

REVIEW

Plants used in Traditional Treatment for Boils in Turkey

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Abstract

Boils are a painful inflammatory skin disease, often accompanied by swelling and redness of the hair follicle and its surroundings by *Staphylococcus aureus* bacteria. Antimicrobial agents are used in its clinical treatment. In addition to clinical treatment, the treatment applications with herbs continue among the public. In this study, which was prepared by screening of ethnobotanical researches made in Turkey, 171 taxa were recorded in the traditional treatment of boils. Information about scientific and local names, families, used parts and usage patterns of these plants were given. As a result of the research, the biological activities of the genera (*Allium*, *Brassica*, *Malva*, *Plantago*) that are most commonly used in the treatment of boils were evaluated by screening the studies in the literature.

Keywords: Boils, Traditional Treatment, Medicinal Plants, Turkey

INTRODUCTION

Boil known as folliculitis, furuncle, and carbuncle in medicine is a painful inflammatory skin disease (Figure 1) that is mostly caused by *Staphylococcus aureus* type bacteria. It is deeply located in the hair follicle, accompanied by swelling and redness, as a result of the loss of the protective function of the skin¹.

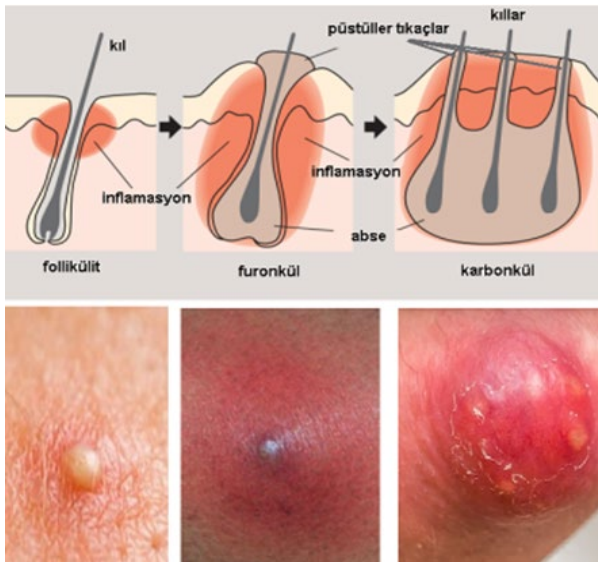


Figure 1. Folliculitis, furuncle & carbuncle (https://www.hakanbuzoglu.com/images/follikulit/follikulit%20kil_koku_iltihabi.png)²

Folliculitis is an inflammation of the hair follicle. It is seen as a painful swelling surrounding the hair and sometimes as a pus settle in the middle.

Furuncle is a deep-seated infection of the hair follicle and its surroundings. It mostly occurs with the progression of infection in folliculitis and formation of nodules. It is known among the people as the "kan çıbanı". Lesions first appear in the dermis. It starts as a hard, painful, red nodule and then develops into a painful fluctuating abscess¹.

Carbuncles are deep and large inflammatory lesions that occur in more than one hair follicle. It may occur as a result of the combination of neighboring furuncles. It is more severe than furuncle. It is caused by bacterial infection most commonly with *S. aureus*³. It is known among the people as the "aslan pençesi". Lesions are usually located on the neck, back and buttocks. It is observed as painful, erythematous, very hard, large nodules. The lesion is softened by fluctuation and may drain spontaneously. Leukocytosis and systemic symptoms such as pain, fever, malaise may occur. There is a risk of developing bacteremia in long-term infections^{1,4}.

Clinical treatment for boils

Generally, systemic or topical antimicrobial agents are used for clinical treatment of boils.

In folliculitis, the lesion is cleaned, saline compress is applied, followed by topical antibiotic / antifungal treatment. It heals in 7-10 days without leaving a scar. Applying intermittent hot compresses on the furuncle and carbuncle may facilitate the drainage of the abscess. A single

lesion that drains on its own can heal without the need for additional treatment, but local antiseptic and antibiotic application is necessary to prevent spreading to its surroundings and for faster healing¹. Large abscesses that cannot drain spontaneously are surgically drained. In such cases, topical and systemic antibiotic treatment is definitely started. Cephalexin, cotrimaxazole, clindamycin and macrolides are used as antibiotics for 10-14 days⁴.

Traditional treatment for boils in Turkey

Antibiotics are of great importance in the treatment of infectious diseases, but the increasing number of multi-drug resistant bacteria decreases the effectiveness of antibiotics and increases the frequency of therapeutic failures. For this reason, the continuity of antibacterial drug research is important. Antibiotic treatment is also important in the clinic for boils, which is one of the infectious diseases, but the presence of resistant bacteria may limit the treatment options¹. At this point, herbs used in traditional treatment among the public have an unlimited potential in search for new drugs. Turkey has a rich flora due to its geographical position⁵. Plants are mostly used in the traditional treatment of many diseases. These plants used in treatment have been revealed by numerous ethnobotanical studies. The purpose of this study is to determine the plants used in the treatment of boils by screening the ethnobotanical studies were carried out in Turkey and evaluate antioxidant, antimicrobial, anti-inflammatory and analgesic activities of the most used genera by screening the studies in the literature.

Plants used for boils treatment in folk medicine are given in Table 1 below with their botanical names, local names, families, used parts and usage.

MATERIAL AND METHOD

This study was prepared screening the MSc and PhD theses in the National Thesis Center of the Council of Higher Education and ethnobotanical studies up to the present conducted in the Turkey with selecting plants used in the treatment of boils.

Then, the most used of these plants, activity studies to support the use of boils were investigated.

RESULT AND DISCUSSION

In this study, the ethnobotanical studies conducted in Turkey were screened and the plants used for the treatment of boils were compiled with their scientific names, local names, parts used and

usages and shown in Table 1.

This review also includes studies showing the antioxidant, anti-inflammatory, and antimicrobial activities of the most commonly used species.

171 taxa were recorded in the traditional treatment of boils. *Abies nordmanniana* (Steven) Spach, *Eryngium bithynicum* Boiss., *Papaver triniifolium* Boiss., *Salvia dichroantha* Stapf are endemic.

The most commonly used parts are leaves (70 taxa) followed by aerial parts (34 taxa), fruits (15 taxa), flowers (12 taxa), tubers (11 taxa), roots (8 taxa) and resin (8 taxa) shown in Figure 2.

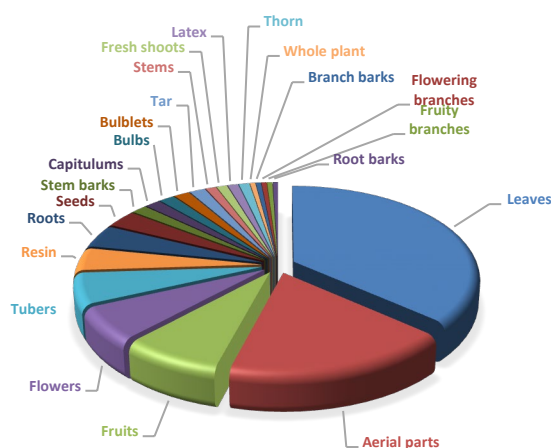


Figure 2. The most used plant parts

The most used plant families in traditional boils treatment are: Asteraceae (17 taxa), Lamiaceae (13 taxa), Fabaceae (10 taxa), Malvaceae (9 taxa), Liliaceae (8 taxa), Polygonaceae (8 taxa), Pinaceae (7 taxa), Rosaceae (7 taxa), Ranunculaceae (6 taxa), Orchidaceae (5 taxa), Plantaginaceae (5 taxa) shown in Figure 3.

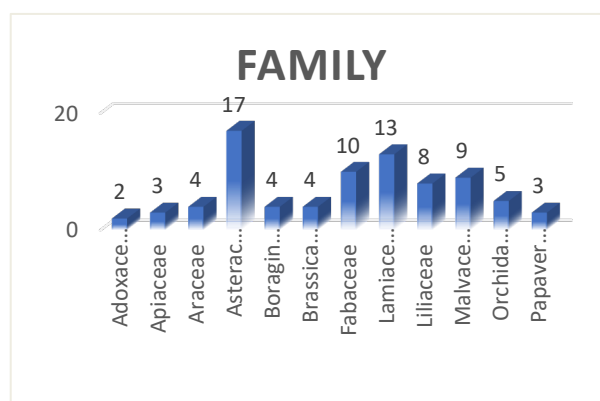


Figure 3. Main families used in traditional boil treatment in Turkey

Table 1. Plants used in the treatment of boil in Turkey

Botanical name	Family	Local name	Plant part used		Usage	Ref.
<i>Abelmoschus esculentus</i> (L.) Moench (Syn. <i>Hibiscus esculentus</i> L.)	Malvaceae	Bamya	Fruits	Ext.	Boiled fruits are applied in the painful area and kept for 8-10 hours.	5, 6, 7
<i>Abies cilicica</i> (Antoine & Kotschy) Carrière	Pinaceae	İladin	Resin	Ext.	Resin is applied to the boil.	8, 9
* <i>Abies nordmanniana</i> (Steven) Spach (Endemic)	Pinaceae	Gökнар Kökнар	Resin	Ext.	Resin is applied to the boil.	10
<i>Abies nordmanniana</i> subsp. <i>equi-trojani</i> (Syn. <i>Abies bornmuelleriana</i> Mattf.)	Pinaceae	Künar sakızı	Resin	Ext.	Resin, soap, butter are put into the cavity opened to the onion and heated and the boiled finger is kept in this hole.	11
<i>Acer campestre</i> L.	Sapindaceae	Akça ağaç	Stem barks	Ext.	Ash of stem barks is applied to the boil.	12
<i>Achillea arabica</i> Kotschy (Syn. <i>Achillea biebersteinii</i> C.Afan.)	Asteraceae	Ormaderen	Capitulums	Ext.	Crushed capitulums is applied to the boil.	13
<i>Achillea crithmifolia</i> Waldst. & Kit.	Asteraceae	Civanperçemi Mayasıl otu	Aerial parts	Int.	Drink the infusion.	14
<i>Achillea millefolium</i> subsp. <i>millefolium</i>	Asteraceae	Civanperçemi	Leaves	Ext.	Crushed leaves are applied to the boil.	15
<i>Alcea apterocarpa</i> (Fenzl) Boiss.	Malvaceae	Hatmi, Gülhatmi	Leaves, Flowers	Ext.	Crushed leaves and flowers are applied to the boil	16
<i>Alcea calvertii</i> (Boiss.) Boiss.	Malvaceae	Hatmi, Gülhatmi	Leaves, Flowers	Ext.	Crushed leaves and flowers are applied to the boil	16
<i>Alcea fasciculiflora</i> Zohary	Malvaceae	Hatmi	Roots	Ext.	Crushed root is applied to the boil.	13, 17
<i>Alcea flavovirens</i> (Boiss. & Buhse) Iljin	Malvaceae	Heru	Roots	Ext.	Crushed root is applied to the boil.	13
<i>Alchemilla minusculiflora</i> Buser	Rosaceae	Deve tabanı Aslan pençesi	Leaves, Flowers	Int.	Drink the infusion.	16
<i>Alkanna tinctoria</i> (L.) Tausch	Boraginaceae	Havacıva otu	Roots	Ext.	Roast the root in butter to obtain an ointment and apply it to a boil.	16
<i>Allium ampeloprasum</i> L.	Liliaceae	Pırasa	Roots	Ext.	The roots of the fresh plant are crushed with butter and milk, then wheat flour is added and cooked. This poultice is applied to the boil.	7
<i>Allium cepa</i> L.	Liliaceae	Soğan	Bulbs	Ext.	-Boiled bulb is applied to the painful area and kept for 8-10 hours. -Grated onion is boiled in milk and then applied to painful area -The grated onion is heated in a pan with soap, milk, beeswax, butter and resin, the resulting ointment is applied to the boil.	6, 9, 11, 18, 19, 20, 21
<i>Allium rotundum</i> L.	Liliaceae	Körmen, Kömüren	Bulblets	Ext.	The onion cooked in embers is crushed and applied to the boil.	5
<i>Allium sativum</i> L.	Liliaceae	Sarımsak	Bulblets	Ext.	Crushed bulb is applied to the boil.	22, 23
<i>Anagyris foetida</i> L.	Fabaceae	Keçigevişi Kokar bakla	Seeds	Ext.	Seeds are crushed with olive oil and applied to the boil.	7
<i>Anchusa azurea</i> Mill.	Boraginaceae	Hımhum İvveyna	Roots	Ext.	Crushed root is applied to the boil.	24
<i>Arctium minus</i> (Hill) Bernh. (Syn. <i>Arctium minus</i> subsp. <i>pubens</i> (Bab.) Arènes)	Asteraceae	Bozptrak	Leaves	Ext.	Leaves are heated over fire and applied to the boil.	13, 21
<i>Arctium tomentosum</i> Miller var. <i>glabrum</i>	Asteraceae	Toptelli	Leaves	Ext.	Crushed leaves are applied to the boil.	13
<i>Arnebia densiflora</i> (Nordm.) Ledeb.	Boraginaceae	Ellik, Enlik, Eğnik	Roots	Ext.	Crushed roots are mixed with butter and applied to the boil.	25
<i>Arum detruncatum</i> C. A. Meyer var. <i>detruncatum</i>	Araceae	Yılan burçağı Yılan yastığı	Tubers, Leaves	Ext.	Fresh tubers and leaves are applied to the boil.	7
<i>Arum elongatum</i> Steven	Araceae	Kabargaç	Tubers, Leaves	Ext.	Poultice is applied to the boil.	20, 26

<i>Arum italicum</i> Mill.	Araceae	Pezük yaprağı	Leaves	Ext.	Fresh leaves are applied to the boil.	21
<i>Arundo donax</i> L.	Poaceae	Kargı, Kamyş	Stems	Ext.	Stem is grated and sugar, egg white and some soap grated are added to obtain the ointment and it is applied to the boil.	27
<i>Asteriscus spinosus</i> (L.) Sch.Bip. (Syn. <i>Pallenis spinosa</i> (L.) Cass.)	Asteraceae	Nalçeken Dağ nergisi	Flowers	Ext.	The poultice prepared from fresh flowers is applied to the boil.	28
<i>Astragalus ancistrocarpus</i> Boiss. & Hausskn.	Fabaceae	Kuşkonmaz	Aerial parts	Ext.	Aerial part ashes are mixed with olive oil and applied to the boil.	29
<i>Beta vulgaris</i> L.	Amaranthaceae	Pezik	Leaves	Ext.	Fresh leaves are applied to the boil.	18
<i>Brassica oleracea</i> L. (Syn. <i>Brassica oleracea</i> L. var <i>capitata</i> DC.)	Brassicaceae	Kara lahana Kara kelem	Leaves	Ext.	-The leaf, which is softened by heating in the fire, is applied to the boil and kept for one night. -Fresh leaves are applied to mature and burst the boil.	9, 11, 21, 30, 31, 32
<i>Buxus sempervirens</i> L.	Buxaceae	Şimşir	Leaves	Ext.	Fresh leaves are applied to the boil.	7
<i>Capparis spinosa</i> L.	Capparaceae	Kıbbar, Kebere Kappari	Leaves	Ext.	Crushes leaves are applied to the boil.	33
<i>Capsicum annum</i> L.	Solanaceae	Acı yeşil biber	Fruits	Ext.	It is cut in half and applied to the boil.	18
<i>Cedrus libani</i> A.Rich.	Pinaceae	Sedir	Tar	Ext.	The onion is cooked in embers and mixed with tar and applied to the boil.	34
<i>Centaurea balsamita</i> Lam.	Asteraceae	Kılıç otu	Leaves	Ext.	Crushed leaves are applied to the boil.	13
<i>Centaurea iberica</i> Trevir. ex Spreng.	Asteraceae	Deve dikeni, Belhok, Çakıldikeni, Deligöz dikeni	Leaves	Ext.	Crushed leaves are applied to the boil.	25
<i>Centaurea pulchella</i> Ledeb.	Asteraceae	Boğa dikeni	Aerial parts	Ext.	Crushed aerial parts are applied to the boil.	9
<i>Centaurea solstitialis</i> subsp. <i>solstitialis</i> L.	Asteraceae	Korugoz, Sarıdiken	Capitulums	Ext.	Crushed capitulums are applied to the boil.	35
<i>Centaurea urvillei</i> subsp. <i>stepposa</i> Wagenitz	Asteraceae	Çobankaldıran	Leaves	Ext.	Crushed leaves are applied to the boil.	35
<i>Cerastium dubium</i> (Bastard) O.Schwarz (Syn. <i>Cerastium anomalum</i> Waldst. & Kit.)	Caryophyllaceae	Cırcamuk	Aerial parts	Ext.	Aerial parts of the fresh plant is kept in olive oil overnight and applied to a boil.	7
<i>Cerasus avium</i> (L.) Moench (Syn. <i>Prunus avium</i> (L.) L.)	Rosaceae	Yabani kiraz	Leaves	Ext.	Fresh leaves are applied to the boil.	12
<i>Chelidonium majus</i> L.	Papaveraceae	Kırlangıç otu Temre otu	Latex	Ext.	Latex is applied to the boil.	7
<i>Cichorium intybus</i> L.	Asteraceae	Yabani hindiba Sütlüot, çitlankuş	Aerial parts	Ext.	Aerial parts are crushed with green lentils and plum seeds and mixed with butter, then applied to the boil.	16
<i>Clematis flammula</i> L.	Ranunculaceae	Acı tefek	Leaves, Flowers	Ext.	Crushed leaves and flowers are applied to the boil.	26
<i>Clematis orientalis</i> L.	Ranunculaceae	Şeytan çubuğu Muşurbaz otu	Aerial parts	Ext.	Aerial parts are chopped finely and applied to the boil.	13, 32, 36
<i>Colutea cilicica</i> Boiss. & Balansa	Fabaceae	Patlangaç Patluk, Patlak	Fruity branches	Ext.	Decoction of fruity branches is applied to the boil.	7
<i>Cornus mas</i> L.	Cornaceae	Kızılıçık, ergen	Leaves	Ext.	Leaves are used for boils externally.	26
<i>Coronilla orientalis</i> Miller var. <i>orientalis</i> (All.) Vitman	Fabaceae	Yonca	Flowers	Ext.	Crushed flowers are applied to the boil.	7
<i>Cucurbita moschata</i> Duchesne	Cucurbitaceae	Bal kabağı	Fruits	Ext.	Fruit poultice is applied to the boil.	16
<i>Dactylorhiza euxina</i> (Nevski) Czerep.	Orchidaceae	Sahlep	Tubers	Int.	The infusion is prepared	16
<i>Dactylorhiza osmanica</i> (Klinge) P.F.Hunt & Summerh.	Orchidaceae	Sahlep	Tubers	Int.	The infusion is prepared	16
<i>Dactylorhiza umbrosa</i> (Kar. & Kir.) Nevski	Orchidaceae	Sahlep	Tubers	Int.	The infusion is prepared	16
<i>Dactylorhiza urvilleana</i> (Steud.) H.Baumann & Künkele	Orchidaceae	Sahlep	Tubers	Int.	The infusion is prepared	16
<i>Daphne oleoides</i> subsp. <i>oleoides</i> Schreber	Thymeleaceae	Ezentene Develik otu Çıtlak	Aerial parts	Ext.	Crushed aerial part is boiled with milk and obtain poultice. This poultice is applied to the boil.	9

<i>Dracunculus vulgaris</i> Schott	Araceae	Yılan burçağı Yılan otu Yılan bıçağı	Leaves, Tubers	Ext.	- Leaves are heated over fire and applied to the boil. - Crushed tuber is applied to the boil.	7
<i>Drimia maritima</i> (L.) Stearn (Syn. <i>Urginea maritima</i> (L.) Baker)	Asparagaceae	Ada soğanı	Bulbs	Ext.	It is cooked in embers or some water and applied to the boil.	34
<i>Ecballium elaterium</i> (L.) A.Rich.	Cucurbitaceae	Deli bostan	Leaves	Ext.	Leaves are applied to the boil.	26, 37
<i>Echinops spinosissimus</i> subsp. <i>bithynicus</i> (Boiss.) Greuter (Syn. <i>Echinops viscosus</i> subsp. <i>bithynicus</i> (Boiss.) Rech. fil.)	Asteraceae	Çengel diken	Capitulums	Ext.	Warmed and crushed capitulums are applied to the boil.	35
<i>Echium italicum</i> L.	Boraginaceae	Sülük otu	Whole plant	Ext.	The whole plant is boiled in small pieces in water, crushed and applied to the boil.	20, 38
<i>Elaeagnus angustifolia</i> L.	Elaeagnaceae	İğde	Leaves	Ext.	The poultice obtained by crushing <i>Elaeagnus</i> leaves and ash of <i>Salix</i> stem bark is applied to the boil.	20
<i>Erica manipuliflora</i> Salisb.	Ericaceae	Funda süpürge otu püren	Aerial parts	Ext.	Ointment prepared by olive oil is applied to the boil.	26
<i>Erodium cicutarium</i> (L.) L'Hér.	Geraniaceae	İnnelik	Aerial parts	Ext.	Crushed aerial parts are applied to the boil.	39
<i>Eryngium billardierei</i> F.Delaroche	Apiaceae	Gelenk, Boğa diken	Roots	Ext.	Crushed roots are applied to the boil.	13, 32
* <i>Eryngium bithynicum</i> Boiss. (Endemic)	Apiaceae	Şeker diken	Aerial parts	Ext.	Aerial parts are boiled with wheat flour to obtaine poultice. Hot poultice is applied to the boil.	9, 19
<i>Eryngium campestre</i> L.	Apiaceae	Boğa diken	Flowers	Ext.	Crushed flowers are applied to the boil.	40
<i>Erysimum pycnophyllum</i> J.Gay (Syn. <i>Erysimum thyrsoideum</i> Boiss.)	Brassicaceae	Çekme otu	Aerial parts	Ext.	Aerial parts are boiled with wheat flour to obtain poultice and then it is applied to the boil.	40
<i>Ficus carica</i> L.	Moraceae	İncir	Latex, Fruits	Ext.	-Latex is applied to the boil. -Fresh fruit is applied to the boil.	12, 18, 20, 25
<i>Filipendula ulmaria</i> (L.) Maxim.	Rosaceae	Dağ reyhanı	Leaves, Flowers	Ext.	Dried leaves and flowers are powdered and applied to a boil.	41
<i>Frangula alnus</i> Mill.	Rhamnaceae	Banişotu	Stem barks and flowering branches	Ext.	Flowering branch and stem barks are boiled in water, Poultice is prepared by adding barley flour to the water and applied to the boil.	38
<i>Fritillaria pinardii</i> Boiss.	Liliaceae	Mor lale	Bulblets	Ext.	Cut the onion in half, add olive oil, heat it over a low fire and put it on the boil.	25
<i>Galanthus fosteri</i> Baker	Amaryllidaceae	Kardelen, Kar çiçeği	Bulbs	Ext.	Cut the onion in half and put it on the boil.	7
<i>Glaucium grandiflorum</i> Boiss. & A.Huet	Papaveraceae	Boynuzlu gelincik	Fruits	Ext.	Fresh fruits are crushed and applied to the boil.	7
<i>Hedera helix</i> L.	Araliaceae	Duvar sarmaşığı, Orman sarmaşığı	Leaves	Ext.	Fresh leaves are applied to the boil.	42, 43, 44
<i>Hordeum vulgare</i> L.	Poaceae	Arpa	Seeds	Ext.	Poultice prepared by boiling barley flour is applied to the boils.	9, 13
<i>Hyacinthus orientalis</i> L.	Asparagaceae	Sümbül	Tubers	Ext.	Tubers are applied to the boils.	22
<i>Hylotelephium telephium</i> (L.) H.Ohba (Syn. <i>Sedum telephium</i> L.)	Crassulaceae	Kalın kaymak bitkisi	Leaves	Ext.	The leaves are kept on a little fire. Then, when we remove the membrane and put it on the inflamed, pimped or boiled area, it has the ability to dry the inflammation.	45

<i>Hypericum perforatum</i> L.	Hypericaceae	Kantaron, Yanık otu	Aerial parts	Ext.	Fresh or dried plant is applied to the boil.	46
<i>Hypericum retusum</i> Aucher ex Jaub. & Spach	Hypericaceae	Batof, Bantof, Aran	Leaves	Ext.	The leaves are boiled in water and the poultice is made by adding flour and applied to the boil.	29
<i>Juglans regia</i> L.	Juglandaceae	Ceviz	Fruits	Ext.	Crushed fresh fruits are applied to the boil.	13, 17, 31
<i>Juniperus oxycedrus</i> L.	Cupressaceae	Ardıç	Tar	Ext.	-Tar is applied to the boil - The tar, egg yolk, onion juice and soap grated are fried in a pan and the prepared ointment is applied to the boil.	11, 25
<i>Lamium album</i> L.	Lamiaceae	Ballıbaba Ghiopırçık	Leaves, Flowers	Ext.	It is applied to the boil.	47, 48
<i>Lapsana communis</i> subsp. <i>intermedia</i> (M.Bieb.) Hayek	Asteraceae	Tavşan salatası Yabani marul	Leaves	Ext.	The poultice prepared from fresh leaves is applied to the boil.	28
<i>Laurus nobilis</i> L.	Lauraceae	Defne	Fruits	Ext.	The oil obtained from the fruit is applied to the boil.	7
<i>Lavandula stoechas</i> subsp. <i>stoechas</i> L.	Lamiaceae	Lavanta	Leaves, Flowers	Int.	The infusion prepared from leaves and flowers is used internally to treat boils.	7
<i>Lepidium sativum</i> subsp. <i>sativum</i> L.	Brassicaceae	Tere	Leaves	Ext.	Fresh leaves are used externally to treat boils.	7
<i>Linum usitatissimum</i> L.	Linaceae	Zeyrek	Seeds	Ext.	-The poultice obtained by crushing and boiling the seeds is applied to the boil. - Seeds are crushed, sifted and mixed with yogurt and applied to the boil. - Seeds are crushed, boiled in milk and the resulting poultice is applied to the boil.	9, 11, 20, 21, 49
<i>Liquidambar orientalis</i> Mill.	Hamamelidaceae	Sığala, Günlük	Resin	Ext.	The resin is applied to the boil and kept for 1 night.	34
<i>Lycopersicon esculentum</i> Mill.	Solanaceae	Domates	Fruits	Ext.	The fruits are crushed and applied to the boil.	20, 50
<i>Lysimachia punctata</i> L.	Primulaceae	Horoz ibiği Sivri burun, Karga otu	Aerial parts	Ext.	Take a pinch of the powder obtained from the dried flowered aerial part and mix it with a tablespoon of olive oil. A dressing is made on the boil with a cotton for 1 week.	28
<i>Malva neglecta</i> Wallr.	Malvaceae	Ebegümeci Deve tabanı, Katır tırnağı	Aerial parts	Ext.	- Aerial parts are boiled with water and while it is warm, it is placed directly on the boil. - Aerial parts are crushed, boiled in milk and the poultice is applied to the boil.	9, 11, 17, 18, 20, 32, 40, 51
<i>Malva nicaeensis</i> All.	Malvaceae	Ebegümeci	Leaves	Ext.	The poultice prepared by boiling the leaves is applied to the boil.	52
<i>Malva sylvestris</i> L.	Malvaceae	Büyük ebegümeci	Leaves	Ext.	The poultice prepared from fresh leaves is applied to the boil to maturation.	12, 15, 53, 54, 55
<i>Marrubium vulgare</i> L.	Lamiaceae	Bozkulak, Boz ot Dağ çayı	Aerial parts	Ext.	The aerial parts are boiled and the poultice is applied to the boil.	7
<i>Mirabilis jalapa</i> L.	Nyctaginaceae	Akşam sefası, Akşam sabah çiçeği	Leaves	Ext.	Leaves are applied to the boil.	56, 57
<i>Morus alba</i> L.	Moraceae	Dut	Fruits	Ext.	Dried fruits pulp is applied to the boil.	32, 58
<i>Nepeta nuda</i> subsp. <i>albiflora</i> (Boiss.) Gams	Lamiaceae	Pisik otu, Kedi otu	Aerial parts	Ext.	Aerial parts of catnip are boiled and filtered, and the pulp is separated. A small amount of barley flour is added to this pulp and the dough is cooked very little over low heat and the dough is applied to the boil. After waiting one night, it is cleaned and this process is continued for 3 days.	27

<i>Ocimum basilicum</i> L.	Lamiaceae	Reyhan, Fesleğen	Leaves	Ext.	The infusion prepared from the leaves is used externally in the treatment of boils.	7
<i>Olea europaea</i> L.	Oleaceae	Zeytin	Fruit	Ext.	The root of the onion is cooked in embers, olive oil (obtained from the fruit) and soap are added and applied to the boil and left overnight.	34
<i>Orchis mascula</i> (L.) L.	Orchidaceae	Sahlep	Tubers	Int.	Drink the infusion.	16
<i>Ornithogalum umbellatum</i> L.	Liliaceae	Köpek soğanı	Tubers	Ext.	Cut the onion in half and put it on the boil.	59, 60
<i>Paliurus spina-christi</i> Mill.	Rhamnaceae	Karaçalı Öküz gözü	Leaves	Ext.	The poultice obtained by crushing the leaves is applied to the boil.	15, 51
* <i>Papaver triniifolium</i> Boiss. (Endemic)	Papaveraceae	Kıllı öbük	Aerial parts	Ext.	The aerial parts are crushed and roasted with barley flour to make an ointment and apply it to a boil.	27
<i>Pelargonium zonale</i> (L.) L'Hér. ex Aiton	Geraniaceae	Sardunya	Leaves	Ext.	Fresh leaves are applied to the boil.	9
<i>Petasites hybridus</i> (L.) "G.Gaertn., B.Mey. & Scherb.	Asteraceae	Kabalak, Karakafes	Leaves	Ext.	Fresh leaves are applied to the boil.	12
<i>Phaseolus vulgaris</i> L.	Fabaceae	Fasulye Bakla, Pakla	Seeds	Ext.	Cut the seeds into two halves and applied to the boil.	61
<i>Phlomis kurdica</i> Rech.f.	Lamiaceae	Çay otu Gubel, Şalba	Leaves	Ext.	Fresh leaves are applied to the boil.	25
<i>Phlomis lycia</i> D.Don	Lamiaceae	Çalba, Kızıl çalba Tüylü çalba	Aerial parts	Ext.	Poultice prepared with flour from above ground is used externally in the treatment of boils.	62
<i>Phlomis rigida</i> Labill.	Lamiaceae	Çelbe, it otu	Aerial parts	Ext.	The poultice prepared from aerial part is applied to the boil to maturation.	29
<i>Picea orientalis</i> (L.) Peterm.	Pinaceae	Doğu ladini Sakız ağacı	Resin	Ext.	Resin is used for boils.	63
<i>Pinus brutia</i> Ten.	Pinaceae	Çam, Kızıl kabuk	Resin	Ext.	Resin is used for boils.	9, 61
<i>Pinus nigra</i> subsp. <i>pallasiana</i> (Lamb.) Holmboe	Pinaceae	Kara çam	Leaves Resin, Tar	Ext.	- The poultice obtained by boiling the leaves in water is applied on the boil. -Resin or tar is mixed with salt and applied to the boils.	11, 64
<i>Pistacia palaestina</i> Boiss.	Anacardiaceae	Sakızlak meneviş, çitlik	Resin	Ext.	Resin is used for boils.	65
<i>Plantago lanceolata</i> L.	Plantaginaceae	Damarlı ot Damar otu, Sinir ot, Sinirli ot, Siğilli yaprak	Leaves	Ext.	The poultice prepared from fresh leaves is applied to the boil.	9, 11, 12, 15, 18, 36, 38, 42, 51, 55, 66
<i>Plantago major</i> L.	Plantaginaceae	Sinirli ot Bağ yaprağı Damarlı ot Kırk sinir otu	Leaves	Ext.	Fresh leaves are applied to the boil.	9, 18, 19, 21, 31, 42, 46, 67
<i>Plantago major</i> subsp. <i>major</i> L.	Plantaginaceae	Bağ yaprağı Sinirli ot, Siğil otu	Leaves	Ext.	Fresh leaves are applied to the boil.	11, 20, 32, 38, 54, 68, 69
<i>Plantago major</i> subsp. <i>intermedia</i> (Gilib.) Lange	Plantaginaceae	Katır tırnağı	Leaves	Ext.	Fresh leaves are applied to the boil.	11, 20, 32, 68, 69
<i>Plantago media</i> L.	Plantaginaceae	Sinir otu Sinirli ot Damar otu	Leaves	Ext.	- Poultice prepared from fresh leaves are applied to the boil. - The leaves are dipped in hot water and removed, then applied to the boil.	16, 23

<i>Platanus orientalis</i> L.	Platanaceae	Doğu çınarı	Leaves Stems and branch barks	Ext.	Purulent boils are washed with decoction and dressing.	44
<i>Plumbago europaea</i> L.	Plumbaginaceae	Serkele, Boya otu Mayasıl otu	Aerial parts	Ext.	Crushed fresh aerial part is applied to the boil.	7
<i>Polygonum cognatum</i> Meisn.	Polygonaceae	Madımak	Leaves	Ext.	Crushed fresh leaves are applied to the boil.	13, 32, 70
<i>Potentilla reptans</i> L.	Rosaceae	Zıbrıgüt	Leaves, Flowers	Ext.	Crushed fresh leaves and flowers are applied to the boil.	41
<i>Primula acaulis</i> subsp. <i>acaulis</i> (L.) L. (Syn. <i>Primula vulgaris</i> Huds.)	Primulaceae	Sapsız çuha çiçeği	Leaves	Ext.	Fresh leaves are applied to the boil.	44, 55
<i>Ranunculus arvensis</i> L.	Ranunculaceae	Düğün çiçeği Dövün otu	Aerial parts	Ext.	It is applied to the boil	59, 68
<i>Ranunculus ficaria</i> subsp. <i>ficariiformis</i> Rouy & Foucaud	Ranunculaceae	Katır nalı	Leaves	Ext.	Fresh leaves are applied to the boil.	43
<i>Ranunculus illyricus</i> L.	Ranunculaceae	wutsuvoyji	Aerial parts	Ext.	Crushed fresh leaves are applied to the boil (1 hour).	9
<i>Ranunculus neapolitanus</i> Ten.	Ranunculaceae	Sarı çiçek	Aerial parts	Ext.	Crushed aerial parts are applied to the boil	13, 42
<i>Rhamnus lycioides</i> subsp. <i>oleoides</i> (L.) Jahand. & Maire	Rhamnaceae	Kördiken	Leaves	Ext.	Poultice made from fresh leaves and barley flour is applied to the boil that do not burst	52
<i>Rhamnus oleoides</i> subsp. <i>graecus</i> (Boiss. & Reut.) Holmboe	Rhamnaceae	Kördiken	Leaves	Ext.	The leaves are mixed with barley flour and pounded into poultice. It is used as an anti-inflammatory agent by making a compress on boils.	71
<i>Rosa canina</i> L.	Rosaceae	Kuşburnu Köpek gülü	Thorn	Ext.	Used to drain the inflammation of inflamed boils	72
<i>Rubus hirtus</i> Waldst. & Kit.	Rosaceae	Böğürtlen	Leaves	Ext.	Fresh leaves are crushed and left on the boil for 15 minutes.	7
<i>Rubus sanctus</i> Schreb.	Rosaceae	Karamama, Böğürtlen	Leaves, Thorn	Ext.	Boils are bled by drawing with a thorn, and a leaf is placed on the boil and used as an anti-inflammatory.	12, 43
<i>Rumex acetosella</i> L.	Polygonaceae	Küçük labada Kuzu kulağı	Leaves	Ext.	Purulent boils are washed with decoction and dressing.	44, 73
<i>Rumex angustifolius</i> Campd.	Polygonaceae	Evelik, Yağlı pancar	Leaves	Ext.	The leaves are crushed and flour is added and the prepared poultice is applied to the boil.	20
<i>Rumex crispus</i> L.	Polygonaceae	Evelik	Fruits	Ext.	Poultice prepared from decoction of fruit and flour is applied to the boil.	74
<i>Rumex patientia</i> L.	Polygonaceae	Labada, İlabada	Leaves	Ext.	Poultice prepared from leaves is applied to the boil.	26, 55
<i>Rumex pulcher</i> L.	Polygonaceae	Labada, Kuzu kulağı	Leaves	Ext.	Poultice prepared from leaves is applied to the boil.	75
<i>Rumex scutatus</i> L.	Polygonaceae	Kuzu kulağı	Leaves	Ext.	Poultice prepared from leaves is applied to the boil.	51
<i>Rumex tuberosus</i> subsp. <i>horizontalis</i> (K.Koch) Rech.f.	Polygonaceae	Kuzu kulağı	Leaves	Ext.	Poultice prepared from leaves is applied to the boil.	51
<i>Ruscus hypoglossum</i> L.	Liliaceae	Tavşan cücüğü Tavşan göbeği Tavşan elması	Fruits	Ext.	Decoction of fruit is applied to the boil.	66
* <i>Salvia dichroantha</i> Stapf (Endemic)	Lamiaceae	Adaçayı	Leaves	Ext.	Infusion is applied to the boil externally.	7
<i>Salvia multicaulis</i> Vahl	Lamiaceae	Baravine, ikoro bizzeyn	Aerial parts	Ext.	Decoction of aerial part is applied to the boil.	24
<i>Salvia virgata</i> Jacq.	Lamiaceae	Yağlısomra	Leaves	Ext.	The leaves are applied to the boil.	76
<i>Sambucus ebulus</i> L.	Adoxaceae	Mürver, ayı otu	Leaves Fresh shoots	Ext.	The poultice obtained by pounding from leaves and fresh shoots is applied to the boil.	26, 66
<i>Sambucus nigra</i> L.	Adoxaceae	Mürver, kovoksülo, liver, lor, sultan	Fruits Leaves Fresh shoots	Int. Ext.	-Ripe fruits are used in treatment by eating in cases such as wounds or boils in the hand (Internally) - The poultice obtained by pounding from leaves and fresh shoots is applied to the boil.	26, 32, 63

<i>Scrophularia libanotica</i> Boiss.	Scrophulariaceae	Kaya çekemi	Aerial parts	Ext.	The plant is beaten with garlic and onion sprouts, and the resulting mash mixture is applied externally.	40
<i>Smilax excelsa</i> L.	Liliaceae	Öz diken Gıcır diken	Leaves	Ext.	Fresh leaves are applied to the boil.	42
<i>Solanum americanum</i> Mill.	Solanaceae	Köpek sirkeni Göğündürme	Fruits	Ext.	The fruits are crushed and crumbled, applied to the inflamed area and waited for 8-10 hours. Can be repeated every day until the inflammation removes	6
<i>Solanum tuberosum</i> L.	Solanaceae	Patates	Tubers	Ext.	Boiled and crushed tubers are applied to the boil.	7
<i>Syringa vulgaris</i> L.	Oleaceae	Leylak, Elguvan	Leaves	Ext.	Fresh leaves are applied to the boil.	46
<i>Tanacetum balsamita</i> L.	Asteraceae	Bağa yaprağı Kılıç otu	Leaves	Ext.	Fresh leaves are applied to the boil.	32
<i>Teucrium polium</i> L.	Lamiaceae	Mayasıl otu	Aerial parts	Ext.	Boiled aerial parts are applied to the boil.	14
<i>Tribulus terrestris</i> L.	Zygophyllaceae	Çoban çöküren Demir diken	Aerial parts	Int., Ext.	Its seeds are prepared as decoction and infusion and drunk. Thorn is burned, powder is mixed with butter and rubbed, the inflammation removes.	77
<i>Trifolium medium</i> L.	Fabaceae	Üçgül, Tırfıl	Aerial parts	Ext.	Crushed aerial parts are applied to the boil.	57
<i>Trifolium rubens</i> L.	Fabaceae	Üçgül	Aerial parts	Ext.	Crushed aerial parts are applied to the boil.	57
<i>Trigonella foenum-graecum</i> L.	Fabaceae	Çemen otu, boyotu	Seeds	Ext.	Poultice prepared from seeds is applied to the boil.	55
<i>Triticum aestivum</i> L.	Poaceae	Buğday	Seeds	Ext.	Wheat flour and Grape molasses are mixed and applied to the boil and left overnight.	34
<i>Tussilago farfara</i> L.	Asteraceae	Bozot Kabarcık yaprağı	Leaves	Ext.	Fresh leaves are applied to the boil.	20, 55
<i>Ulmus canescens</i> Melville (Syn. <i>Ulmus minor</i> subsp. <i>canescens</i> (Melville) Browicz & Ziel.)	Ulmaceae	Kara ağaç	Roots	Ext.	After the fresh, thin roots are cut into small pieces, it is boiled in milk and filtered and the poultice prepared by adding wheat into milk is used externally in the treatment of boils.	78
<i>Ulmus minor</i> Mill. (Syn. <i>Ulmus carpinifolia</i> Gled.)	Ulmaceae	Kara ağaç	Root barks	Ext.	Crushed root barks are mixed with <i>Malva</i> sp. aerial part and the poultice is prepared and it is applied to the boil.	32
<i>Ulmus glabra</i> Huds.	Ulmaceae	Kara ağaç	Stem barks	Ext.	Stem barks are boiled in water and applied to the boil.	38
<i>Urtica dioica</i> L.	Urticaceae	Cızlağan	Aerial parts	Ext.	Crushed fresh aerial parts are applied to the boil.	9, 57
<i>Urtica urens</i> L.	Urticaceae	Isırgan	Aerial parts	Int.	Decoction of aerial part is applied to the boils.	7
<i>Verbascum cheiranthifolium</i> Boiss.	Scrophulariaceae	Bozot, yalangi, Kurt kulağı, Sigil otu	Aerial parts	Ext.	It is applied to the boils.	79
<i>Veronica officinalis</i> L.	Scrophulariaceae	Çıban otu Yavşan otu	Leaves	Ext.	Poultice prepared from leaves is applied to the boils.	55
<i>Vicia faba</i> L.	Fabaceae	Kara fasulye	Leaves	Ext.	Fresh leaves are applied to the boil after heated over fire	11
<i>Vigna unguiculata</i> (L.) Walp.	Fabaceae	Börülce	Leaves	Ext.	Leaves are crushed and applied to the boil. Wait overnight until it heals.	34
<i>Viola gracilis</i> Sibth. & Sm.	Violaceae	Hercai menekşe	Flowers	Ext.	After the boiled flowers are crushed and pulped, they are spread on the wound and boil.	76
<i>Viola tricolor</i> L.	Violaceae	Menekşe	Aerial parts	Ext.	The infusion prepared from the aerial part is applied externally to the boil.	7
<i>Vitis vinifera</i> L.	Vitaceae	Üzüm asma, tefek	Fruits	Ext.	- The molasses obtained from the fruit is mixed with flour and applied to boil until it heals and left overnight. - Fresh or dried fruits are crushed and applied to the boil.	9, 26, 57
<i>Ziziphora tenuior</i> L.	Lamiaceae	Nane kekiği Mor kekik	Aerial parts	Ext.	The infusion prepared from fresh or dried herb is used externally for dressing and cleaning boils, burns or wounds	28

Very common to use *Plantago*, *Allium*, *Malva*, *Brassica* genera.

Although the external use of herbs is common in the treatment of boils, *Achillea crithmifolia*, *Alchemilla minusculiflora*, *Dactylorhiza euxina*, *Dactylorhiza osmanica*, *Dactylorhiza umbrosa*, *Dactylorhiza urvilleana*, *Lavandula stoechas* subsp. *stoechas*, *Orchis mascula*, *Sambucus nigra*, *Tribulus terrestris*, *Urtica urens* taxa are used internally.

In clinical treatment, antimicrobial medicines are used for boils. When the biological activity studies in the literature of the plants used for boils in traditional treatment were examined, it is thought that their healing effects are due to their analgesic, antioxidant, anti-inflammatory, antimicrobial activities of phytochemical compounds such as alkaloid, tannin, saponin, phenolic acid, flavonoid, flavonol, proanthocyanidin, anthocyanin.

When we look at the biological activities of the genera commonly used in treatment;

Allium cepa and *Allium sativum* essential oils were found to have significant antimicrobial activities on *Staphylococcus aureus*, *Salmomella enteritidis* bacteria and *Aspergillus niger*, *Penicillium cyclopium* and *Fusarium oxysporum* fungi species⁸⁰. These essential oils also have antioxidant and anti-inflammatory activities⁸¹.

Ethanol extract of *Malva neglecta* flowers showed antibacterial activity on *Bacillus anthracis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Pseudomonas aeruginosa* species⁸². In addition, *M. neglecta* also showed antibacterial activity on antibiotic resistant *Staphylococcus aureus* species⁸³.

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In a study investigating the effects of *M. neglecta* aqueous, ethanol and chloroform extracts on bacterial and fungal contaminants causing wound infection, all extracts were found to be effective on *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Proteus vulgaris*, which cause problems with multiple resistant wound infections. It was also found that ethanol extracts showed higher antibacterial activity than others⁸⁴. Aqueous alcohol extract of *Malva sylvestris* leaves showed topical anti-inflammatory activity. Malvidin-3 glycoside was found to be the major compound responsible for this effect⁸⁵.

P. lanceolata and *M. neglecta* species showed high oxygen radical absorbance capacity and total reduction capacity. It has been determined that the major compounds of hydrophilic extracts are phenolic compounds and antioxidant activity correlates with the concentrations of these compounds⁸⁶. In addition, *P. lanceolata* plant has anti-inflammatory activity and accelerating effect on wound healing^{87,88}.

CONCLUSION

The antibacterial activities of the plants determined by the researches in the literature make their use in traditional boils treatment meaningful. The presence of resistant bacteria and the gradual increase of multi-drug resistant bacteria may limit the treatment options in the clinic and require new drug searches.

We hope that the plants used in the treatment of boils will be researched for the compounds that make them effective in the treatment and they will contribute to the research and development of new drugs.

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