COMPOSITION OF ESSENTIAL OIL FROM SEEDS OF *Metasequoia glyptostroboides* GROWING IN CHINA

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Metasequoia glyptostroboides Hu et Cheng belongs to a genus of coniferous trees in the family Taxodiaceae and is the single living fossil of the species. During the Cretaceous Period, it occupied large territories in the northern hemisphere and persists only in central China. It has been investigated for more than 16 years [1]. The harvest of seeds from *M. glyptostroboides* in Lichuan is about 840 kg per year.

Chemical and pharmacological properties of this plant are concentrated mainly in the leaves [2, 3]. However, the chemical composition of seed oils from *M. glyptostroboides* has not been previously studied. We have characterized the composition of essential oil from *M. glyptostroboides* seeds for the first time.

Essential oil from *M. glyptostroboides* was obtained by steam distillation for 12 h with subsequent extraction by ether from the aqueous phase using ground seeds (40 g) collected in Hubei and Lichuan provinces of the Chinese People's Republic. The ether extract was dried over Na_2SO_4. Solvent was quickly removed. The yield of essential oil was 0.97% of the seed mass. The oil was a light-yellow liquid with a characteristic aroma and density 0.8 g/cm^3.

The chemical composition of essential oils was studied by GC—MS on a Perkin—Elmer Turbo Mass Aid System XL GC with a quadrupole mass spectrometer as the detector.

We used a 30-m quartz capillary column (PE-5MS), internal diameter 0.25 mm, stationary phase thickness 25 μm (5% phenylmethylsilicone), gas flow rate 35 mL/min (He carrier gas), programmed temperature. The column was held at 75°C for 2 min, heated to 100°C at 2°C/min, to 160°C at 4°C/min, to 220°C at 2°C/min, and held for 2 min at this temperature. The final isothermal duration was 20 min at 230°C.

TABLE 1. Chemical Composition of Essential Oil from Seeds of *Metasequoia glyptostroboides* Hu et Cheng

Compound	MW	Content, %	Compound	MW	Content, %
Methyl 4-methoxybutanoate	132	1.6	δ-Terpinene	136	0.04
Tricyclene	136	0.12	α-Terpinolene	136	0.58
1-Phellandrene	136	0.04	*cis*-Limonene oxide	152	0.53
α-Pinene	136	81.56	3-Pinanone	152	0.04
α-Phenchene	136	0.05	4-Methyl-1-(1-methylethyl)-3-cyclohexan-1-ol	154	0.04
Camphene	136	0.21	*trans*-Caryophyllene	204	5.04
Sabinene	136	0.24	α-Caryophyllene	204	0.52
β-Pinene	136	1.84	Germacrene D	204	0.08
β-Myrcene	136	2.08	Caryophyllene oxide	220	0.76
δ-3-Carene	136	3.62	Humuladienone	220	0.06
1-Methyl-4-(1-methylethyl)-benzene	134	0.06	1,2,3,4,4a,9,10,10a-Octahydro-1-phenanthrene	270	0.07
Limonene	136	0.52	Methyl arachidonate	318	0.22
β-Phellandrene	136	0.09			

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Samples (0.2 μL) were injected into the vaporizer at 180°C, detector 220°C, ionization potential 70 eV, scanning in the range *m*/*z* 30-550.

The contents of oil components were calculated from areas of GC peaks without correction coefficients. Qualitative analysis was performed by comparing retention times and full mass spectra with those of standard oils, pure compounds, and mass spectrometry libraries from NBS, NIST, and Wiley.

Table 1 lists 25 identified components of essential oils from *M. glyptostroboides* seeds, the principal one of which was α-pinene. The contents of compounds in *M. glyptostroboides* seeds can differ depending on the habitat.

REFERENCES

1. J. S. Ma and G. F. Shao, *Taxon*, **52**, No. 4, 585 (2003).
2. S. Beckmann and H. Geiger, *Phytochemistry*, **7**, No. 9, 1667 (1968).
3. X. R. Yang, W. W. Liu, M. J. Shi, H. Y. Wang, and Y. Ao, *Chin. Pharm. Bull.*, **16**, No. 1, 87 (2000).