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*Streptococcus sobrinus*에 대한 *Dryopteris crassirhizoma*의 항균활성

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Antimicrobial activity of *Dryopteris crassirhizoma*  
against *Streptococcus sobrinus*

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요 약

약용식물로부터 충치예방물질을 개발하기 위하여 우리나라에서 전통적으로 널리 사용되어 왔던 10종류의 약용식물로부터 에탄올 추출물을 분리하였다. 이를 대상으로 충치 원인균인 *Streptococcus sobrinus*에 대한 항균활성을 나타내는 약용식물을 조사하였다. 관중의 에탄올 추출물이 *S. sobrinus*에 대해 항균활성을 나타냈다. 이 결과를 근거로 하여 관중의 추출물은 *S. sobrinus*에 대한 충치 예방물질로서 가능성이 있음을 나타낸다.

ABSTRACT

As part of our screening of anticariogenic agents from medicinal plants, the ethanol extracts of 10 herbs widely used in the folk medicine were tested for the antimicrobial activity against a cariogenic bacterium *Streptococcus sobrinus*. The ethanol extracts of *Dryopteris crassirhizoma* showed antimicrobial activities against *S. sobrinus*. These results suggested that the extracts of *Dryopteris crassirhizoma* could be the potential source of antimicrobial agent against *S. sobrinus*.

키워드

*Streptococcus sobrinus*, *Dryopteris crassirhizoma*

## I . Introduction

Oral *streptococcus sobrinus* is major constituents of dental plaques. Dental plaques are caused by acids produced from the fermentation of food in the mouth dissolving the calcium component and finally resulting in teeth loss. Streptococci is known to be potent in creating dental caries. Among the several species of Streptococci, *Streptococcus sobrinus* is predominant strains in human dental caries.

The colonization of *S. sobrinus* on the tooth surface is considered to be the first step in the induction of dental caries. *Streptococcus sobrinus* can adhere to the tooth surface and produce water insoluble glucans from sucrose, which enable *Streptococcus sobrinus* to colonize the tooth surface. The colonized *S. sobrinus* induced dental caries and finally teeth loss. Sometimes *S. sobrinus* invades cells and has been isolated from blood related to cardiovascular disease.

Several types of antimicrobial agents have been proposed to prevent dental caries. For several decades, various types of enzymes and bacteriocins have been isolated from soil bacteria to develop microbial agents that have medical and industrial usage.

In this study, antimicrobial activities of 10 medicinal plant extracts which were prepared from *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Houttuynia cordata*, *Forsythia saxatilis*, *Arctium lappa*, *Castanea crenata*, *Aster tataricus* were evaluated against *Streptococcus sobrinus*. The extracts of *Dryopteris crassirhizoma* showed antimicrobial activity against *Streptococcus sobrinus*.

## II . STRAIN & Materials

Strain; *Streptococcus sobrinus*

Materials; *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Houttuynia cordata*, *Forsythia saxatilis*, *Arctium lappa*, *Castanea crenata*, *Aster tataricus*

## III. METHODS

Medicinal Plant 25g / 500ml 70% Ethanol



Boil with Heating Mantle for 3 Hour



Cooling & Filtration



Concentrate with Evaporator



Dry with Freeze Dryer



Weight & Dissolve with Dimethyl sulfoxide



Disk Diffusion Method

#### IV. RESULTS

Table 1. Antimicrobial activity of medicinal plant extracts against *Streptococcus sobrinus*.

Scientific Name	Medicinal Part	Ethanol Extract (200µg/disk)
		<i>Streptococcus sobrinus</i>
<i>Dryopteris crassirhizoma</i>	Rhizoma	++
<i>Cimicifuga heracleifolia</i>	Rhizoma	-
<i>Bupleurum falcatum</i>	Root	-
<i>Magnolia kobus</i>	Flower Bud	-
<i>Artemisia princeps</i>	Leaf	-
<i>Houttuynia cordata</i>	Herb	-
<i>Forsythia saxatilis</i>	Fruit	-
<i>Arctium lappa</i>	Fruit	-
<i>Castanea crenata</i>	Pericarp	-
<i>Aster tataricus</i>	Root	-

The antimicrobial activity was represented as followed. : -; no inhibitory effect, +; 8.1~10.0 mm, ++; 10.1~13.0 mm, +++; 13.1~16.0 mm.

Table 2. Antimicrobial activity by different concentration of medicinal plant extracts against *Streptococcus sobrinus*.

Scientific Name	Medicinal Part	Concentration (µg/disk)	<i>S. sobrinus</i>
<i>Dryopteris crassirhizoma</i>	Rhizoma	100	+
		200	++
		300	+++

The antimicrobial activity was represented as followed. : -; no inhibitory effect, +; 8.1~10.0 mm, ++; 10.1~13.0 mm, +++; 13.1~16.0 mm



Figure 1. Assay of antimicrobial activity by *Dryopteris crassirhizoma*. 1:0 µg, 2:100 µg, 3:200 µg, 4:300 µg

## VI. CONCLUSIONS

1. The ethanol extracts of 10 medicinal plants were tested for the antimicrobial activity against *Streptococcus sobrinus*.
2. The extracts of Rhizoma of *Dryopteris crassirhizoma* showed antimicrobial activity against *Streptococcus sobrinus*.
3. At the 300ug/disk concentration of the ethanol extract from *Dryopteris crassirhizoma* showed significant antimicrobial activity against *Streptococcus sobrinus*.
4. These results suggested that the extracts from *Dryopteris crassirhizoma* could be the potential source of antimicrobial agents against *S. sobrinus*.

## VII. REFERENCES

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