CHEMICAL COMPOSITION OF ESSENTIAL OIL FROM SEEDS OF *Anethum graveolens* CULTIVATED IN CHINA

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Dill, *Anethum graveolens* L. (Apiaceae), is an annual plant with a strong spicy odor [1]. Dill has been known since antiquity as an agent for increasing the stomach tonus and has been used for aches in the stomach and intestines, dispepsia, bladder inflammation, liver diseases, headaches, cramps, and insomnia [2]. The essential oil (EO) of dill seeds contains biologically active compounds [3, 4].

We used EO from dill seeds collected in the Xinjiang—Uigur Autonomous Region of China. EO was extracted from dill seeds (50 g) by steam distillation for 4 h and extracted from the aqueous phase by diethylether. The ether extract was dried with Na_2SO_4. Solvent was removed overnight. The yield of EO was 3.8% of the seed mass. EO of dill was an oily light yellow liquid with a unique odor and a density of 0.925 g/cm^3.

The chemical composition of the EO was studied by GC—MS on a Perkin—Elmer Turbo Mass Aid System XL gas chromatograph with a quadrupole mass spectrometer as the detector. We used a 30-m PE-5MS capillary quartz column (copolymer 5% phenylmethylsilicone) with internal diameter 0.25 mm and stationary-phase film thickness 25 μm, flow rate 35 mL/min, He carrier gas with temperature programming. The column was held for 2 min at 75°C, 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 that temperature. The final isothermal duration was 20 min at 230°C. Samples (0.2 μL) were injected. The evaporator temperature was 180°C; detector, 220°C; ionization potential, 70 eV, *m*/*z*, 30-550. The contents of oil components were calculated using the areas of the GC peaks without correction coefficients. Quantitative analysis was based on comparison of retention times and complete mass spectra with those of standard oil components, pure compounds, and mass spectrometric libraries of NBS, NIST, and Wiley.

TABLE 1. Chemical Composition of Essential Oil from *Anethum graveolens* L. Seeds

Component	MW	Content, %
Limonene	136	2.12
1-Methoxy-4-(2-propenyl)benzene	142	2.18
D-(+)-Carvone	150	1.68
6-Methyl-2,4-di-*t*-butylphenol	220	0.17
Humulene	204	0.38
1-Allyl-2,5-dimethoxy-3,4-methylenedioxybenzene (Diplaniol)	222	0.91
Heptadecane	240	0.63
Eicosane	282	1.24
n-Heneicosane	296	1.15
Docosane	310	2.23
Tricosane	324	9.14
n-Pentacosane	352	27.96
Dioctylester of 1,2-Phenyldicarboxylic acid	390	25.10
Octacosane	394	13.81
n-Nonacosane	408	6.85

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Table 1 lists the 15 oil components that were identified. The principal component of the essential oil from American dill seed was limonene [5]; European, carvone [6]. However, the principal components from Chinese samples were *n*-pentacosane (27.96%), 1,2-benzenedicarboxylic acid dioctyl ester (25.10%), and octacosane (13.81%). The variation of the component composition of dill seed EO is probably due to the growing conditions.

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