
Antimicrobial Activity of Medicinal Plant Extracts against *Streptococcus mutans* II

Jin-seong Eum * Young-doo Park

Mokwon University
jseum@mokwon.ac.kr

ABSTRACT

This study was carried out to research antimicrobial agents from medicinal plants, *Pueraria thunbergiana*, *Sophora flavescens*, *Lonicera japonica*, *Pinellia ternata*, *Dictamnus dasycarpus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cryptotympana pustulata*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Houttuynia cordata*, *Forsythia koreana*, *Arctium lappa*, *Castanea crenata*, *Aster tataricus*, *Citrus unshiu*, *Gardenia jasminoides*, *Ledebouriella seseloides*, *Hovenia dulcis*, *Prunus sargentii*. The ethanol extracts of 24 medicinal plants were tested for the antimicrobial activity against *Streptococcus mutans*. The extracts of *Sophora flavescens*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Gardenia jasminoides* and *Ledebouriella seseloides* showed antimicrobial activity against *Streptococcus mutans*. The extracts of *Pinus densiflora* and *Sophora flavescens* among these medical plants showed significant antimicrobial activity against *Streptococcus mutans*. These results suggested that the extracts from *Pinus densiflora* and *Sophora flavescens* could be the potential source of antimicrobial agents against *S. mutans*.

Key word; antimicrobial activity, *Pinus densiflora*, *Sophora flavescens*

I. INTRODUCTION

Dental caries 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 mutans* is the most predominant strains in human dental caries.

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

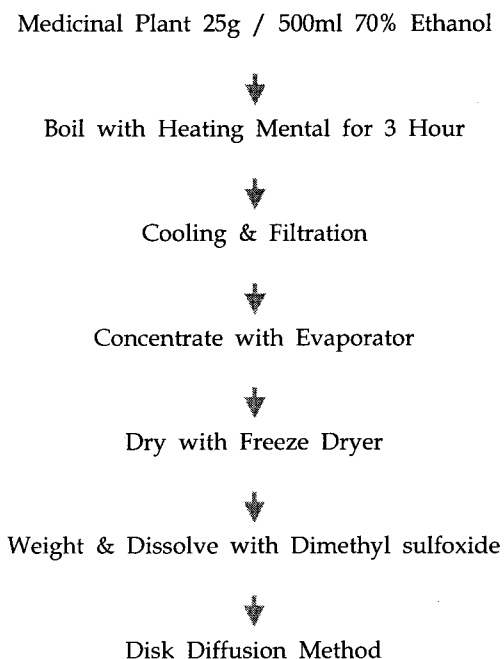
Several types of antimicrobial agents have been proposed to prevent dental caries. For several decades, various types of enzymes and bacteriocins have been isolated from soil bacteria to develop microbial agents that have medical and industrial usage.

In this study, antimicrobial activities of 24 medicinal plant extracts which were prepared from *Pueraria thunbergiana*, *Sophora flavescens*, *Lonicera japonica*, *Pinellia ternata*, *Dictamnus dasycarpus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cryptotympana pustulata*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Houttuynia cordata*, *Forsythia koreana*, *Arctium lappa*, *Castanea crenata*, *Aster tataricus*, *Citrus unshiu*, *Gardenia jasminoides*, *Ledebouriella seseloides*, *Hovenia dulcis*, *Prunus sargentii* were evaluated against *Streptococcus mutans*. The extracts of *Sophora flavescens*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Gardenia jasminoides* and *Ledebouriella seseloides* showed antimicrobial activity against *Streptococcus mutans*.

II. MATERIALS

Pueraria thunbergiana, *Sophora flavescens*, *Lonicera japonica*, *Pinellia ternata*, *Dictamnus dasycarpus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cryptotympana pustulata*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Houttuynia cordata*, *Forsythia koreana*, *Arctium lappa*, *Castanea crenata*, *Aster tataricus*, *Citrus unshiu*, *Gardenia jasminoides*, *Ledebouriella seseloides*, *Hovenia dulcis*, *Prunus sargentii*

III. METHODS



IV. RESULTS

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

Scientific name	Medicinal part	Ethanol extract (200 μ g / disk)
		<i>S. mutans</i>
<i>Pueraria thunbergiana</i>	Root	-
<i>Sophora flavescens</i>	Root	++
<i>Lonicera japonica</i>	Flower	-
<i>Pinellia ternata</i>	Tuberous root	-
<i>Dictamnus dasycarpus</i>	Root Bark	-
<i>Paeonia lactiflora</i>	Root	-
<i>Angelica dahurica</i>	Root	-
<i>Spirodela polyrhiza</i>	Herb	-
<i>Cryptotympana pustulata</i>	Slough	-
<i>Pinus densiflora</i>	Node of Branch	+++
<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 koreana</i>	Fruit	-
<i>Arctium lappa</i>	Fruit	-
<i>Castanea crenata</i>	Pericarp	-
<i>Aster tataricus</i>	Root	-
<i>Citrus unshiu</i>	Pericarp	-
<i>Gardenia jasminoides</i>	Fruit	+
<i>Ledebouriella seseloides</i>	Root	+
<i>Hovnia dulcis</i>	Seed	-
<i>Prunus sargentii</i>	Bark	-

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

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

name \ con.	0 μg /disk	100 μg /disk	200 μg /disk	300 μg /disk
<i>Sophora flavescens</i>	-	-	+(10.0mm)	+++ (14.0mm)
	-	-	++(10.4mm)	++(12.6mm)
	-	-	+(9.7mm)	++(11.2mm)
	-	-	+(9.8mm)	++(12.0mm)
<i>Pinus densiflora</i>	-	+(9.5mm)	++(11.5mm)	+++ (14.1mm)
	-	+(9.7mm)	++(11.3mm)	+++ (14.1mm)
	-	+(9.2mm)	++(12.2mm)	++++ (16.2mm)
	-	+(9.1mm)	+++ (14.3mm)	++++ (17.0mm)

▶ antimicrobial activity : -, no inhibitory effect, +; 8.1-10.0mm, ++; 10.1-13.0mm, +++; 13.1-16.0mm, ++++, over 16.0mm

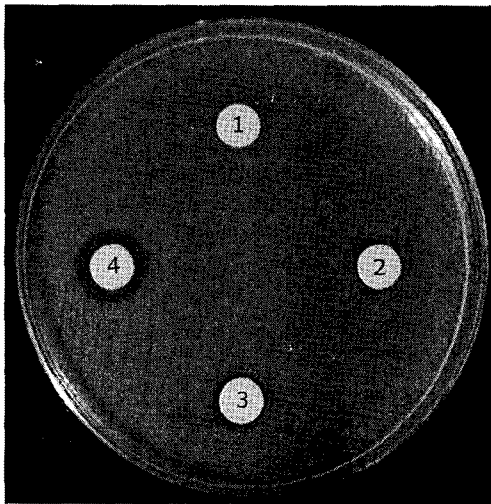


Figure 1. Assay of antimicrobial activity by *Sophora flavescens*. 1: 0 ug, 2:100ug, 3:200ug, 4:300ug

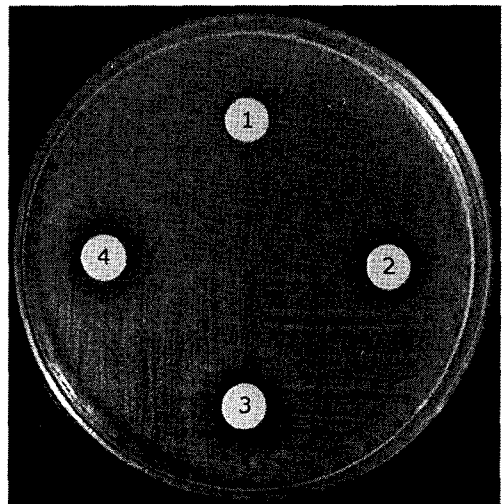


Figure 2. Assay of antimicrobial activity by *Pinus densiflora*. 1: 0 ug, 2:100ug, 3:200ug, 4:300ug

V. CONCLUSIONS

1. The ethanol extracts of 24 medicinal plants were tested for the antimicrobial activity against *Streptococcus mutans*.
2. The extracts of *Sophora flavescens*, *Pinus densiflora*, *Cimicifuga heracleifolia*, *Gardenia jasminoides* and *Ledebouriella seseloides* showed antimicrobial activity against *Streptococcus mutans*.
3. The extracts of *Pinus densiflora* and *Sophora flavescens* showed significant antimicrobial activity against *Streptococcus mutans*.
4. The extracts from *Pinus densiflora* and *Sophora flavescens* could be a candidate for new antimicrobial agents against *Streptococcus mutans*.

VI. REFERENCES

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