CHEMICAL COMPOSITION OF COMMERCIALLY AVAILABLE ESSENTIAL OILS FROM EUCALYPTUS, PINE, YLANG, AND JUNIPER

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The term essential oil refers to any class of volatile oils containing a multipart mixture of hydrocarbons and other volatile aromatic compounds steam-distilled from different parts of plants. The hydrocarbon fractions of oils consist mainly of monoterpenoids and smaller amounts of sesquiterpenoids. Essential oils are typified by their overall capacity to generate aroma and flavor. Hence, they are widely used as flavoring additives in food production, fragrances in cosmetics, and components of soaps, air fresheners, and detergents. Furthermore, the interest in their pharmaceutical uses has enjoyed a revival in recent decades with the popularity of aromatherapy, in which oils are heated and volatilized. Clinical aromatherapy is the use of essential oils for expected outcomes that are measurable; it is also a therapy used in nursing [1].

TABLE 1. Chemical Composition of the Commercial Pine Extract, Eucalyptus Extract, Juniper Extract, and Ylang-Ylang Extract

Compound	RI	Extract, %			
		Pine	Eucalyptus	Juniper	Ylang-ylang
Unknown	944	1.79±0.09			
α-Pinene	949	17.00±0.37	5.50±0.93	77.54±0.98	
Unknown	960			1.57±0.93	
Camphene	961	2.89±0.12			
β-Pinene	979	4.10±0.08		15.63±0.55	
Unknown	983	4.09±0.20			
Myrcene	993	1.22±0.27			
Unknown	993			1.47±0.47	
Unknown	1011			1.03±0.22	
Δ^3-Carene	1012	26.85±0.24			
Unknown	1017	1.88±0.22			
Unknown	1024	2.83±0.70			
o-Cymene	1025		3.48±0.59		
Limonene	1028			4.37±0.82	
β-Phellandrene	1029	13.89±0.39			
1,8-Cineole	1033		89.01±1.25		
Unknown	1058	3.07±0.08			
Terpinolene	1089	18.93±0.11			
Terpin-4-ol	1180	1.57±0.89	0.63±0.55		
α-Terpineol	1194		1.17±0.18		
Geranyl acetate	1377				2.54±0.29
(*E*)-Caryophyllene	1421				12.59±1.07
α-Humulene	1455				3.65±0.17

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TABLE 1 (continued)

Compound	RI	Extract, %			
		Pine	Eucalyptus	Juniper	Ylang-ylang
(*E*)-β-Farnesene	1465				0.52±0.30
Germacrene D	1484				35.30±1.26
α-Muurolene	1496				0.99±0.38
(*E,E*)-α-Farnesene	1509				33.99±0.45
Δ-Cadinene	1526				5.64±0.57
Benzyl benzoate	-				Peak GC-MS
(*E,E*)-Farnesyl acetate	1844				4.86±0.36
Benzyl salicylate	-				Peak GC-MS

RI: retention index.

Most available experimental studies of the compositional variation of essential oils deal with plant extracts obtained directly by steam distillation. While this is of value in determining the ability of certain plants to produce secondary volatile metabolites, it does not reflect the composition of commercial preparations containing essential oils.

In this study, we analyzed four of the most commonly used essential oils commercially available in Poland and elsewhere in the world: eucalyptus leaf oils, ylang oil, oil from pine needles and twigs, and juniper oils (Table 1).

Four types of commercially available essential oils were analyzed for their chemical composition: 23 terpenes and sesquiterpene alcohols were identified and quantified. Comparison with the composition of pure extracts obtained from different individual species revealed in most cases a similar qualitative profile of volatile compounds. However, there were quantitative differences between the dominant compounds found in commercial pine oil and the individual species extracts reported in the literature. The contents of the main components of the other commercial oils were quite similar to those of the natural extracts [2–8].

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