

Mouth Gargles and Antimicrobial Activities of Extracts of Corn Silk

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ABSTRACT

Carries and plaque of dental are the most widespread diseases, this problem are caused by the mixture of microorganisms and debris of food and are caused by a mixture of microorganisms and debris of food debris. *Streptococcus mutans* are the main culprit for dental problems that colonize on the dental surface and caused damage to the tooth surface. Corn silk alludes to the marks of shame of *Zea mays* L. (Gramineae) from the female blossoms of maize. it is restoratively utilized in the treatment various infection. Screening of plant against pathogenic microscopic organisms is a significant stage to approve its restorative properties. Subsequently, the point of this review was to research the capacity of extracted corn silk to inhibit the growth of cariogenic bacteria and compare the efficacy with commercial gargles and Amoxi-Clav antibiotics.

Our *in-vitro* study results show a double inhibition effect on *S. mutans* as compared with amoxi-clav, and a significant inhibitory effect compared with commercial gargles. Corn silk extract were tested for their antimicrobial activity and showed higher significant activity than amoxi-clav and commercial gargle against *S. mutans* ($p < 0.05$).

Keywords: Antimicrobial activity, Corn silk, Herbal therapy, Plant extract.

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INTRODUCTION

Dental caries is one of the most well-known and expensive infections on the planet. To diminish the pervasiveness of caries, an improved understanding of the role of microorganisms in dental diseases is needed.¹ The tooth surface is covered with a biofilm—a sludge layer comprising millions of bacterial cells, salivary polymers, and food debris. Uncontrolled, this biofilm can without much of a stretch arrive at a thickness of many cells on the surfaces of the teeth. The framed biofilm, additionally called plaque, gives an incredible attachment site to the colonization and development of numerous bacterial species.

S. mutans produces adhesions on the cel¹ surface that potentiate adherence to host surface, including collagens, fibronectins and lamins that form much of the extracellular matrix in host tissue.² Polysaccharide capsules of *Staphylococcus* are important to maintaining it to prevent immunoglobulin binding and interfere with immune recognition and subsequent opsonization, this enables persistent colonization in the bloodstream of the host.³ In Chinese medication, corn silk is used for edema of different origins and hepato-biliary disease.⁴ The therapeutic properties of corn silk upheld by a few creators as it displayed cell reinforcement action,^{5,6} against the diabetic activity,^{7,8} anti-toxin action towards earworm.⁹ Insect attack resistance,¹⁰ and

antitumor action.¹¹ The standard methodologies for deciding likely restorative utilization of plants and their synthetic constituents is to evaluate them for action against a wide scope of infections, microscopic organisms and pathogenic growths; accordingly, the current work as attempted to further.

This investigation showed the efficacy of corn silk extract against *S. mutans* and compared the activates with standard antibiotic amoxi-clav and commercial gargles.

MATERIALS AND METHODS

Core Silk Harvested

The yellow maize crop, a Dutch hybrid, was cultured in the spring lug, and when the female flowering stage was completed and the silk appeared, it was cut and taken from the good plant that is not exposed to disease or insects.

Plant Extract

An absolute 150 gram of silk were defatted independently with an adequate measure of hexane dissolvable for 24 hours to eliminate any greasy materials, the dried defatted material (just 100 gram) was pressed in a thimble, the thimble then, at that point, set in a soxhlet extractor 540 mL of 80% methanol^{12,13} was put in the round flask. The example was extricated until complete limpness for around 12 hours.

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The alcoholic concentrate was separated by channel paper to eliminate the marce. The filtrate was thought under decreased pressure utilizing a revolving evaporator.^{12,13}

Antimicrobial Screening

S. mutans were acquired from typical individuals and cultured by utilizing changed media (mitis-salivaris agar with 0.2 unit/mL bacitracin).¹⁴

The Kirby-Bauer technique method was used to determine the inhibitory potential of microbial growth.¹⁵ Few colonies were mixed with sterile 0.8% of nutrient broth solution and compared the turbidity with standard 0.5 McFarland solutions, equivalent to 106–108 CFU/mL. The inoculum was added to molten agar and the media was entirely shaken to scatter the microorganisms.

The test was done by preparing the inoculums by adding five isolated colonies grown on a modified mitis-salivaris agar plate to 5 mL of nutrient broth and incubated at 37°C for 18 hours and compared with (0.5) McFarland standard tube. A sterile swab was utilized to acquire an inoculum from the bacterial suspension, this inoculum was streaked on a Mueller-Hinton agar plate and left to dry. The test openings were finished by a planned piece of the metal tip on the outer layer of the medium at equally dispersed spans and the antimicrobial circle was get by flared forceps and brooded for 24 hours at 37°C. After that the Hindrance zones were estimated utilizing a ruler and contrasted and the zones of restraint were controlled.

Molecular Identification of *S. mutans*

DNA extraction was done from mixed of *Streptococcus* spp cultured on modified Mitis Salivaris Agar (MSA). Furthermore, the strategy was performed by conventions suggested by the manufacturer (Bioneer/ Korea).

Dissolving of Primers

In this study the primer pairs used in this study were dissolved utilizing TE Buffer, 1X (pH 8.0).

Composed of 10 mM Tris-HCl containing 1mM EDTA-Na2. Firstly, the primer stock tube is prepared, then the working solution is prepared from primer stock tube. According to the instruction provided by primer manufactured company (Bioneer/Korea). The TE buffer was added to get a 100 picomole/microliter concentration of primer stock solution. The working solution was prepared from stock by dilution with TE buffer to get 10 picomole/microliter.

Species-Specific Primer and the Amplification Conditions

The primer used, amplification condition and product size were mentioned in Tables 1 and 2.

The Mixture of Reaction

The DNA amplified was put in the 20 µL reaction mixture as mentioned in Table 3.

Table 1: Specific primers sequence and amplicon size

Primer name	Sequence	Product size (bp)	Reference
<i>Sm479</i>	F: TCGCGAAAAAGATAAACAAACA R: GCCCCTTCACAGTTGGTTAG	479	Zhou <i>et al.</i> , 2007

Table 2: The Cycling conditions

Steps	Temperature	Time	No. of cycles
Initial denaturation	94 C°	3 min	1
Denaturation	95 C°	30 sec	40
Annealing	55 C°	30 sec	
Extension	72 C°	59 sec	
Final extension	72 C°	5 min	1

Table 3: Contents of the reaction mixture

No.	Contents of reaction mixture	Volume
1.	Green master mix	10 µl
2.	Upstream primer	1µl
3.	Downstream primer	1µl
4.	DNA template	2 µl
5.	Nuclease free water	6 µl
Total volume		20 µl

Gel Electrophoresis

The PCR resulting product run in 2% agarose gels. It was prepared by dissolving 2 g of powder agarose in 100 mL of TBE buffer in a boiling water bath, then allowed to cool to 50°C, at a concentration of 5 µL ethidium bromide was added. The comb was fixed at one end of the tray for making wells used for loading DNA, then the agarose was poured gently into the tray, solidify was allowed at room temperature for about 30 minutes. Then the comb was removed slowly from the tray. The tray was fixed in an electrophoresis chamber filled with TBE buffer covering the gel's surface. The electric current was allowed at 70 volts for two hours.¹⁶

RESULT AND DISCUSSION

Only two (out of seven) samples were positive confirmed by PCR obtained with *S. mutans* shows in Figure 1.

Also the result showed that the best action as an inhibitor against *S. mutans* found when corn silk extract with 10% concentration as compared with commercial moth gargle and amoxi-clav (antibiotics) as shown in Table 4.

The corn silk extract 10% shows the double inhibition zon as compared with amoxi-clav. On the other hand, no effect

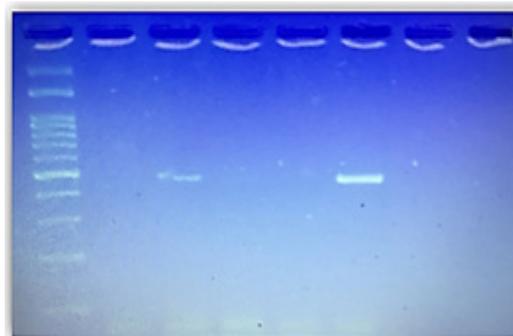


Figure 1: Gel Electrophoresis of PCR product of specificity Sm479F/R Primers by PCR, Observed from *S. mutans*.

Table 4: Zone of bacterial inhibition and concentration according to the material used.

No.	Materials used	Concentration and active ingredient	Zone of inhibition
1.	Extracted corn silk	Corn silk extract 10%	20 mm
2.	Extracted corn silk	Corn silk extract 100%	0 mm
3.	Extracted corn silk	Corn silk extract 1000%	0 mm
4.	Commercial gargles	Aqua, alcohol, Sorbitol, Arina, Pokixaner407, Benzoic acid, Eucalyptl, Methyl salicylate, Thymol, Sucralose, Menthol, Sodium benzoatae and Glycerin.	0 mm
5.	Sterail distill water	Steril distal water	0 mm
6.	Amoxi-clav	20/10 µg	10 mm

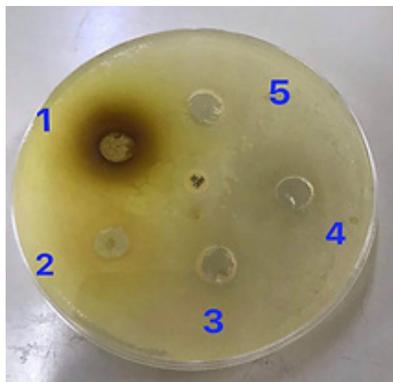


Figure 2: Corn silk extract(10%) present in number 1, commercial gargles present in number 2, corn silk extract(100%) present in number3, corn silk extract (1000%) present in number4, distal water present in number 5 while the amoxi-clav in the center of a petri dish.

appear when used in commercial gargles, distilled water, corn silk with 100 and 1000% concentration (see below figure 2).

The anti-bacterial activity was due to the presence of chitosan and dextran, which have this activity.¹¹

Also, the low activity of commercial mouth gargles may be due to poor quality control in our country, which appears to have the same result as compared with sterile distal water.

CONCLUSION

In this *in-vitro* study, we conclude that using corn silk extract as mouth gargles at 10% significantly minimizes the growth of harmful decay-causing bacteria (*S. mutans*) compared with amoxiclav and commercial gargles. Also, we suggest that using corn silk extract will help overcome resistance to bacteria, especially in the case of gingivitis. The best corn silk extract inhibitor effect appears on 10% concentration.

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