



## The Antimicrobial Effect of Commercial Available Local Brand of Toothpastes Against Some Dental Caries Microorganisms

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### Abstract

The present study was designed to choose the best toothpaste, were using every day to reduce proliferation microorganisms in mouth as well as bad smell of mouth because of presenting microorganism in mouth and were found food between teeth. The antimicrobial activity of seven different toothpastes Emoform, Colgate, Signal, Crest, Sanino, Close up & Sensodyne were evaluated on some pathogenic oral microorganisms: *Streptococcus mutans*, *Micrococcus spp.*, *Proteus vulgaris*, *Staphylococcus aureus* & *Candida albicans*. After wash the volunteers teeth with toothpaste, Emoform toothpaste was more effect than another type by killing of all type of bacteria. The antimicrobial activity was performed by using agar well diffusion method demonstrate that the Emoform toothpaste its more effect than another types. the diameter of inhibition zone was (30, 25, 23, 31, 27 and 35 mm) against *C. albicans*, *S.aureu*, *Str. Mutans*, *Micrococcus spp*, *P. vulgaris*, *S. epidermidis* and *B. subtilis* respectively. In conclusion the antimicrobial activity of Emoform, Colgate, Crest were better than Sanino, Sansodyne and Close up.

**Key words:** Antimicrobial activity, toothpaste, teeth decay

### Introduction:

Bacteria form an important group of microorganisms found in both healthy and diseased mouths. There have been more than 300 types of bacteria found in the mouth [1]. Commensal bacteria are regarded as beneficial by depending against the colonization of invading pathogen [2].

One might think thus suggests that the oral cavity is a relatively easy environment for bacteria to colonize. However, relatively few of the oral bacteria are found further along the gastro-intestinal tract. This illustrates the unique ecology of the oral cavity and the specialized of the bacteria that resides in it [1].

More over, a bacterial accumulation on oral surfaces is a major factor in the development of most of the common dental diseases such as dental caries and penitential disease [3].

Toothpastes and brushes are among the physical forces that remove plaque. Fluoride containing toothpastes have a significant effect on the initiation and progression of cares [4].

Within these fluorides containing toothpastes is a cationic agent called chlorhexidine. Chlorhexidine has been documented for it's ability to inhibit the formation of dental plaque. However, the use of chlorhexidine has a few drawbacks. The first drawback is the staining of teeth and tongue [3].

Triclosan, a compound commonly used for disinfection is another broad-spectrum antibacterial agent manufactured specially for use in oral care [5]. This study was aimed to test the effect of seven commercial toothpaste against teeth decay bacteria.

### Material & Methods

#### A- Isolation Method

The samples were collected from 100 people with sterile swab from teeth decay and were taken to the microbiology laboratory 30 min after collection. Each sample was inoculated onto blood agar plates, Chocolate agar, MaConkeys agar was also used and incubated aerobically. Sabouraud glucose agar was used for culture *Candida* spp. All plates were incubated at 37C for 24 hours, with further 24 hours incubation if there were no growth [6].

#### B- Steps of identification and maintenance of test organisms

Direct smears were prepared and stained with gram stain. All morphological arrangement and its reaction with the stain were studied by using light microscope. Biochemical reactions, sugar fermentation tests, bile solubility, starch hydrolysis, gelatin digestion, catalase, lecithinase, indole production and nitrate reduction tests, which are the most characteristics tests to differentiate between them. All pure cultures were stored and maintained in nutrient broth at 4°C for further use [7].

#### C-Collection of toothpastes

Seven type of toothpastes brands commonly used in Iraqi were bought from the market, and immediately taken to the Laboratory, Microbiology Department, University of Babylon.

#### D-Testing the bactericidal activity of toothpastes:

Choice [10] volunteers from positive result and wash their teeth with all type of toothpaste and then the



bacteria were isolated after wash . The toothpaste used in a separate days about 7 days to collect samples concerning the different toothpaste.

**E- Antibacterial Assay**

The antibacterial activity of the different toothpaste was done by agar well diffusion method by mixing 2g each of the toothpastes in 5 mL of sterile distilled water respectively of the various toothpaste brands. A sterile 8mm cork-borer was used to made wells in the Muller Hinton agar media. 0.2ml of the toothpaste dilutions was introduced into each of the wells while the same amount of sterile distilled water was introduced into the first well as control. The plates were incubated at 37°C for 24hours. The antimicrobial activity was evaluated by measuring the diameters of inhibition zones (mm). [8].

**F-Statistical analysis:**

Statistical analysis was performed using SPSS statistical computer software version.

**Result& Discussion:**

The use of a toothpaste as an adjunct to tooth brushing may assist oral hygiene practices in a number of ways. It may prevent plaque formation by interfering with bacterial adherence to the tooth surface and reducing salivary bacterial numbers [ 9].

In this research present 79 samples positive from 100 samples 56 samples from male, 23 from female, (p<0.05) table (1) The result showed the most prevalent type of bacteria isolated from teeth decay was *Streptococcus mutans* table (2).

After wash the volunteers teeth with toothpaste, Emoform toothpaste was more effect than another type by killing of all type of bacteria, followed by Crest and Colgate that kill all type of bacteria except one Table (3) .

**Table (1) the number of positive and negative result isolated from teeth caries**

Type of samples	Positive NO.(%)	Negative NO.(%)	Total NO.(%)
Male	56(56)	14(14)	70(70)
Female	23(23)	7(7)	30(30)
Total NO.(%)	79(79)	21(21)	100(100)

p<0.05 significant difference

**Table(2) :Type and number of bacteria isolated from teeth**

Type of bacteria	Number
<i>Candida albicans</i>	43
<i>Staphylococcus aureus</i>	32
<i>Streptococcus mutans</i>	45
<i>Micrococcus spp.</i>	5
<i>Proteus vulgaris</i>	14
<i>Staphylococcus epidermidis</i>	26
<i>Bacillus subtilis</i>	19



Table (3) *In vivo* effect the using toothpaste on teeth caries bacteria

Volunteers People	Bacterial type number before using toothpaste	Bacterial number after using toothpaste						
		Crest Mild mint	Colgate miswak	Signal	Sensodyne Extra fresh	Emoform Gum care	Sanino original	Close up Deep action
1	7	2	-	3	5	-	2	2
2	5	-	2	3	3	-	1	3
3	7	-	-	4	4	-	-	2
4	3	-	-	2	2	-	-	-
5	6	-	-	2	4	-	2	-
6	2	-	-	-	2	-	1	-
7	6	-	-	2	4	-	3	-
8	4	-	-	-	3	-	1	2
9	1	-	-	-	1	-	-	-
10	2	-	-	1	1	-	-	-

The diffusion method can be used as a preliminary test for detecting antimicrobial activity in substances or products. Since the diffusion phenomenon depends on each substance's physical-chemical properties, as for example its diffusion coefficient, as well as the medium where the diffusion occurs [10]. The effect of seven toothpaste on growth of bacteria by using well diffusion method demonstrate that the Emoform toothpaste its more effect than another types.

Followed of Crest, Colgate and Close up while Sensodyne and Sanino are less effect on the isolated bacteria ( $p < 0.05$ ) table (4).

The stronger antimicrobial properties of Emoform toothpaste belong to the ingredients (glycerin, magnesium carbonate, hydroxide, sodium carbonate, potassium nitrate, sodium chloride, cellulose gum).

Table(4):The diameter of inhibition zones (mm) in seven toothpastes against bacteria

Toothpastes Bacteria	Diameter of inhibition zone[mm]						
	Crest Mild mint	Colgate miswak	Signal	Sensodyne Extra fresh	Emoform Gum care	Sanino original	Close up Deep action
<i>Candida albicans</i>	30	24	15	3	30	12	23
<i>Staphylococcus aureus</i>	28	22	12	2	25	8	18
<i>Streptococcus mutans</i>	31	21	9	1	23	14	22
<i>Micrococcus spp.</i>	26	28	16	0	31	18	16
<i>Proteus vulgaris</i>	24	19	20	0	27	7	25
<i>Staphylococcus epidermidis</i>	32	17	13	5	35	19	24
<i>Bacillus subtilis</i>	28	20	8	0	31	10	19



$p < 0.05$  significant difference In conclusion this study, the Emoform was better than other toothpastes Crest, Colgate & Signal .

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