

THE ESSENTIAL OIL COMPOSITION OF *Gnaphalium luteo-album**

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The genus *Gnaphalium* L. (Asteraceae) is represented in Turkey by six different species and altogether seven taxa, only one being endemic. *G. luteo-album* L. (flannel-leaf or cud-weed in English) is an annual woolly plant with simple entire and sessile leaves, having small clustered heads. The stem is leafless, growing upwards, and heads are corymbose [1]. It is very common as a weed, particularly in sunny wet places. The leaves are used as astringent, cholagogue, diuretic, febrifuge, and haemostatic [2]. The whole plant is used in the treatment of breast cancer in Belgium [3] and for lactation in India [4].

TABLE 1. Composition of the Essential Oil of *Gnaphalium luteo-album* L.

Compound	RRI	%	Compound	RRI	%
α -Pinene	1032	2.0	Undecanal	1617	1.1
3-Hexanone	1058	1.9	α -Humulene	1687	0.3
2-Hexanone	1087	2.0	α -Terpineol	1706	Tr.
Hexanal	1093	1.0	Dodecanal	1722	2.5
Undecane	1100	0.4	Naphthalene	1763	0.7
β -Pinene	1118	0.3	(<i>E,E</i>)-2,4-Decadienal	1827	0.5
δ -2-Carene	1146	Tr.	Octyl hexanoate	1829	0.6
α -Phellandrene	1176	Tr.	(<i>E</i>)-Geranyl acetone	1868	1.2
Heptanal	1194	0.9	(<i>E</i>)- β -Ionone	1958	0.3
Limonene	1203	1.5	Caryophyllene oxide	2008	3.6
1,8-Cineole	1213	1.7	Octyl octanoate	2020	2.0
2-Hexanol	1223	0.4	Hexahydrofarnesyl acetone	2131	1.2
2-Pentyl furan	1244	1.2	Pentadecanal	2041	2.4
γ -Terpinene	1255	0.2	Carvacrol	2239	1.7
<i>p</i> -Cymene	1280	0.4	1-Methylethyl hexadecanoic acid	2251	3.0
Octanal	1296	1.0	Dodecanoic acid	2503	2.4
Hexanol	1360	0.2	Tetradecanoic acid	2670	0.5
Nonanal	1400	4.1	Hexadecanoic acid	2931	1.9
Tetradecane	1400	0.5	Monoterpene hydrocarbons		4.4
(<i>E</i>)-2-Octenal	1441	0.2	Oxygenated monoterpenes		5.0
Decanal	1506	9.7	Sesquiterpene hydrocarbons		14.7
Camphor	1532	Tr.	Oxygenated sesquiterpenes		3.6
α -Gurjunene	1544	6.4	Aliphatic compounds		29.1
(<i>E</i>)-2-Nonenal	1548	0.3	Fatty acids and esters		10.4
Linalool	1553	0.4	Others		3.4
β -Caryophyllene	1612	8.0	Total		70.6

RRI: relative retention indices calculated against *n*-alkanes; %: calculated from FID data; Tr.: trace (<0.1%).

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An infusion of the aerial parts has been reportedly used as an emmenagogue [5]. The flowering aerial parts of *G. dioicum* L. are used similar to *Helichrysum* species in Anatolia [6]. The antiinflammatory activity of several extracts obtained from the aerial parts of *G. luteo-album* has been reported [7]. Phytochemical studies on this species revealed the occurrence of flavones, flavonols, and an alkaloid [8–10].

The microdistilled essential oil from the herbal parts of *G. luteo-album* was analyzed by gas chromatography and gas chromatography/mass spectrometry. The compounds characterized are given with their percentage amounts in Table 1. Forty-four compounds were identified in the oil of *G. luteo-album*, representing 70.6% of the total oil with 4.4% monoterpene hydrocarbons, 5.0% oxygenated monoterpenes, 14.7% sesquiterpene hydrocarbons, 3.6% oxygenated sesquiterpenes, 29.1% aliphatic compounds, 10.4% fatty acids and esters, and 3.4% others. The main constituents were found to be decanal (9.7%), β -caryophyllene (8.0%), and α -gurjunene (6.4%). To the best of our knowledge, there is no report on the essential oil composition of *G. luteo-album*.

Microdistillation was utilized as a useful tool enabling the analysis of ~200 mg plant material for its volatiles. This technique has also been successfully applied to investigate the composition of volatiles in minute samples of medicinal and aromatic plants in a short time [11–13].

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