

## 메타세콰이어 추출물의 항균 활성

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### Anti-fungal properties of essential oil of *Metasequoia glyptostroboides*

Miki ex Hu

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#### Objectives

To examine the chemical composition of essential oil isolated from the floral cone of *M. glyptostroboides* Miki ex Hu by GC-MS and to generate directly comparable, quantitative, anti-fungal data of essential oil of *M. glyptostroboides* against agricultural phytopathogens.

#### Materials and Methods

##### ○ Materials

##### - Plant material

The floral cones of *M. glyptostroboides* were collected from the Pusan area of Korea, in September 2005 and initially identified by morphological features and the data base present in the library at the Department of Biotechnology, Daegu University, Korea.

##### - Isolation of the essential oil

The air-dried plant material (200 g) was subjected to hydrodistillation for 3 h using a Clevenger type apparatus. The oil was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub> and preserved in a sealed vial at 4°C until further analysis.

- Microorganisms : The fungi tested were obtained from the Korean Agricultural Culture Collection (KACC). Cultures of each fungal species were maintained on potato-dextrose-agar (PDA) slants and stored at 4°C. The fungal species used in the experiment were *Botrytis cinerea* (KACC 40573), *Rhizoctonia solani* (KACC 40111), *Fusarium oxysporum* (KACC 41083), *Sclerotinia sclerotiorum* (KACC 41065), *Colletotricum capsici* (KACC 410978), *Fusarium solani* (KACC 41092) and *Phytophthora capsici* (KACC 40157).

##### ○ Methods

The anti-fungal activity of essential oil of *Methasequoia glyptostroboides* Miki ex Hu against the tested fungi was determined qualitatively and quantitatively by agar diffusion method based on presence or absence of inhibition zones and their respective MIC values.

## Results and Discussion

The chemical composition of essential oil isolated from the froral cone of *Metasequoia glyptostroboides* Miki ex Hu by hydrodistillation was analysed by GC-MS. It was determined that 59 compounds, which represented 97.06% of total oil, were present in the oil. The oil contain mainly  $\alpha$ -pinene (29.54%), caryophyllene oxide (4.49%),  $\alpha$ -humulene (1.18%),  $\alpha$ -thujene (8.63%), bornylene (8.63%), Totarol (5.28%),  $\beta$ -caryophyllene (4.40%),  $\delta$ -3-Carene (3.19%), and 2-  $\beta$ -pinene (2.25%). Thus, the oil was found containing mainly the oxygenated mono- and sesquiterpenes and their respective hydrocarbons. Essential oil of *Metasequoia glyptostroboides* was tested for anti-fungal activity, which was determined by disc diffusion and MIC determination methods. The oil showed great potential of anti-fungal activity as a mycelial growth inhibition against the tested phytopathogenic fungi such as *F. oxysporum*, *F. solani*, *S. sclerotiorum*, *R. solani*, *C. capsici*, *B. cinerea*, and *P. capsici*, in the inhibition range of 56-65% and the MIC ranging from 500 to 1000 $\mu$ g/ml.

### \* 시험성적

Table 1. Anti-fungal activity of essential oil 5 $\mu$ l (1000 ppm) of *Metasequoia glyptostroboides* against tested phytopathogens

Fungal strain	Mycelial growth inhibition		MIC ( $\mu$ g/ml)
	mm	%	
<i>F. oxysporum</i> ( KACC 41083)	16	63	500
<i>P. capsici</i> (KACC 40157)	19	56	1000
<i>C. capsici</i> (KACC 410978)	16	63	500
<i>F. solani</i> ( KACC 41092)	15	65	500
<i>B. cinerea</i> ( KACC 40573)	19	56	1000
<i>S. sclerotiorum</i> (KACC 41065)	19	56	1000
<i>R. solani</i> ( KACC 40111)	nd	nd	na

\* nd means no detection of anti-fungal activity.