

Nutrition Contents of the Some Wild Edible Plants in Central Black Sea Region of Turkey

Tuğba Bayrak ÖZBUCAK

Öznur ERGEN AKÇİN

Sevda YALÇIN

tsiozbucak@hotmail.comoakcin@omu.edu.trsevda341@mynet.com

University of Ordu, Faculty of Arts and Sciences, Department of Biology
Perşembe-Ordu, TURKEY

Received : 26 May 2006

Accepted : 01 July 2006

Abstract:

The Central Black Sea region is in the northern part of Turkey. This region has a rich plant diversity. This study was carried out to determine the food values of some edible plants (*Amaranthus retroflexus*, *Heracleum platytaenium*, *Ornithogalum sigmoideum*, *Chenopodium album*, *Cichorium intybus*, *Epi lobium angustifolium*, *Malva sylvestris*, *Oxalis acetosella*, *Plantago media*, *Polygonum cognatum* and *Smilax excelsa*). The plants were collected in Ordu in 2004. The dry matter, nitrogen, phosphorus and protein contents were investigated in the studied plants. Dry matter contents were the highest in the stem of *H. platytaenium*. While the richest nitrogen and protein contents were the leaves of *P. cognatum*, the lowest contents were found in the stem of *P. media*. Although the maximum concentration of phosphorus was determined in the leaves of *A. retroflexus*, the lowest phosphorus concentration was found in the leaves of *P. media*.

Key Words: Nourishment plants, Regional wild plants, Central Black Sea.

INTRODUCTION

The Black Sea region is situated at the junction of Irano-Turanian and Euro-Siberian phytogeographic regions. These regions have their own endemic species and natural ecosystems. Therefore, the region has a great diversity of wild plants. In some studies it has been reported that many wild plants have been used as food in Turkey, especially in the Black Sea Region [1,2,3,4].

Plants have been used as the source of food since the human existed. Cultivated plants are widely used today although edible plants have the significant medical and the other economical properties (i. e. as a food source). It is known that the plants which are consumed in the world today are mostly cultivated plants and the consumption of local wild edible plants are restricted comparatively. Edible plants may have different uses in different areas of the same country. Additionally, people use them for some medicinal purposes due to economical and geographical reasons [4].

Plants have been used as food, dye, ornamental and medicinal purposes by people since ancient times. Williams emphasized the need to preserve new plant resources to broaden the biological diversity in human nutrition [5]. Many local wild plants have been used as salad and vegetable dishes in Turkish cuisine [6]. Wild plant species provide minerals, fibre, vitamins and essential fatty acids and enhance taste and colour in diets [7].

The aim of this study was to investigate some nutritional value of some edible wild plants [*A. retroflexus* L. (*Amaranthaceae*), *H. platytaenium* Boiss. (*Umbelliferae*), *O. sigmoideum* Freyn and Sint. (*Liliaceae*), *C. album* L. (*Chenopodiaceae*), *C. intybus* L. (*Asteraceae*), *E. angustifolium* L. (*Onagraceae*), *M. sylvestris* L. (*Malvaceae*), *O. acetosella* L. (*Oxalidaceae*), *P. media* L. (*Plantaginaceae*), *P. cognatum* Meissn. (*Polygonaceae*), *S. excelsa* L. (*Liliaceae*)]. Some of the botanical properties of plants which occur in Central Black Sea Region are given below;

***Amaranthus retroflexus* L. (*Amaranthaceae*):** It is an annual herbaceous plant which has a height of 15-100 cm. Its local name is "Kırmızı Köklü Tilki Kuyruğu". It is widespread around the roadsides and the cultivated lands.

The green leaves of the plant are consumed as vegetables by people [8,9].

***Chenopodium album* L. (*Chenopodiaceae*):** It is an glabrous, mealy or glandular herb. This species is 15-100 cm of height. Its local name is "Hoşkiran". It occurs in the moisture places and the corn fields. The green leaves of the plant are consumed as vegetables by people. *Chenopodium album* is used as medical plant, as well [8, 9].

***Cichorium intybus* L. (*Asteraceae*):** It is a perennial herbaceous plant which has a height of 20-120 cm. *Cichorium intybus* is known as "Yılan Yastığı, Dana Ayağı, Hindiba and Nivik" in Turkey. It occurs in the garbage dump, the cultivated lands and the meadows. The fresh leaves of plant are consumed as salad. The plant is also used as a medical plant [8, 9].

***Epilobium angustifolium* L. (*Onagraceae*):** It is a perennial herbaceous plant which is 50-250 cm. of height. It has red or white flowers. Its local name is "Yakı otu". It is widely spread around the wetland places and the marshes. The roots of plant are used medically [8, 9].

***Heracleum platytaenium* Boiss. (*Umbelliferae*):** It is a perennial herbaceous and monocarpic endemic plant. This species is 100-200 cm. of height and it has white flowers. Its local name is "Yavşan otu". It occurs in the mixed forest, the rocky slopes, and the stream sides. The stem of plant is consumed as pickle [10, 11].

***Malva sylvestris* L. (*Malvaceae*):** This is a plant whose purple flowers are perennial to biennial. *Malva sylvestris* is known as "Ebegümeçi". It spreads in the scrubs and the fields. The leaves of the plant are consumed as vegetables and used as a medical plant by people [8, 9].

***Ornithogalum sigmoideum* Freyn and Sint., (*Liliaceae*):** It is a bulbous plant. Its regional names are "Sakarca and Çökülce". It occurs in the fallow fields and meadows. The leaves and bulbs of fresh plants are consumed as vegetables [8, 9].

***Oxalis acetosella* L. (*Oxalidaceae*):** It is a perennial herb which has scaly rhizomes. Its local name is "Ekşi yonca". It is usually widespread in the forest clearings. The fresh leaves of the plant are consumed as salad and the dried leaves are consumed as tea and a medical plant. [8, 9].

Plantago media L. (*Plantaginaceae*): It is a perennial herb which is 100-200 cm. of height. Its local names are “Kuzukulağı and Labada ”. It occurs in the montane slopes, the steppe and the roadsides. The leaves and the fresh stem of the plant are consumed when they are raw and they can also be cooked. The plant is used as a medical plant as well. [8, 9,11].

Polygonum cognatum Meissn. (*Polygonaceae*) : It is a perennial herb with a slender woody stock. Its regional name is “Madımak ”. It is widespread in the roadsides, the slopes, the cliffs and the cultivated lands. The fresh leaves

MATERIALS AND METHODS

The plant specimens were collected in the vicinity of Ordu. The city is situated in the northern part of Turkey (37°10 E, 41°22 N). Eleven wild plants were investigated in this study. The studied plants were collected from the late winter to spring in 2004. Taxonomic nomenclature followed Flora of Turkey [12]. Plants were separated as the edible and the discarded parts (Table 1).The plant parts were dried at 70°C until the constant weight was provided and then they were milled. Nitrogen and phosphorus in the plant samples were determined by standard methods [13]. Protein contents of the plant species were determined by multiplying N contents by a coefficient of 6.25 [14].

RESULTS

The dry matter %, N %, P % and Protein % values are given in Table 2. The nitrogen concentration was extended from 1.1-4.2 (2.77±0.284), while the phosphorus concentration was extended from 0.006-0.16 (0.048±0.011). The highest N % concentration was observed in the leaves of *P. cognatum* and the lowest N % concentration was found in the stem of *P. media*. The leaves of *A. retroflexus* had the highest P % concentration and the shoots of *S. excelsa* had a lowest P% concentration. The protein values are followed the similar trend with N% values. Therefore, the highest protein value was determined in the leaves of *P. cognatum*, the lowest protein value was found in the stem of *P. media*.

The dry matter values are extended from 7.17-21.38 (17.60 ±1.79). The highest dry matter was found in the stem of *H. platytenium* and the lowest dry matter was found in the leaves of *O. sigmoideum*.

A. retroflexus, *H. platytenium* and *O. sigmoideum* are used as vegetables, others are used as both vegetables and medical plants[15].

and the stem of plant are consumed as vegetables. The dried plant is used as a medical plant[8, 9,11].

Smilax excelsa L. (*Liliaceae*): It is a climbing scrub up to 20m. It is known as “Melocan, Melvocan, Silcan, Diken otu, Mamula (Rize), Melevcen, Siraca (Mersin), Kırçan and Çıtırğı” in Turkey. It occurs in the deciduous forests, the scrubs and the roadsides. The shoots of the plant are consumed as vegetables and it is known as a medical and economic plant, as well. [8, 9, 11]

Table 1. Edible parts of plants.

Plant	Edible part
<i>A. retroflexus</i>	Leaf
<i>C. album</i>	Leaf
<i>C. intybus</i>	Leaf, Stem
<i>E. angustifolium</i>	Root
<i>H. platytenium</i>	Stem
<i>M. sylvestris</i>	Leaf
<i>O. sigmoideum</i>	Leaf, Bulb
<i>O. acetosella</i>	Leaf
<i>P. media</i>	Leaf, Stem
<i>P. cognatum</i>	Leaf, Stem
<i>S. excelsa</i>	Shoot

DISCUSSION

The nutrient content and the moisture vary with topographic position within an ecosystem [16]. Sympatric plant species take the mineral elements in different a concentration and accumulate them in various tissues, mainly in the leaf tissue [17]. Macroelement concentrations of the leaves (particularly N) are closely related to the photosynthetic capacity [18].

Generally, nitrogen contents of the plants vary according to the different factors. The most common factors are temperature and light intensity [19]. High N% concentrations were found in the present study because the cultivated lands cover a great part of the study area. According to Table 2, P% concentration was found rather low. The low P% concentration may be reflected to low soil P% levels.

As a result of the developments in agricultural techniques and marketing facilities, using of wild edible plants was remarkably decreased [20]. However, many of wild plants are nutritionally important because of their high vitamin, mineral and fiber contents and they can be used as food and will be used alternatively for the poverty problem [21]. Therefore, it is important to determine nutrition contents of wild edible plants and to use them as food.

Table 2. %N, P, dry matter concentrations of plants.

Plant	%N	%P	%Protein	(%)Dry matter
<i>A. retroflexus</i> (Leaf)	3.4	0.16	21.38	6.8
<i>C. album</i> (Leaf)	4.2	0.10	26.42	3.7
<i>C. intybus</i> (Stem)	1.3	0.01	8.43	19.9
<i>C. intybus</i> (Leaf)	2.5	0.03	16.17	4.3
<i>E. angustifolium</i> (Root)	1.9	0.06	12.21	14.8
<i>H. platytaenium</i> (Stem)	3.2	0.02	20.58	23.8
<i>M. sylvestris</i> (Leaf)	3.5	0.06	22.33	23.1
<i>O. sigmoideum</i> (Leaf)	3.4	0.04	21.73	2.1
<i>O. sigmoideum</i> (Bulb)	2.1	0.05	13.1	8
<i>O. acetosella</i> (Leaf)	3.93	0.10	24.56	6.1
<i>P. media</i> (Stem)	1.1	0.02	7.17	10.7
<i>P. media</i> (Leaf)	2.2	0.009	14.10	2.4
<i>P. cognatum</i> (Leaf)	4.4	0.05	28.03	2.7
<i>P. cognatum</i> (Stem)	3.29	0.01	20.56	12.3
<i>S. excelsa</i> (Shoot)	1.16	0.006	7.28	15.2
Mean ± SE	2.77± 0.284	0.048± 0.011	17.60± 1.79	10.35± 1.94

REFERENCES

- [1]. Işık S, Gönüz A, Arslan U, Öztürk M. 1995. Ethnobotanical properties of some species of Afyon (Türkiye). The Herb Journal of Systematic Botanic. 2: 161-166.
- [2]. Bağcı Y. 2000. Ethnobotanical properties of Aladağlar province(Yahyalı, Kayseri). The Herb Journal of Systematic Botanic. 7: 89-94.
- [3]. Duran A, Satıl F. 2001. Ethnobotanical properties of Balıkesir anda re consumed edible wild fruits- The Herb Journal of Systematic Botanic. 8: 87-94.
- [4]. Doğan Y, Baslar S, Ay G, Mert HH. 2004. The use of wild edible plants in Anatolia (Turkey). Economic Botany. 58: 684-690.
- [5]. Williams DE. 1993. *Lyanthes moziniana* (Solanaceae): An underutilized Mexican food plant with "new" crop potential. Economic Botany. 47: 387-400.
- [6]. Wetherilt H. 1992. Evaluation of *Urtica* species as potential sources of important nutrients. Food Science and Human Nutrition, 29: 15-26.
- [7]. Gren S.1993. An overview of production and supply trends in the U.S. specialty vegetable market. Acta Horticulturae. 318: 41-45
- [8]. Baytop T. 1984. Therapy with plants in Turkey. İstanbul Üniversitesi. No: 40.
- [9]. Davis PH. 1965-1985. Flora of Turkey and The East Aegean Islands. Vol 2,4,5,7 and 8. Edinburg: at the University Pres.
- [10]. Zeybek N. 1994. Pharmacological Botanic, Pharmacy Faculty of Ege University. No: 2, İzmir.
- [11]. Asımgil A. 2003. A .Asımgil, Healing Plants Book, Timaş Pres. İstanbul.
- [12]. Davis PH, Mill RR, Tan K. 1988. Flora of Turkey and The East Aegean Islands. Vol 10, Edinburg: at the University Pres.
- [13]. Allen SE, Grimshaw HM, Parkinson JA, Quarmby C, Roberts JD. 1976. Chemical Analysis. In: Chapman SB(ed). Methods in Plant Ecology. Blackwell Scientific Publications, Oxford. 411-466.
- [14]. Kaçar B. 1972. Chemical analyses of plant and soil II. Plant Analyses. Agriculture Faculty of Ankara University., 453.
- [15]. Baytop T. 1994. Turkish Plant Name Dictionary. Atatürk Culture, High Language and History Association.578, Ankara.
- [16]. Kutbay HG, Ok T. 2001. Foliar N and P resorbtion and nutrient levels along an elevational gradient *Zelkova carpinifolia* (Pall.) C. Koch subsp. *Yomraensis*. Annual Agriculture .Biological Research. 6:1-8.
- [17]. Pastor J, Bockheim JG. 1984. Distribution and cycling of nutrients in an aspen-mixed hardwood-spodosol ecosystem in Northern Wisconsin. Ecology. 65:339-353.
- [18]. Reich RB, Kloeppel BD, Ellsworth DS, Walters MB. 1995. Different photosynthesis nitrogen relations in deciduous hardwood and evergreen coniferous tree species. Oecologia. 104:24-30.
- [19]. Gürses Ö.L. 1983. Nitrate amount of tea and examine of health. Food. 8: 275-278.
- [20]. Yıldırım E, Dursun A, Turan M. 2000. Determination of the Nutrition Contents of the Wild Plants Used as Vegetables in Upper Çoruh Valley. Turkish Journal of Botany. 25: 369 .
- [21]. Tukan S, Takruri HR, Al- Eisawi DM. 1998. The use of wild edible plants in the Jordiandiet. International Journal of Food Sciences and Nutrition. 49:225-235.