

Helichrysum Species as Choloretic and Chologogue Crude Drugs*

Koleretik ve Kolagog Droglar Olarak *Helichrysum* Türleri

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Abstract:

In this work, the possibility of obtaining new choloretic and chologogue crude drugs from Turkish *Helichrysum* Gaertner species was investigated by comparing their flavanoids with the active compounds of medicinal *H.arenarium* (L.) Moench.

Key words: *Helichrysum* sp., choloretic, chologogue, detoxifying function of the liver.

Introduction

There are about 500 *Helichrysum* species in the world (Engler 1964) and 20 of them grow in Anatolia (Davis *et al.*,1975, Davis *et al.*,1988, Yıldız *et al.*,1988). Several of these species have been used as traditional folk medicine for centuries. It is given in Dioscorides records, in *Materia Medica*, that the heads of *H.siculum* (*H.stoechas* subsp.barrelieri) are used to cure biliousness. *H.vestitum* is used as a remedy for jaundice and biliousness and is the only one which is used for liver diseases in South Africa from among 32 *Helichrysum* species which are used in folk medicine (Watt *et al.*,1962).

Today in Europe, people use infusions prepared from the heads of *H.arenarium* and *H.italicum* because of their bile regulatory and diuretic effects. The capitula of *H.arenarium* are described in the Polish 1970, Swiss 1971 and USSR 1961 Pharmacopoeia. *H.arenarium* has also been included in some commercial preparations in Germany and Italy.

Pharmacological investigations on *Helichrysum arenarium* and its flavonoids have revealed that infusion (10 %) prepared from the flowering tops has secretion regulatory effects on liver, pancreas and stomach (Wasicky 1932, Khadzai 1968) and has chologogue and choloretic activities (Levinson 1932, Janson 1973).

* This study is based on the paper presented at the Pharmacy World Congress' 91 in Washington, DC , U.S.A. (Çubukçu 1991).

Choloretic activities for apigenin, kaempferol 3-glucoside and naringenin, 5-glucoside have also been documented (Szadowska 1962). Additionally it has been reported that quercetin, luteolin, naringenin and isohelichrysin also possess the same activity and quercetin increases the detoxifying function of the liver among these flavonoids (Prokopenko *et al.*, 1972). Skakun *et al.*, (1989) have revealed the protective, antioxidant and choloretic effects for *H.arenarium*. Baimuk-Hamedo *et al.*, (1983) have demonstrated that cholagogue activity has also been found in *H.maracandium*. The flavonoids of Turkish *Helichrysum* species have been investigated by Çubukçu *et al.*, (*H.graveolens* (Bieb.) Sweet 1972, 1986; *H.orientale* (Sprengel) Ledeb. 1976, 1981; *H.plicatum* DC. 1977, *H.plicatum* DC. subsp. *polyphyllum* (Ledeb.) Davis-Kupicha 1979; *H.armenium* DC. 1982; *H.noeanum* Boiss. 1984; *H.pallasii* (Sprengel) Ledeb. 1984; *H.sanguineum* (L.) Kostel 1984; *H.arenarium* (L.) Moench 1986; *H.stoechas* (L.) Moench subsp. *barrelieri* (Ten) Nyman 1992).

In this work, the possibility of obtaining new choloretic and cholagogue crude drugs from Turkish *Helichrysum* species was investigated by comparing their flavonoids with the active compounds of medicinal *H.arenarium*.

Materials and Methods

Material: Plant materials have been collected from Anatolia. The specimens are kept in the Herbarium of Faculty of Pharmacy, University of Istanbul (ISTE).

Extraction and isolation of flavonoids: The flavonoids were isolated from the petroleum ether-chloroform, ethanol-chloroform and ethyl acetate extract of the capitula and leafy stems. The extracts were purified by silicagel and polyamide column chromatography and also by preparative paper and thin layer chromatography.

Identification of flavonoids: The flavonoids were identified by their physical properties (TLC, UV, IR) and comparison was made with authentic samples. For quantitative determinations, a colorimetric method based on the cyanidin reaction was used. The absorbances were measured with a suitable spectrophotometer and the calculations were made on helichrysin B and rutin (Çubukçu *et al.*, 1981).

Results and discussion

The flowering tops and leaves of the *Helichrysum plicatum* subsp. *plicatum* and *H.plicatum* subsp. *polyphyllum* are used in Anatolia as cure for jaundice and stomach ailments, as *H.obconicum* in Spain (Rivera *et al.*, 1995), *H.vestitum* in South Africa (Watt *et al.*, 1962) and *H.faradifani* and *H.selaginifolium* in Madagascar (Beaujard 1988) are used for the same purpose.

Yund (1990) has reported that *Helichrysum* species are used for stomach pains on Taurus Mountains and Honda *et al.*, (1996) reports that *H.plicatum* subsp. *polyphyllum* is used in Afyon-Karahisar-Karacaören for the same purpose.

Table 1: Flavonoids of *Helichrysum arenarium* (1), *H. plicatum* (2) and *H. plicatum* subsp. *polyphyllum* (3)

Flavonoids	1		2		3	
	c	l	c	l	c	l
Apigenin	+		+			
Luteolin	+					
Galangin	+					
3,5-Dihydroxy 6,7,8- Trimethoxy flavone	+					
Kaempferol	+				+	+
Quercetin	+		+			+
Naringenin	+		+		+	
Apigenin 7-glucoside	+				+	+
Apigenin 4'-glucoside					+	
Kaempferol 3-glucoside	+		+			+
Kaempferol 3-diglucoside	+				+	
Isoastragalin			+			
Quercetin 3-glucoside			+			+
Helichrysin A	+		+			
Helichrysin B	+		+		+	+
Naringenin 5-diglucoside	+					
Isosalipurposit	+		+		+	+

c: capitula l: leafy stems

Table 2: Total flavonoids and helichrysin B contents (Çubukçu *et al.*, 1981)

Plant name	Quantitative determination of total flavonoids (%)		Quantitative determination of helichrysin B (5)
	Capitula	Leafy stems	Capitula
<i>H. arenarium</i> subsp. <i>aucheri</i>	1.95	0.50	0.73
<i>H. arenarium</i> subsp. <i>erzincanicum</i>	1.00	trace	0.40
<i>H. arenarium</i> subsp. <i>rubicundum</i>	1.63	trace	0.41
<i>H. armenium</i> subsp. <i>araxinum</i>	3.56	2.04	0.39
<i>H. armenium</i> subsp. <i>armenium</i>	3.80	2.86	0.53
<i>H. compactum</i>	1.00	0.50	0.25
<i>H. graveolens</i>	4.80	1.47	1.41
<i>H. noeanum</i>	5.23	1.57	1.12
<i>H. orientale</i>	6.00	0.40	0.57
<i>H. pallasii</i>	2.92	1.56	0.36
<i>H. pamphylicum</i>	1.54	trace	0.62
<i>H. plicatum</i> subsp. <i>plicatum</i>	4.83	2.93	0.41
<i>H. plicatum</i> subsp. <i>polyphyllum</i>	4.50	3.03	0.50
<i>H. plicatum</i> subsp. <i>pseudoplicatum</i>	4.92	1.82	0.87
<i>H. sanguineum</i>	antocyan: 3.63 flavon: 6.83	trace	-
<i>H. stoechas</i> subsp. <i>barrelieri</i>	0.83	0.80	trace
<i>H. arenarium</i> (Berlin)	2.50		1.10
<i>H. italicum</i> (Berlin)	1.00		Trace

The heads of *H.plicatum* subsp. *plicatum* are used as cure for jaundice in Bilecik-Sögütkepen (Fujita *et al.*, 1995) and its flowers and leaves are used for the same purpose in Karaman (Yeşilada *et al.*, 1995). As a matter of fact, this plants is called "Sarılık Çiçeği" (Jaundice flower) in Bilecik and in Bolu Mountains (Çubukçu 1995).

The studies on the flavonoids of *H.plicatum* and *H.plicatum* subsp. *polyphyllum* have shown that choleric and cholagogue effective flavonoids (apigenin, kaempferol, luteolin, naringenin, quercetin and their derivatives), found in *H.arenarium* are also present in the above plants (Table 1). (Çubukçu and Meriçli 1977, 1979). In addition, it has been recorded in quantitative analysis that these plants contain high percentages of flavonoids (Table 2).

Results: It has been shown through quantitative and qualitative analyses that the contents of *H.plicatum* and *H.plicatum* subsp. *polyphyllum* , used by the Anatolian people as bile regulator and as a cure for stomach pain, are similar to the medicinal species *H.arenarium* with same effects. For this reason these plants which are widespread in Anatolia can be used as a source in pharmaceutical industry.

In addition the follwings plants which also have a high percentage of similar flavonoids can be considered as drug source (Table 2); *H.graveolens*, *H.orientale*, *H.armenium* and *H.armenium* subsp. *araxinum*.

Özet

Bu çalışmada, Türkiye'de yetişen *Helichrysum* türlerinden elde edilen flavonoidler, tıbbi *H.arenarium* çiçeklerindeki ile karşılaştırılarak koleretik ve kolagog etkili drogların Türk *Helichrysum* türlerinden elde edilme olanakları araştırılmıştır.

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