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# Folk medicinal plants of Kartepe (Kocaeli-Türkiye)

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**ABSTRACT**: This paper presents important ethnobotanical information about the folk-medicinal plants found in Kartepe and their ethnopharmacological usage. The primary aims of the study were collecting and identifying plants used therapeutically by the local people, and making available traditional, herbal medicinal information about these plants. The study, conducted from 2018 to 2019, is based on plants collected during field work. The study identified 59 plants that are used in folk-medicine and that belong to 31 families. Of these, 47 taxa were wild, and 12 species were cultivated plants. The most common families were Rosaceae (14%), Asteraceae (12%), Malvaceae (7%), Lamiaceae (5%) and Papaveraceae (5%). The most common preparation was infusion (30.9%). In addition, a cultural importance index (CI) was calculated for each species. Based on the CI, the most important plants were *Hypericum perforatum* (0.82), *Plantago major* subsp. *major* (0.80), *Ficus carica* subsp. *carica* (0.79) and *Chelidonium majus* (0.77). Thus, with this study, the plants used asfolk medicine in the region have been scientifically identified and a resource has been created to transmit this information to future generations.

**KEYWORDS**: Ethnobotany; Folk medicinal plants; Kartepe; Kocaeli; Turkey.

## 1. INTRODUCTION

The aim of the WHO Traditional Medicine Strategy 2014–2023 [1] is to help member states develop policies and implement action plans that strengthen the role of traditional medicine in maintaining healthy populations. The use of traditional medicine is still widespread in most developing countries [2]. Ethnobotanical studies are crucial for bringing to light lost or neglected information, and so potentially enable the discoveries and uses of new and effective therapeutic compounds [3].

There are 9582 species of vascular plants in the Turkish flora, of which around 3155 are endemic. Turkey is home to numerous Anatolian civilizations, which contribute to the historical and cultural richness of the area. Turkey holds considerable significance for traditional herbal therapy due to its rich biodiversity. Ethnobotanical research, the most important research in the study of traditional folk medicines, is increasing in Turkey [4]. In 2012 ethnobotanical survey [5] conducted in the Izmit region gathered limited information in Kartepe. This current study was carried out to identify the plants used therapeutically by the people in Kartepe, where traditional life continues along with industrialization and which hosts different plant groups.

## 2. RESULTS AND DISCUSSION

The plants used for medicinal purposes in Kartepe are presented in Table 1. They are arranged alphabetically according to their botanical names, and are listed with related information. Taxonomic changes to The Plant List [6] appear in parentheses in Table 1., along with the plants' popular scientific names.

During the study of this research area, 105 specimens were collected, and 59 medicinal plant taxa belonging to 31 families were recorded for the research. Of these, 47 taxa were wild plants and 12 species were cultivated: Rosaceae (13.5%), Asteraceae (10.1%), Malvaceae (6.7%), Lamiaceae (5%) and Papaveraceae (5%) (Table 2).

The plant parts most commonly used to prepare remedies were leaves (43.2%), fruits (23.7%) and flowers (8.2%). Other parts were 24.9%.

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Occasionally, the local people also used other ingredients such as lemons, olive oil or molasses to prepare the remedies.

**Table 1.** Folk medicinal plants of Kartepe (Kocaeli, Turkey)

| Botanical name, Family and Specimen number | Local name | Plant part used | Ailments treated/ Therapeutic effect | Preparation Adminstration | CI | References |
|---|---|---|---|---|---|---|
| ***Actinidia chinensis*** Planch. [a] (Actinidiaceae, MARE 19625) | Kivi | Fruits | Immunostimulant | — Eaten, int. | 0.06 | |
| ***Alcea pallida*** Waldst. et Kit. (Malvaceae, MARE 20308) | Gülhatmi, Hatmiçiçeği | Leaves<br>Aerial parts | Cold<br>Stomach ailments | Infusion, int.<br>Infusion, int. | 0.23 | |
| ***Anthemis cretica*** L. subsp. ***pontica*** (Willd.) Grierson [***Anthemis cretica*** L.] (Asteraceae, MARE 19650) | Papatya | Capitulum | Insomnia | Infusion, int. | 0.30 | |
| ***Anthemis tinctoria*** L. **[*Cota tinctoria* (L.) J. Gay ]** (Asteraceae, MARE 20275) | Papatya | Capitulum | Shortness of breath | Infusion, int. | 0.32 | (1)[b] |
| ***Arum italicum*** Miller (Araceae, MARE 19584) | Zehirli kılıç, Zehirli ot | Leaves<br>Tubers<br>Tubers | Immunostimulant<br>Gastrointestinal diseases<br>Hemorrhoids | Cooked, int.<br>Cooked, int.<br>— int. | 0.49 | Hemorrhoids (3, 5 6, 10)<br>(4)[b] |
| ***Brassica*** *oleraceae* L. var. *acephala* DC. [a] [***Brassica oleracea*** L.] (Brassicaceae, MARE 19654) | Kara lahana | Leaves | Rheumatism | Heated then wrapped in a cloth for one night, ext. | 0.25 | 7<br>(4, 5, 13, 14)[b] |
| ***Castanea sativa*** Mill. (Fagaceae, MARE 19598, 20317) | Kestane | Seed<br>Leaves | Cough<br>Cold | Grilled then eaten, int.<br>Decoction, int. | 0.39 | Cough (18)<br>(4)[b] |
| ***Cerasus avium*** (L.) Moench [a] [***Prunus avium*** (L.) L.] (Rosaceae, MARE 19626) | Kiraz | Fruits<br>Fruit's stalk | Diarrhea<br>Gastrointestinal diseases | — Eaten, int.<br>Infusion, int. | 0.67 | Diarrhea (1)<br>Gastrointestinal diseases (2)<br>(3, 4, 5, 7 ,9)[b] |
| ***Chelidonium majus*** L. (Papaveraceae, MARE 21810) | Kına otu | Latex<br>Latex | Eczema<br>Warts | — ext.<br>— ext. | 0.77 | Eczema (6,11)<br>Wart (5,12, 14, 16, 19)<br>(15, 20, 18)[b] |
| ***Cirsium vulgare*** **(Savi) Ten.** (Asteraceae, MARE 20309) | Devedikeni | Aerial parts | Rheumatism | Infusion, int. | 0.15 | (17)[b] |
| ***Cistus creticus*** L. (Cistaceae, MARE 19639, 20298) | Boğaz otu, Pamuk otu | Flowers<br>Leaves | Sore throat<br>Cold | Infusion, int.<br>Infusion, int. | 0.33 | (6, 8)[b] |

| Botanical name, Family and Specimen number | Local name | Plant part used | Ailments treated/ Therapeutic effect | Preparation Adminstration | CI | References |
|---|---|---|---|---|---|---|

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|---|---|---|---|---|---|---|
| ***Crataegus monogyna*** Jacq. (Rosaceae, MARE 21813) | Alıç | Leaves | Antihypertansive | Decoction, int. | 0.26 | (1 , 3, 14-16) (4, 8, 9, 17)[b] |
| ***Cucurbita maxima*** Duchesne [a] (Cucurbitaceae, MARE 20259) | Bal kabağı Helvacı kabağı Tatlı kabak | Fruits | Digestive | Cooked , int. | 0.11 | (5,14)[b] |
| ***Cupressus sempervirens*** L. (Cupressaceae, MARE 20311) | Selvi | Young shoots | Cold | Decoction, int. | 0.39 | (3, 5)[b] |
| ***Cydonia oblonga*** Mill. [a] (Rosaceae, MARE 19600, 20263) | Ayva | Fruits<br>Leaves | Gastrointestinal diseases<br>Cough | —, int.<br>Decoction, int. | 0.71 | Cough (2, 3, 16) Gastrointestinal diseases (15) (19, 20)[b] |
| ***Datura stromonium*** L. (Solanaceae, MARE 20300) | Eşek otu | Seeds | Hemorrhoids | — Eaten, int. | 0.04 | (1, 3, 8, 16)[b] |
| ***Diospyros lotus*** L. [a] (Ebenaceae, MARE 19572, 20303) | Trabzon hurması | Fruits | Cardiovascular system diseases | — Eaten, int. | 0.09 | |
| ***Echium vulgare*** L. (Boraginaceae, MARE 19593) | Yılan otu | Leaves | Headache | Infusion, int. | 0.08 | |
| ***Erica arborea*** L. (Ericaceae, MARE 20312) | Çalı, Funda, Süpürge çalısı | Aerial parts | Urinary tract infection | Infusion, int. | 0.19 | (13) (3)[b] |
| ***Equisetum telmateia*** Ehrh. (Equisetaceae, MARE 19617, 21808) | Atkuyruğu, Çam otu, Eğrelti otu | Leaves<br>Leaves<br>Leaves<br>Root | Infertility<br>Rheumatism<br>Wound<br>Rheumatism | Decoction, int.<br>Heated then wrapped in a cloth, ext.<br>Heated then wrapped in a cloth, ext.<br>Crushed, ext. | 0.47 | (2, 3, 5, 6, 8, 11, 13)[b] |
| ***Ficus carica*** L. ***subsp. carica*** (Moraceae, MARE 19597, 20267, 20319) | Incir | Leaves<br>Latex | Wound<br>Wart | Wrapped in a cloth, ext.<br>Ext. | 0.79 | Wart ( 2, 3, 5, 16) (1, 9, 13)[b] |
| ***Galega officinalis*** L. (Fabaceae, MARE 19591) | Yabani yonca | Leaves | Stomachache | — Eaten, int. | 0.07 | |
| ***Hedera helix*** L. (Araliaceae, MARE 20290) | Duvar sarmaşığı Sarmaşık | Leaves | Wounds | Crushed with olive oil, ext. | 0.16 | (5,7-9, 14, 18)[b] |
| ***Hibiscus syriacus*** L. [a] (Malvaceae, MARE 20257) | Hatmi | Flowers | Cold | Infusion, int. | 0.10 | |
| ***Hypericum perforatum*** L. (Hypericaceae, MARE 1971, 19601, 19642, 20273) | Kantaron Sarı kantaron | Flowering branches<br>Flowering branches<br>Flowering branches<br>Flowers | Insomnia<br>Wounds<br>Skin diseases<br>Wounds | Infusion, int.<br>Oleat, ext.<br>Oleat ext.<br>Crushed then heated added molasses | 0.82 | Wound (1, 3,6, 8, 13, 14, 16, 19) Skin disease (15, 16, 19) (2, 4, 9,18,20)[b] |

| **Botanical name, Family and Specimen number** | **Local name** | **Plant part used** | **Ailments treated/ Therapeutic effect** | **Preparation Adminstration** | **CI** | **References** |
|---|---|---|---|---|---|---|
| ***Laurocerasus officinalis*** M.Roem. [***Prunus laurocerasus*** L.] | Kara yemiş | Leaves<br>Fruits | Diabetes<br>Diabetes | Infusion, int.<br>—, int. | 0.51 | Diabetes (5, 6, 8, 9) (7)[b] |

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|---|---|---|---|---|---|---|
| (Rosaceae, MARE 19580, 20266, 20299) | | | | | | |
| ***Laurus nobilis*** L. (Lauraceae, MARE 20265) | Defne | Leaves<br>Leaves | Kidney diseaeses<br>Shortness of breath | Infusion, int.<br>Infusion, int. | 0.40 | Kidney diseases (3) (4, 5,9, 11)[b] |
| ***Malva sylvestris*** L. (Malvaceae, MARE 19581, 19641) | Ebegümeci<br>Ebegömeç | Roots<br>Leaves | Urinary tract infection<br>Cold | Infusion, int.<br>Infusion, int. | 0.65 | Cold (9) (2, 3, 6- 8)[b] |
| ***Matricaria chamomilla*** L. var. ***recutita*** (L.) Grierson [***Matricaria chamomilla*** L.] (Asteraceae, MARE 19582) | Papatya | Aerial parts<br>Capitulum<br>Capitulum | Conspitation<br>Eye diseases<br>Analgesic | Infusion, int.<br>Decoction, dropped into the eyes<br>Decoction, int. | 0.49 | Eye diseases (16) (6, 4, 12, 13, 15, 17-20)[b] |
| ***Mentha longifolia*** (L.) Hudson subsp. ***typhoides*** (Briq.) Harley var. ***typhoides*** (L.) Hudson (Lamiaceae, MARE 20277) | Nane | Leaves | Stomach ailments | Eaten, int. | 0.71 | Stomach ailments (6, 17, 19) (1, 5, 7, 8, 15, 16, 18)[b] |
| ***Mentha spicata*** L. subsp. ***spicata*** [a] [***Mentha spicata*** L.] (Lamiaceae, MARE 19622, 19644, 20272) | Nane | Leaves<br>Leaves<br>Leaves | Stomach ailments<br>Halitosis<br>Cold | Eaten, int.<br>Eaten, int.<br>Infusion, int. | 0.69 | Stomach ailments (2, 4)<br>Cold (20) (6, 12)[b] |
| ***Mespilus germanica*** L. (Rosaceae, MARE 21800) | Beşbüyük, Muşmula | Leaves<br>Fruits | Conspitation<br>Conspitation | Infusion, int.<br>Infusion, int. | 0.51 | 5 (2,9)[b] |
| ***Onopordum*** sp. (Asteraceae, MARE 20271) | Devedikeni | Fruits | Stomach ailments | — Eaten, int. | 0.11 | |
| ***Origanum vulgare*** L. subsp. ***hirtum*** (Link) Ietsw. (Lamiaceae, MARE 20252) | Kekik<br>Yabani kekik | Leaves<br>Leaves<br>Leaves | Stomach ailments<br>Headache<br>Nausea | — Eaten, int.<br>Oleat, ext.<br>Infusion, int. | 0.67 | Nausea (6) (3, 8)[b]<br>Stomach ailments (17, 13) (16, 18, 20)[b] |
| ***Papaver dubium*** L. (Papaveraceae, MARE 19607, 19610) | Gelincik | Flowering branches | Sore throat | Infusion, int. | 0.31 | |
| ***Papaver rhoeas*** L. (Papaveraceae, MARE 19603) | Gelincik | Flowering branches | Sore throat | Infusion, int. | 0.31 | Sore throat (9) (3, 5)[b] |
| ***Phytolacca americana*** L. (Phytolaccaceae, MARE 20322) | Şerbetci boyası | Fruits | Hemorrhoids | — Eaten, int. | 0.09 | (9)[b] |

| **Botanical name, Family and Specimen number** | **Local name** | **Plant part used** | **Ailments treated/ Therapeutic effect** | **Preparation Adminstration** | **CI** | **References** |
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| ***Pinus nigra* Arn. subsp. *pallasiana* (Lamb.) Holmboe** (Pinaceae, MARE 20315) | Çam, Karaçam | Young shoots | Shortness breath | Infusion, int. | 0.47 | 5 |
| ***Plantago major* L. subsp. *major*** [***Plantago major* L.**] (Plantaginaceae, MARE 19620, 19645, 20268, 20278) | Kalp otu, Sinir otu, Yedi damarlı ot | Leaves<br>Leaves<br>Leaves<br>Leaves<br>Leaves | Cardiovascular system diseases<br>Wounds<br>Rheumatism<br>Insect bites<br>Boil | Crushed, , int.<br>Heated , wrapped in a cloth, ext.<br>Heated , wrapped in a cloth, ext.<br>Heated , wrapped in a cloth, ext. | 0.80 | Boil (3)<br>Wound (5, 6, 8, 12, 16, 17, 19)<br>(4, 15, 20, 18)[b] |
| ***Platanus orientalis* L.** (Platanaceae, MARE 20260) | Çınar | Leaves | Shortness breath | Decoction, int. | 0.46 | (3, 5, 8,9)[b] |
| ***Pteridium aquilinum* (L.) Kuhn** (Dennstaedtiaceae, MARE 19618) | Eğretlti otu | Leaves | Infertility | Infusion, int. | 0.05 | (2, 4)[b] |
| ***Raphanus raphanistrum* L.** (Brassicaceae, MARE 19587, 19629) | Sarı hardal | Leaves<br>Aerial parts | Digestive<br>Digestive | Decoction, int.<br>Cooked, eaten int. | 0.22 | (5,7)[b] |
| ***Rhododendron ponticum* L. subsp. *ponticum*** [***Rhododendron ponticum* L.**] (Ericaceae, MARE 19602, 19612, 19635) | Mor orman gülü, Orman gülü | Leaves | Cold | Chrused , int. | 0.30 | |
| ***Ribes nigrum* L.** [a] (Grossulariaceae, MARE 19653) | Frenk üzümü, Kuş üzümü | Fruits | Cardiovascular system diseases | — Eaten, int. | 0.10 | |
| ***Rosa canina* L.** (Roseceae, MARE 19611) | Kuşburnu | Fruits<br>Fruits | Cold<br>Cardiovascular system diseases | Infusion, int.<br>— Eaten, int. | 0.63 | Cold (1, 2, 5, 6, 8, 17)<br>Cardiovascular system diseases (4, 3)<br>(16, 18,19, 20)[b] |
| ***Rubus canescens* DC. var. *canescens*** [***Rubus canescens* DC.**] (Rosaceae, MARE 20258) | Böğürtlen | Fruits | Anaemia | — Eaten, int. | 0.21 | (6)[b] |
| **Botanical name, Family and Specimen number** | **Local name** | **Plant part used** | **Ailments treated/ Therapeutic effect** | **Preparation Adminstration** | **CI** | **References** |
| ***Rubus sanctus* Schreb.** (Rosaceae, MARE 19637, 20291, 20320) | Böğürtlen | Fruits | Anaemia | — Eaten, int. | 0.21 | (1, 2, 3, 6- 9)[b] |
| ***Ruscus aculeatus* L.** | Kalp otu | Fruits | Cardiovascular | — Eaten, int. | 0.08 | (10)[b] |

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|---|---|---|---|---|---|---|
| (Asparagaceae, MARE 20293, 21809) | | | system diseases | | | |
| ***Salix alba*** L. (Salicaceae, MARE 20307) | Söğüt | Bark | Rheumatism | Decoction, int. | 0.13 | (2, 8)[b] |
| ***Sambucus ebulus*** L. (Adoxaceae, MARE 20311) | Cüce mürver | Fruits<br>Fruits | Rheumatism<br>Hemorrhoids | — Eaten, int.<br>Decoction, int. | 0.37 | Hemorrhoids (3, 6, 8)<br>Rheumatism (3, 5, 7,19)<br>(16)[b] |
| ***Sambucus nigra*** L. (Adoxaceae, MARE 20305) | Şahmelik | Fruits<br>Fruits | Stomach ailments<br>Rheumatism | — Eaten, int.<br>— Eaten, int. | 0.37 | Rheumatism (3,16)<br>(2, 4-6,12, 13, 15, 17-19)[b] |
| ***Solanum nigrum*** L. subsp. ***schultesii*** (Opiz) Wessely [***Solanum decipiens*** Opiz] (Solanaceae, MARE 20294) | Köpek üzümü<br>İt üzümü | Fruits | Stomachache | — Eaten, int. | 0.06 | (6)[b] |
| ***Taraxacum*** sp. (Asteraceae, MARE 19648) | Hindiba, Karahindiba | Roots | Kidney stone | Decoction ,int. | 0.04 | |
| ***Tilia argentea*** DC.[a] [***Tilia tomentosa*** Moench.] (Malvaceae, MARE 19608, 20261) | Ihlamur | Flowering branches<br>Flowers<br>Leaves | Cold<br>Gastrointestinal system diseases<br>Digestive | Decoction, int.<br>Infusion, int.<br>Infusion, int. | 0.73 | Cold (1, 3) (4, 8, 13, 20,)[b] |
| ***Trachystemon orientalis*** (L.) D.Don (Boraginaceae, MARE 19594, 19627) | Çiçekli mancar, Kaldırak, Kaldirek | Leaves<br>Leaves | Analgesic<br>Urinary tract infection | Heated then wrapped in a cloth, ext.<br>Cooked, int. | 0.21 | Analgesic (6) (5, 11)[b] |
| ***Urtica dioica*** L. (Urticaceae, MARE 19621, 20262) | Isırgan | Leaves<br>Leaves<br>Aerial parts<br>Aerial parts | Hair tonic<br>Enteritis<br>Diuretic<br>Cough | Oleat, ext.<br>Infusion, int.<br>Decoction, int.<br>Decoction, int. | 0.51 | Cough (16)<br>Diuretic (13)<br>Hair tonic (16, 17)<br>(1-9, 11, 12, 15, 18-20)[b] |
| ***Xanthium strumarium*** L. subsp. ***cavanillesii*** [***Xanthium strumarium*** subsp. ***strumarium***] (Asteraceae, MARE 20292) | Pitrak | Leaves | Rheumatism | Decoction, int. | 0.04 | |
| ***Vitis vinifera*** L.[a] (Vitaceae, MARE 19624, 19628) | Üzüm | Fruits<br>Fruits | Anameia<br>Coıgh | — Eaten, int.<br>— Eaten, int. | 0.62 | Anameia (4, 5, 8)<br>(13)[b] |

Int.; Internal use. Ext.; External use. Adm.: Administration, , aCultivated plant b Different usage. The language of local names are in Turkish.
(1)Albayrak et Daşkın , 2018; (2) Bulut , 2011; (3) Genç et Özhatay,2006; (4) Güler et al., 2015; (5) Gürbüz, et al., 2019; (6) Kızılarslan et Ozhatay, 2012; (7) Koca et Yıldırımlı, 2010; (8) Koçyiğit, et Özhatay, 2006; (9) Koyuncu,et al., 2009; (10) Sağıroğlu, et al., 2022; (11) Uzun, et al., 2004; (12) Koleva, et al., 2015; (13) Łuczaj, et al., 2021; (14) Mincheva et al., 2022; (15) Mustafa, et al., 2012; (16) Mustafa et al., 2020; (17) Pieroni, et al., 2011; (18) Rexhepi, et al., 2013; (19) Savić, et al., 2019; (20)Nedelcheva, et al., 2017.

The main preparation methods were infusion (30.9%), direct application (23.7%, with no preparation) decoction (16.5%) and other methods (28.9%). The study recorded a total of 97 remedies, most of which were taken internally (81.4%) (Table 1).

According to the calculations of the cultural importance index (CI), the most important plants were *Hypericum perforatum* (0.82), *Plantago major* subsp. major (0.80), *Ficus carica* subsp. carica (0.79), and *Chelidonium majus* (0.77) (Table 1).

It has been determined that plants in the region are mostly used in the treatment of colds, skin wounds, digestive disorders, stomach disorders and rheumatism.

According to the interviewees, *Arum italicum* and *Phytoloccca americana* should be handled with care since an overdose (long-term exposure) could prove dangerous.

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**Table 2.** Numbers of plant species by the families used for medicinal purposes

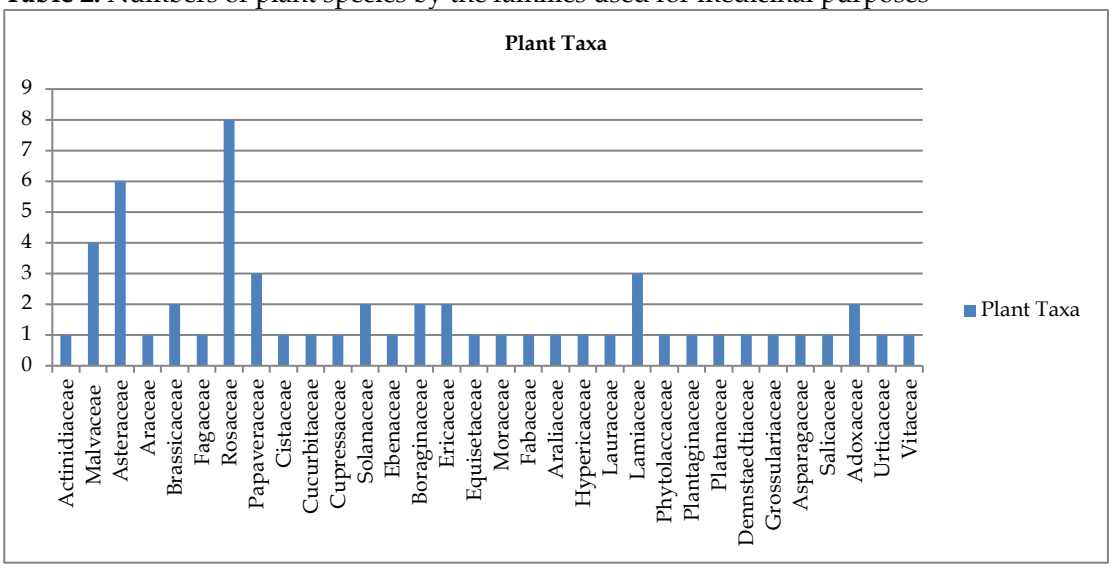


**Figure 1.** Meal of *Trachystemon orientalis*

During our research, it was determined that the folk medicine plants *Brassica oleraceae* var. acephala, *Trachystemon orientalis* and *Urtica dioica* were also used in cooking (Figure 1).

It was also determined that *Mentha longifolia* subsp. typhoides var. typhoides, *Mentha spicata* subsp. spicata, *Origanum vulgare* and *Laurus nobilis* leaves were used as spices.

The natives referred to certain different plant species by the same vernacular name. For example, both *Rubus canescens* var. canescens and *Rubus sanctus* were called "böğürtlen", *Mentha longifolia* subsp. typhoides var. typhoides and Mentha spicata subsp. spicata were called "nane", *Anthemis tinctoria* and *Matricaria chamomilla* var. recutita were called "papatya" and *Papaver rhoeas* and *Papaver dubium* were called "gelincik".

Comparison of the present study with other comprehensive ethnobotanical studies of folk-medicinal plants used in neighbouring areas [5, 7-16] is presented in Table 1. It shows that *Urtica dioica* (recorded in 10 localities), *Hypericum perforatum* and *Rubus sanctus* (recorded in seven localities each) are the most common medicinal plants in Kartepe and the surrounding area. The use of the *Urtica dioica* plant as a diuretic and cough treatment and the use of *Hypericum perforatum* as a wound treatment were recorded in this region. It seems that the use of *Rubus sanctus* is not common in this region.

When we compared our study with a study [5] of an area close to ours, it was determined that the studies had 30 plants in common used as traditional folk medicine and 18 of these were used for the same purpose.

The local use of *Actinidia chinensis* Planch., *Alcea pallida* Waldst. et Kit., *Anthemis cretica* L. subsp. pontica (Willd.) Grierson, *Diospyros lotus*, *Echium vulgare*, *Galega officinalis*, *Hibiscus syriacus* L., *Papaver dubium* L., *Rhododendron ponticum* L. subsp. ponticum, *Ribes nigrum* L., and *Xanthium strumarium* L. subsp. cavanillesii (Schouw) D. Löve & Dans. have not been observed in nearby regions [5, 7-16].

When we compared the research we conducted in the Kocaeli region with research conducted in the Balkan Peninsula [17-25] it was seen that the uses of *Chelidonium majus*, *Hypericum perforatum*, *Matricaria cahamomilla* var. recutita, *Sambucus nigra*, *Plantago major*, and *Urtica dioica* are similar.

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## 3. CONCLUSION

This study showed that plants are an accepted part of traditional folk medicine in Kartepe. It demonstrated that despite the region's industrialization and proximity to developed urban centers, traditional knowledge has been preserved in Kartepe. Thus, with this study, the plants used as folk medicine in the region have been scientifically identified and a resource has been created to transmit this information to future generations.

## 4. MATERIALS AND METHODS

### 4.1. Study area

Kartepe is located in northwestern Turkey (40° 45′ N, 30° 1′ E) at an altitude of 1,602 m (Figure 2). It consists of a single sub-district and 32 villages, covers an area of 269 km2 and has a population of 142,175 (2023)[26].

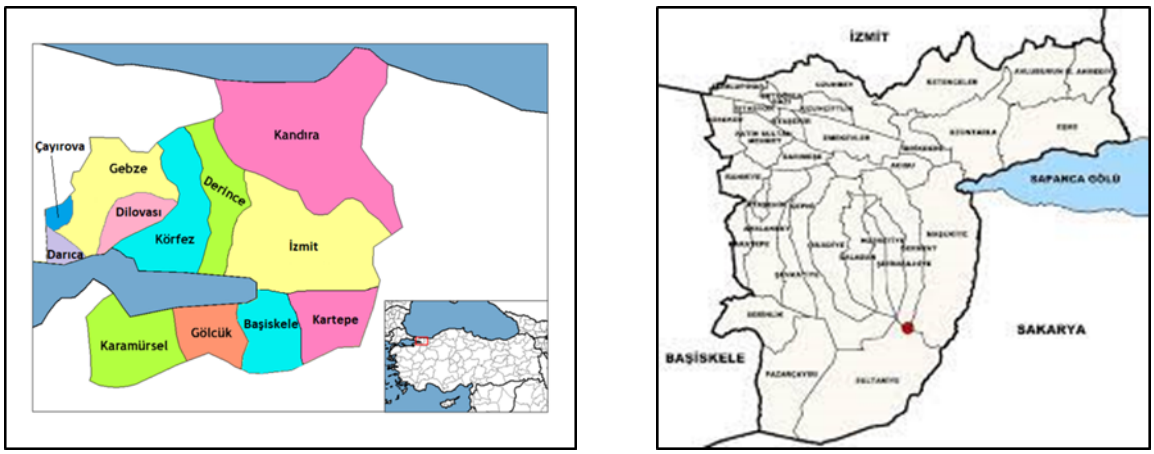


**Figure 2.** Map of Kartepe

It ranges from Köseköy settlement in the west to Sapanca Lake and Sakarya in the east, from Mt. Kartepe in the south to İzmit in the north. The southern part of Kartepe consists of the middle range of the Samanlı Mountains, which run east to west and form a massif. Although Kartepe,'s climate is influenced by the Sea of Marmara and the western Black Sea, it shows variations that make it unique. The prevailing climate is steppe and temperate, with an annual mean temperature of 13.2 °C. Rainfall is intense in winter and spring, but occurs in all seasons (Figure 3-4). The ski resort at Kartepe is renowned as a popular destination for winter tourism [27].

The Flora of Turkey and the East Aegean Islands [28-30] has recorded 15 plants for Kartepe: *Achillea grandifolia* Friv., *Asperula taurina* L. subsp. taurina, *Blackstonia perfoliata* L. subsp. perfoliata, *Campanula latifolia* L., *Cenchrus americanus* (L.) Morrone, *Corydalis cava* (L.) Schweigg. & Körte, *Corydalis wendelboi* Lidén subsp. congesta Lidén & Zetterlund, *Crocus pulchricolor* Herb. ex Tchich., *Gentiana asclepiadea* L., *Luzula forsteri* (Sm.) DC., *Luzula sylvatica* (Hudson) Gaudin, *Jacobaea erratica* (Bertol.) Fourr., *Orchis militaris* L., *Salvia glutinosa* L., *Teucrium chamaedrys* L. subsp. chamaedrys, *Vallisneria spiralis* L., and *Veronica serpyllifolia* L.

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**Figure 3.** General view of center of Kartepe

**Figure 4.** General view of Samanlı Mountains

A study identifying the flora of the Kartepe region recorded 80 families and 418 species [31]. The vegetation of the area contains Mediterranean and Euro-Siberian elements such as *Carpinus betulus* L., *Castanea sativa* Miller, *Cistus creticus* L., *Fagus orientalis* Lipsky, *Laurus nobilis* L., *Phillyrea latifolia* L. and *Rhododendron ponticum* L. subsp. ponticum (Figure 5).

**Figure 5.** General view of vegetation

A survey of the research literature revealed ethnobotanical studies in the Izmit region, which includes a part of Kartepe. A study conducted by Kızılarslan in 2012 covered only nine of the 32 villages in the Kartepe region [5]. Our study aimed to conduct research covering the entire region.

### 4.2. Field study

This ethnobotanical survey focuses on the medicinal usage of wild plants. During the field work (2018-2019), all the settlements (a total of 32 villages: 1. Acısu, 2. Ataevler, 3.Arslanbey, 4. Ataşehir, 5.Balaban, 6. Çepni, 7. Derbent, 8. Dumlupınar, 9. Emekevler, 10. Ertuğrul Gazi, 11. Eşme, 12.Eşmeahmediye, 13. Fatih Sultan Mehmet, 14. Havluburun, 15.İbrikdere, 16. İstasyon, 17. Karatepe, 18.Ketenciler, 19. Köseköy, 20. Maşukiye, 21.Nusretiye, 22. Pazarçayırı, 23. Rahmiye, 24. Sarımeşe, 25.Serinlik, 26. Suadiye, 27. Sultaniye, 28. Şevkatiye, 29.Şirinsulhiye, 30. Uznubey, 31. Uzunçiftlik, 32. Uzuntarla) were visited. Data were collected mainly by means of the free listing method, and supplemented by the observations of participants during informal walks with selected key informants. A total of 84 people were interviewed. Of these, 52 were women and 32 were men. Interviews were arranged at various places (e.g. tea houses, gardens, homes).

The demographic characteristics of the 84 respondents were recorded during face-to-face interviews. The age groupings were 30–40 years old (17), 41–59 (39) and over 60 (28). All the respondents were native to Kartepe and lived in villages. Of the respondents, 32 were male and 52 were female, and 95.2% were literate.

For medicinal plants, the local names, names of the part(s) of the plants used, ailments treated, therapeutic effects, and methods of preparation and of administration were gathered during interviews.

The Code of Ethics of the International Society of Ethnobiology [32] was strictly followed.

The collected plants were identified by the author using the *Flora of Turkey and East Aegean Islands* [28-30]. Voucher specimens were deposited in the Herbarium of the Faculty of Pharmacy, University of Marmara (MARE).

### 4.3. Calculations

The Cultural Importance Index (CI) [33] is a comparative measure of the importance of the most commonly used species, according to informants. It was calculated by using the formula $CI=UR_s/N$; UR (Use Report) = the total number of uses recorded for each species; N= the total number of informants participating in the research.

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