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SOME BIOLOGICAL ACTIVITY INVESTIGATIONS ON *BALLOTA ACETABULOSA*

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SUMMARY

In this study, the potential cytotoxic and the antioxidant activity of the aerial parts of *Ballota acetabulosa* (L.) Bentham (Labiatae) have been investigated by the Brine Shrimp (*Artemia salina*), DPPH (1,1-diphenyl-2-picrylhydrazyl) and reducing power methods respectively. The ethanolic extract of the plant was found to be active in all mentioned methods.

Keywords: *Ballota acetabulosa*, Labiatae, Brine Shrimp, Antioxidant.

ÖZET

Bu çalışmada *Ballota acetabulosa* bitkisinin topraküstü kısımlarının potansiyel sitotoksik ve antioksidan aktiviteleri sırasıyla Brine Shrimp (Artemia salina), DPPH (1,1- difenil-2-pikrilhidrazil), indirgeme metodları kullanılarak araştırılmıştır. Bitkinin etanol ekstresi bahsedilen tüm yöntemlerde aktif bulunmuştur.

Anahtar kelimeler: *Ballota acetabulosa*, Labiatae, Brine Shrimp, Antioksidan.

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INTRODUCTION

11 *Ballota* species are found in the Turkish Flora (1). The species are known as "köpekotu", "karayerpırası", "kandilotu". *Ballota* species have been used as diuretic, carminative, anthelmentic in traditional Turkish folk medicine (2). *B. acetabulosa* is used for haemorrhoid treatment as its infusion in Balıkesir, Turkey (Tuzlacı, 1985). We know that the antioxidant activity properties of *Ballota* species are related with phenolic compounds, especially flavonoids (5, 8). Previous studies reported that *Ballota* species have contain nearly ten flavonoids which are kumatakenin, pachypodol, 5-hydroxy-7,3^{l},4^{l}-trimethoxy flavone, velutin, corymbosin, retusine, 5-hydroxy-7,4^{l} - dimethoxy flavone, flindulation, ladanein, 5-hydroxy-3,7,4^{l}-trimethoxy flavone)(3). Antimicrobial acitivities of the species are also related to their some kinds of flavonoids and polyphenolic compounds (4). These polyphenols are also responsible for the antioxidant activity.

RESULTS AND DISCUSSION

Results are summarized in Table 1 and 2.

Table 1: The data obtained from the Brine Shrimp method

Sample	ppm	LC_{50}
The ethanolic extract	1000:100:10	356.4512
Standart (Umbelliferon)	1000:100:10	715.3625

Table 2: The data obtained from the antioxidant methods

Sample	DPPH method (%) (517 nm absorbances)	Reducing Power method (700 nm absorbances)
The ethanolic extract	79	75
Ascorbic acid	98	-
Standart (α-Tocopherol)	-	0.98
Standart (Butylhydroxyanisol)	-	1.0

According to the Brine shrimp (*Artemia salina*) method, the ethanolic extract of the plant was found to be active (Table 1). The obtained data was compared with authentic active standart (Umbelliferone).

The ethanolic extract showed significant antioxidant activity by the mentioned methods. According to the obtained data the extract has an antioxidant capacity. We know that the natural antioxidants such as phenolic compounds like flavonoids, phenolic acids are related to a material's antioxidant activity. The results of two different antioxidant methods are summarized in Table 2. The obtained data were compared with authentic samples such as BHA, α-tocopherol and ascorbic acid. As a results of these information, the plant has potential antioxidant capacity and the plant could be as a source of bioactive antioxidant compounds besides its known phytotherapeutic properties.

EXPERIMENTAL

Plant Material:

Ballota acetabulosa was collected from Bozcaada-Çanakkale, in June 2005. The plant was identified by Gizem Emre Bulut. The voucher specimens are deposited in the Marmara University Faculty of Pharmacy Herbarium (MARE 9931).

Extraction:

The air dried and powdered aerial parts of the plant material (500g) were extracted with ethanol for 8 hours in the Soxhlet apparatus. The obtained solution was evapotated to dryness.

Methods:

Brine Shrimp (*Artemia salina*) method: The method was used for the potential cytotoxic acitivity determination (6). Umbelliferon was used as authentic sample.

DPPH Method: The free scavening activity of 50, 100, 250, 500 µg/L solutions of the extract were controled with DPPH radical. Ascorbic acid was used as control (7)

Reducing Power Method:**The reducing power activity of 50, 100, 250, 500 µg/L solutions of the extract were measured. Buthylated hydroxyanisole(BHA) and α-tocoferol (Vitamin E) were used as controls (7).**

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