
Agrobacterium tumefaciens에 대한 약용식물의 탐색 I

음진성 * 박영두

목원대학교

The Screening of Medicinal Plant Extracts against *Agrobacterium tumefaciens* I

Jin seong Eum * Young doo Park

Mokwon University

jseum@mokwon.ac.kr

요 약

본 연구는 약용식물로부터 항균활성 물질을 찾기 위하여 *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Dictamnus albus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Arctium lappa*, *Aster tataricus*, *Hovenia dulcis*, *Citrus unshiu*, *Asparagus cochinchinensis*, *Gardenia jasminoides*, *Smilax china*, *Hovenia dulcis*, *Prunus sargentii*, *Scutellaria baicalensis* 등의 약용식물을 사용하였다. 총 20종류의 약용식물로부터 에탄올 추출물을 분리하여 *Agrobacterium tumefaciens*에 대한 항균활성을 조사하였다.

Glycyrrhiza uralensis, *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*의 추출물이 *Agrobacterium tumefaciens*에 대한 항균활성을 나타냈다.

ABSTRACT

This study was carried out to research antimicrobial agents from medicinal plants, *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Dictamnus albus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Arctium lappa*, *Aster tataricus*, *Hovenia dulcis*, *Citrus unshiu*, *Asparagus cochinchinensis*, *Gardenia jasminoides*, *Smilax china*, *Hovenia dulcis*, *Prunus sargentii*, *Scutellaria baicalensis*. The ethanol extracts of 20 medicinal plants were tested for the antimicrobial activity against *Agrobacterium tumefaciens*.

The extracts of *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum* showed antimicrobial activities against *Agrobacterium tumefaciens*.

Key word

Agrobacterium tumefaciens, antimicrobial activity

1. INTRODUCTION

Agrobacterium tumefaciens is a gram negative soil bacterium which occurs crown gall tumor by infecting at wounded sites of many kinds of dicotyledonous plant and some monocotyledonous plant. This disease causing this tumor occurs by Tumor-inducing(Ti) plasmid over 200 kb size in *A. tumefaciens*. The Ti plasmid has regions where are concerned in the formation of crown gall tumor. Transfer-DNA(T-DNA) from the Ti plasmid is processed into intermediate form, transferred to the plant cell and integrated into the plant nuclear genome. Integrated T-DNA directs the synthesis of the plant growth hormones like auxin and cytokinin, and tumorigenesis results from the hormone imbalance. An opine is synthesized by the opine synthesis gene in T-DNA and the synthesized opine is decomposed by opine degradation gene in Ti plasmid. The opine can't be used by other plants or microorganisms, may be used as nutrition source by *A. tumefaciens* which has Ti plasmid. Octopine, Nopaline, Agropine, Mannopine, Succinamopine and etc. as the kinds of opine have been known, and these opine types can be used as the standard for classification of Ti plasmids. In addition to the T-DNA, the Ti plasmid virulence(*vir*) region, are required for tumor formation. The *vir* region of the Ti plasmid is located adjacent to the left border of the T-DNA and has a very important function in T-DNA transfer. The *vir* region is composed of about eight complementation groups(*virA*, *virG*, *virB*, *virC*, *virD*, *virE*, *virF* and *virH*) that act to generate the T-DNA and mobilize it to plant nuclear genome between *A. tumefaciens* and plant cell. But the *vir* gene itself is not integrated into the plant nuclear genome. The expression of these *vir* genes is induced by a specified phenolic compounds, and *vir* genes have a variety of functions for safe transfer of T-DNA to plant nuclear genome. The expression of *virA* and *virG* gene is induced by specified phenolic compounds synthesized at plant wound site. A VirA product seems to act as sensor protein and transmits a signal to the VirG

product. A VirA product and VirG product act the transcriptional regulatory elements to the expression of other *vir* genes and *virB*, *virC*, *virD*, *virE*, *virF* and *virH* are the inducible genes which activated by VirA and VirG products (Stachel *et al.*, 1998; Fullner, 1998). In this research, antimicrobial activities of 20 medicinal plant extracts which were prepared from *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Dictamnus albus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Arctium lappa*, *Aster tataricus*, *Hovenia dulcis*, *Citrus unshiu*, *Asparagus cochinchinensis*, *Gardenia jasminoides*, *Smilax china*, *Hovenia dulcis*, *Prunus sargentii*, *Scutellaria baicalensis*. were evaluated against *Agrobacterium tumefaciens*.

II. MATERIALS

Glycyrrhiza uralensis, *Dryopteris crassirhizoma*, *Dictamnus albus*, *Paeonia lactiflora*, *Angelica dahurica*, *Spirodela polyrhiza*, *Cimicifuga heracleifolia*, *Bupleurum falcatum*, *Magnolia kobus*, *Artemisia princeps*, *Arctium lappa*, *Aster tataricus*, *Hovenia dulcis*, *Citrus unshiu*, *Asparagus cochinchinensis*, *Gardenia jasminoides*, *Smilax china*, *Hovenia dulcis*, *Prunus sargentii*, *Scutellaria baicalensis*.

III. METHODS

Medicinal Plant 25g / 500ml 70% Ethanol



Boil with Heating Mantle for 3 Hour



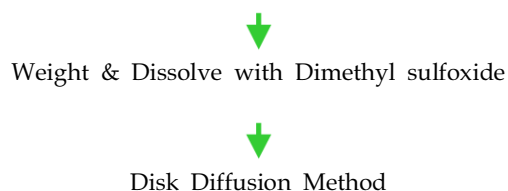
Cooling & Filtration



Concentrate with Evaporator



Dry with Freeze Dryer



IV. RESULTS

Table 1. Antimicrobial activity of medicinal plant extracts against *A.tumefaciens* A348.

Scientific Name	Medicinal Part	Extract (200µg)
		<i>A.tumefaciens</i> A348
<i>Glycyrrhiza uralensis</i>	Root	+
<i>Dryopteris crassirhizoma</i>	Rhizoma	+
<i>Dictamnus albus</i>	Root Bark	-
<i>Paeonia lactiflora</i> var. <i>hortensis</i>	Root	-
<i>Angelica dahurica</i>	Root	-
<i>Spirodela polyrhiza</i>	Herb	-
<i>Cimicifuga heracleifolia</i>	Rhizoma	+
<i>Bupleurum falcatum</i>	Root	+
<i>Magnolia kobus</i>	Flower Bud	-
<i>Artemisia princeps</i>	Leaf	-
<i>Arctium lappa</i>	Fruit	-
<i>Aster tataricus</i>	Root	-
<i>Hovenia dulcis</i>	Seed	-
<i>Citrus unshiu</i>	Pericarp	-
<i>Asparagus cochinchinensis</i>	Tuberous Root	-
<i>Gardenia jasminoides</i>	Fruit	-
<i>Smilax china</i>	Rhizoma	-
<i>Hovenia dulcis</i>	Trunk of Tree	-
<i>Prunus sargentii</i>	Bark	-
<i>Scutellaria baicalensis</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, ++++: over 16.0 m



Figure 1. Assay of antimicrobial activity by different concentration of the extracts from *Dryopteris crassirhizoma*. 1:0 µg, 2:100 µg, 3:200 µg, 4:300 µg, 5:400 µg.

V. CONCLUSIONS

1. The ethanol extracts of 20 medicinal plants were tested for the antimicrobial activity against *Agrobacterium tumefaciens* A348.
2. The extracts of *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum* showed antimicrobial activity against *A. tumefaciens* A348.
3. The extracts from *Glycyrrhiza uralensis*, *Dryopteris crassirhizoma*, *Cimicifuga heracleifolia*, *Bupleurum falcatum* could be the candidate for new antimicrobial agents against *A. tumefaciens* A348.

VI. REFERENCES

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