



Comparative Study of Antimicrobial Activity of Herbal, Non- Herbal Toothpastes and Wooden Coal

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ABSTRACT

Oral bacteria can contribute in various diseases. Many herbal and non-herbal types of toothpaste are sold in local markets for oral health. The present study was aimed to carry out comparative study of antimicrobial activity of different brands of toothpastes against *Shigella*, *Salmonella*, *Staphylococcus* and *Bacillus* sp. by agar well diffusion method. Additionally, wooden coal was also studied for its antimicrobial activity, as it is used in rural areas for tooth cleaning. Toothpastes containing herbal ingredients showed maximum inhibitory activity against all these bacteria, non-herbal toothpaste showed less inhibition as compared to herbal toothpaste whereas wooden coal failed to show any antimicrobial activity against these bacteria.

Key words: Toothpaste, wooden coal, antibacterial activity

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INTRODUCTION

On general quality of life and wellbeing, oral health has a considerable influence[1]. The microbial ecology of the mouth cavity is recognised to have an impact on the majority of infectious oral disorders, including periodontal disease and dental caries [7].The global demand for efficient preventative and treatment products has increased as the prevalence of oral problems has increased[1].Mechanical tooth cleaning with toothbrushes and interface brushes is the most popular and straightforward technique for delivering oral dental care[4]. Toothpaste is used to boost the mechanical cleaning effectiveness of toothbrushes [4]. As evolving and developing oral hygiene products, toothpaste has always been made available to consumers [4].Toothpaste is categorised as a pharmaceutical not a cosmetic because it includes ingredients like, *Curcuma longa*, sodium fluoride, *Menthaspicata*, sodium lauryl sulphate etc. to decrease microbial burden. The main objectives of toothpaste are to decrease germs in mouth, add fluoride to teeth, and promote dental health [2].In order to reduce, control, and prevent the build-up of periodonto pathogenic and cariogenic microorganisms, the inclusion of various antimicrobial drugs has been proposed as a feasible strategy[3].

Chlorhexidine is now thought to be the most powerful antibacterial substance when used in dentistry as mouthwash because of its broad-spectrum action against yeasts, viruses and Gram-negative and Gram-positive bacteria [3]. Due of their prominence in dental biofilms, natural antimicrobials found in herbal toothpastes have been speculated to be just as effective as chlorhexidine for both rapid and delayed bacterial killing [3].

Among the essential elements of oral health services is the use of herbs, which have been utilised in herbal toothpastes for many years in ancient times[5].Several nations have a long history of using charcoal for mouth hygiene[6].Some toothpaste products contain charcoal or activated carbon as a component[4].Due to the capacity of charcoal, fluoride, and other active ions to bind to teeth, toothpaste containing activated charcoal may not always have the desired benefits[4].

MATERIAL AND METHODS

Selection of toothpastes for analysis:In this study, two commercially available toothpastes, Dantakanti and Colgate were used.Dantakanti was studied as herbal toothpaste as it contains key ingredients such as Pudina (*Mentha Piperita*), Laung Oil (*Syzygium Aromaticum*), Akarkara Root Ext(*Anacyclus Pyrethrum*). Babool (*Acacia Arabica*), Haldi (*Curcuma Longa*), Tomar Seed Oil(*Zanthoxylum Alatum*), Pippali Chhoti (*Piper Sylvaticum*), Bakul (*Mimusops Elengi*).Colgate studied as a conventional toothpaste and its

ingredients are Water, Hydrated Silica, Sodium Lauryl Sulfate, Flavor, Sodium Fluoride, CI74160, Sorbitol, Sodium Hydroxide, PVM/MA Copolymer, Sodium Saccharin, Carragenan, Triclosan, CI77891.

Wooden coal Sample: wooden coal were randomly collected and transported to the laboratory to study antimicrobial activity.

Antimicrobial activity assay: Antimicrobial activity was tested against different microorganisms viz. *Shigella*, *Salmonella*, *Staphylococcus* and *Bacillus* sp. The isolates of these organisms were collected from Microbiology Laboratory, Yashwantrao Chavan Institute of Science, Satara. The sample of toothpastes and wooden coal were examined using the Agar well diffusion technique using Mueller Hinton Agar media for antibacterial activity.

Measurement of inhibitory Zone: The plates were incubated for 24 hours at 37 °C. Inhibition zones were measured after incubation. Antimicrobial activity of each sample was expressed in terms of zone of inhibition (mm) produced by respective sample.

RESULT AND DISCUSION

The goal of current study was to compare the antimicrobial effectiveness of toothpaste having herbal ingredients, toothpaste containing non-herbal chemical compounds, and wooden coal against various bacterial species. A comparison of the antibacterial effects of toothpaste and coal was carried out. Toothpastes showed a considerable zone of inhibition against the chosen microbial populations (Table 1).

Table:1. Antimicrobial Activity of Toothpastes and Wooden Coal against test organisms

Samples	Antimicrobial Activity(Zone of Inhibition) in mm			
	<i>Shigella</i> sp.	<i>Salmonella</i> sp.	<i>Staphylococcus</i> sp.	<i>Bacillus</i> sp.
Dantakanti (Herbal Toothpaste)	32	40	36	40
Colgate (Non-herbal Toothpaste)	18	-	30	28
Wooden Coal	-	-	-	-

During the investigation it was found that amongst the test organisms, *Salmonella* and *Bacillus* sp. Showed maximum susceptibility (40mm zone of inhibition) to herbal toothpaste- Dantakanti, followed by *Staphylococcus* and *Shigella* sp. (36mm and 32mm zone of inhibition respectively). For non herbal toothpaste-Colgate, *Staphylococcus* sp. was most sensitive (30mm zone of inhibition) than *Bacillus* and *Shigella* sp. (28mm and 18mm zone of inhibition respectively). Colgate was failed to show any inhibitory action against *Salmonella* sp. whereas wooden charcoal was not shown antibacterial activity against any test organisms. (Figure1).

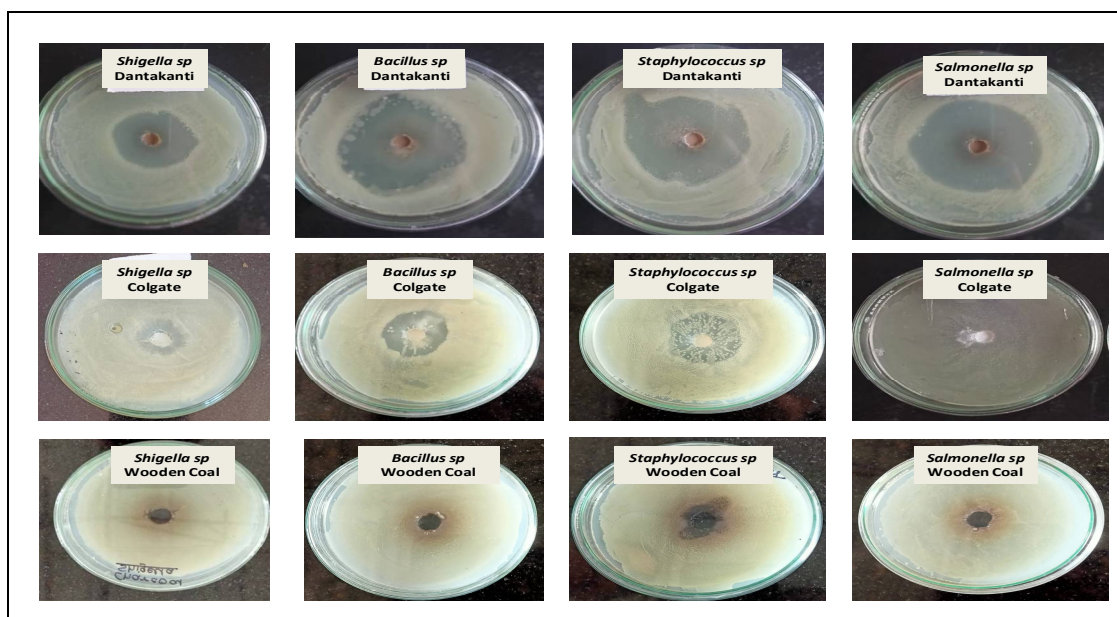


Figure 1. Antimicrobial activity shown by Toothpastes and Wooden coal

CONCLUSION

The greatest inhibitory efficacy was seen against all tested organisms, indicating that the bacterial species were sensitive to the herbal toothpaste (Dantakanti). In comparison to herbal toothpaste, the test organisms were less susceptible to non-herbal toothpaste (Colgate). And it was discovered that none of the test organisms were susceptible to wooden coal.

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