

## COMPOSITION OF THE ESSENTIAL OIL OF *Arbutus unedo*\*

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*Water-distilled essential oil from leaves of Arbutus unedo L. of Turkish origin was analyzed by GC/MS. Thirty-seven constituents were characterized with (E)-2-decenal (12.0 %),  $\alpha$ -terpineol (8.8 %), hexadecanoic acid (5.1 %), and (E)-2-undecenal (4.8 %) as the major constituents.*

**Key words:** *Arbutus unedo*, *Ericaceae*, essential oil composition, (E)-2-decenal,  $\alpha$ -terpineol, hexadecanoic acid, and (E)-2-undecenal.

Strawberry-tree (*Arbutus unedo* L.), an evergreen shrub belonging to the family *Ericaceae*, is distributed in regions bordering the Mediterranean Sea especially in Southern European countries [1, 2].

The leaves of *A. unedo* are used as diuretic, urinary antiseptic, antidiarrheal, astringent, depurative, against blenorhagia, and as antihypertensive [3–5]. In Morocco, the leaves are used by hypertensive diabetic patients [3]. A tea from the leaves is used as diuretic in Turkey [4].

Previous studies on *A. unedo* were concentrated on the isolation and identification of its flavonoids (afzelin, juglanin, avicularin, quercitrin, hyperin) [6]. In other studies, the occurrence of phenolic glycosides (arbutin and methylarbutin), lipids, tannins, and vitamin E has been reported [7–10]. Emission rates of volatile organic compounds of *A. unedo* were reported from Italy [11].

In this study, the chemical composition of Turkish strawberry-tree oil was studied for the first time.

The results of analysis of Turkish Strawberry-tree oil obtained by water distillation are shown in Table 1. The oil was analyzed by GC/MS. Thirty-seven components representing 76.7% of leaf oil were identified.

There is no previous report on strawberry-tree oil of Turkish origin. According to our results, the principal components identified were (E)-2-decenal,  $\alpha$ -terpineol, hexadecanoic acid, and (E)-2-undecenal. Furthermore, appreciable quantities of 2,2,6,8-tetramethyl-7,11-dioxatricyclo(6.2.1.0)-1,6-undec-4-ene, nonanal, (E)-geranylacetone,  $\beta$ -ionone, nonanoic acid, myristic acid, hexahydrofarnesylacetone, and 3,4-dimethyl-5-pentylidene-2(5H)-furanone were also detected.

## EXPERIMENTAL

**Plant Material.** The essential oil of *A. unedo* was isolated by water distillation of the comminuted leaves of the plant for 4 h. *A. unedo* leaves were collected in March 1999 from West Anatolia in Izmir-Cicekliköy, and identified by B. Kivcak. A voucher specimen (No 1251) is deposited in the herbarium of the Faculty of Pharmacy, Ege University, in Izmir.

**GC/MS Analysis.** The oil was analyzed by GC/MS using a Hewlett-Packard GCD system. An HP-Innowax FSC column (60 m  $\times$  0.25 mm; 0.25 mm film thickness) was used with helium as carrier gas (1 mL/min). The injector temperature was at 250°C. GC oven temperature was kept at 60°C for 10 min and programmed to 220°C temperature at a rate of 4°C/min, and then kept constant at 220°C for 10 min and then programmed to 240°C at a rate of 1°C/min. Alkanes were used as

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TABLE 1. Composition of the Essential Oil of *Arbutus unedo*

RRI	Compound	%	RRI	Compound	%
1400	Nonanal	3.7	1827	(E,E)-2,4-Decadienal	0.5
1506	Decanal	0.5	1830	$\beta$ -Damascone	0.3
1507	(E,E)-2,4-Heptadienal	0.6	1857	Geraniol	0.4
1548	(E)-2-Nonenal	0.5	1864	<i>p</i> -Cymen-8-ol	0.2
1553	Linalool	1.2	1868	(E)-Geranylacetone	3.8
1562	Octanol	1.9	1958	$\beta$ -Ionone	3.4
1599	(E,Z)-2,6-Nonadienal	0.4	2037	Salvial-4(14)-en-1-one	0.3
1602	6-Methyl-3,5-heptadien-2-one	1.1	2084	Octanoic acid	1.7
1612	$\beta$ -Caryophyllene	0.7	2131	Hexahydrofarnesylacetone	3.9
1638	$\beta$ -Cyclocitral	0.8	2148	(Z)-3-Hexen-1-yl-benzoate	1.1
1648	2,2,6,8-Tetramethyl-7,11-dioxatricyclo(6.2.1.0)-1,6-undec-4-ene	4.3	2179	3,4-Dimethyl-5-pentylidene-2(5H)-furanone	2.2
1655	(E)-2-Decenal	<b>12.0</b>	2192	Nonanoic acid	3.9
1706	$\alpha$ -Terpineol	8.8	2193	$\gamma$ -Eudesmol	1.1
1715	(E,E)-2,4-Nonadienal	0.3	2250	$\alpha$ -Eudesmol	0.6
1764	(E)-2-Undecenal	4.8	2257	$\beta$ -Eudesmol	0.5
1779	(E,Z)-2,4-Decadienal	0.7	2503	Dodecanoic acid	1.6
1798	Methylsalicylate	0.7	2670	Myristic acid	2.3
1804	Myrtenol	0.3	2931	Hexadecanoic acid	5.1
1815	2-Tridecanone	0.5		<b>Total</b>	<b>76.6</b>

RRI: Relative retention indices calculated against *n*-alkanes, % calculated from TIC.

reference points in the calculation of relative retention indices (RRI). Split ratio was adjusted at 50:1. MS were taken at 70 eV. Mass range was from *m/z* 35–425. Library search was carried out using Wiley GC/MS Library and TBAM Library of Essential Oil Constituents. Relative percentage amounts were calculated from TIC by computer.

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