fruits, herbs, meat, and chocolate are a few examples. So "why are the chocolates healthy," you ask? Due to its high sugar and fat content, chocolate has a poor reputation. Obesity, high blood pressure, coronary heart disease, type 2 diabetes, and dental cavities are all invariably linked to it. [1] What results from untreated dental caries? Dental caries that are left untreated could lead to other problems like the inability to eat, sleep, or concentrate, in addition to the caries itself.

A popular myth Is that because chocolate is the king of junk foods, it is the leading cause of tooth cavities? But, the truth is that among all he list of cariogenic substances does not include chocolate. Apart from this, chocolate has a positive feature because it contains cocoa powder, which is made from cocoa beans (refined chocolates are excluded). It is said that this cocoa bean has anticariogenic compounds. [3]

On the other hand, a vaccine for cavities is still in the early phases of development. Even if it reaches the general market, it is doubtful whether it will be practical and affordable for the average person, particularly in developing nations. Antibiotics are used for everything in the age of modern medicine. In addition to increasing problems like antibiotic resistance and drug allergies, this has also lessened the problems. Returning to nature would be a secure substitute. Researchers are therefore motivated to find anti-cariogenic drugs with minimal side effects. Extracts from cocoa beans have been used to stop the development of caries.

Origin Of Dark Chocolate:

Almost 3,000 years ago, dark chocolate was first discovered. [11] In 1900 B.C., it then developed as a beverage in Central and South America. That was the only kind of chocolate that was attainable at the time. Subsequently, it developed into a novel and unique beverage that was provided at Aztec and Mayan ceremonial events. It was also very well-liked for therapeutic uses. Although natural dark chocolate is bitter, it has been altered over time.

Early in the 1500s, chocolate was discovered in Spain. It was brought back to Europe and given sugarcane and honey to make it sweeter, paving the way for milk chocolate production. In the early 1600s, Hans Solan, a resident of Jamaica, Dark chocolate was given a little milk to bitter down its flavour. Daniel Peter and Henri Nestle were the first two people to add "condensed milk" to milk chocolates when they created them in 1847. Following then, chocolates were made into solid forms. Milk chocolate began to be produced in large quantities around the turn of the 20th century, and it quickly overtook dark chocolate in popularity. Due to its important health benefits, however, dark chocolate has recently earned some appeal and attention.

Composition Of Dark Chocolate:

Theobromine, which is present in 50% to 90% of the cocoa beans used to make dark chocolate, is its main component. 1.2%-2.4% Iron (Fe), magnesium (Mg), zinc (Zn), copper (Cu), potassium (K), selenium (Se), phosphorus (P), and manganese (Mn) are among the minerals present. Antioxidants such as flavanols, monomers, epicatechins, and polyphenols (flavanols), as well as cocoa butter and sugar

Benefits Of Dark Chocolate For Our Health:

By restoring the flexibility of the arteries and preventing leucocyte margination, dark chocolate can lower the chance of developing atherosclerosis. [17]

The flavanol-containing cocoa beans, which may help prevent cardiometabolic disorders [18].

Patients with stage I hypertension benefit from the high amounts of polyphenol found in dark chocolate by having better endothelial function and lower blood pressure. [19]

Consuming dark chocolate helps the blood vessels stay healthy and increases circulation, both of which help prevent type II diabetes mellitus. Flavanoids found in dark chocolate help lower insulin resistance. Flavonoids support healthy cell activity and restore the body's ability for cells to utilize insulin effectively. [20]

By boosting heart and brain blood flow, dark chocolate enhances cognitive function. The key chemicals' stimulating effects have a positive impact on the brain and cognitive health. Phenylethylamines cause the brain to release endorphins, which increase alertness. [21]

Caffeine, a mild stimulant with less caffeine than coffee, helps with alertness, weight loss, enhancing athletic performance, boosting brain functions, and aiding in memory, among other things. [22]

Antioxidants found in dark chocolate defend against free radicals, which are uncharged molecules that cause oxidative stress or cell damage. [23]

It lessens the effects of aging and safeguards the body against many malignancies and tumor types. [24]

Theobromine, a substance found in dark chocolate (Theobroma cacao), hardens tooth enamel and lowers the incidence of dental cavities. A bitter alkaloid found in the cocoa plant that goes by the name of xantheose Its chemical name is C7H8N4O2. The main sources of it are kola nuts, tea leaves, and chocolate. [25]

Dark chocolates (about 10 g/kg) have higher theobromine concentrations than milk chocolates (about 1–5 g/kg). More cocoa beans are likely to be consumed with chocolate.

Dark Chocolate's Anricariogenic Property:

Streptococcus mutans is attributed as the main causative agent of dental caries in humans. It produces three types of glucosyltransferase (GTF): GTFB, GTFC, and GTFD. It synthesizes glucan, which is an adherent and water-insoluble, from sucrose, thereby adhering firmly to the surface of the tooth [27]. The adherent glucan in which the accumulation of acids occurs contributes to dental plaque formation, resulting in localized demineralization of the enamel surface of the tooth [28]. Cocoa bean husks contain higher molecular weight polyphenolic compounds that have the firm anti-glycosyltransferase property. The unsaturated free fatty acid contents, like oleic acids, linoleic acids, etc., have antibacterial activity against S. mutans. These biologically active compounds confer cacao bean husk caries-preventing properties. [27]

Studies done to identify the mechanism of action of the anticariogenicity of theobromine compounds showed the formation of an apatite structure medium that enhances the remineralization of the tooth surface. [29]

Scientists have learned from tests that theobromine, an ingredient in cocoa beans, protects teeth better than fluorides.

In an in vitro study, there was a comparison of antibacterial activity in 3 patients. The first is a fluoride-free chocolate-based toothpaste called theobromine, while the other two are fluoride-containing toothpastes that are readily accessible in stores. [30] Findings indicated that, due to the absence of non-toxic fluoride, theobromine toothpaste demonstrated a greater zone of microorganism inhibition compared to other fluoride toothpastes. It also demonstrated enamel remineralization and blended easily with calcium and phosphate to speed up the process.

Moreover, patients with dental fluorosis, tooth discoloration, or hyperplasia of the enamel should use toothpaste containing theobromine. [31] [32]

Another study comparing cacao bean husk extract mouthwash to chlorhexidine mouthwash as an antibacterial agent revealed comparable significant reductions in Streptococcus mutans counts in saliva in both groups at all follow-up intervals, demonstrating that this mouthwash is a good substitute for chlorhexidine. [33]

Effects On Periodontium:

Periodontitis progresses differently as a result of oxidative stress. Flavonoids in cocoa, which have antioxidant qualities and may reduce gingival oxidative stress in periodontal diseases, are abundant. In a study on animals, eating a diet high in cocoa reduced gingival oxidative stress and periodontal inflammation.

CONCLUSION:-

Indeed, dark chocolate is healthy for our teeth. It is able to stop dental cavities. Although not all chocolate is good for your teeth, the cocoa bean is the key element that gives chocolate its health benefits. Many vitamins and antioxidants included in cocoa beans are beneficial to the entire human system, not just the mouth and teeth. Most notably, they aid in the prevention of caries by preventing microbial adhesion to the teeth. Polyphenol reduces the amount of bacteria in the mouth and prevents halitosis. It contains flavonoids that play a part in reducing periodontal issues and slowing the spread of caries.

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