

Anticancer Uses of Medicinal Plants in Turkish Traditional Medicine

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ABSTRACT

The use of plants as therapeutic agents have been known since the ancient times. In developing countries, traditional medicinal plants are critical for disease treatment. Various herbal drugs are obtained from these plants for therapeutic use. These herbal drugs are used in the treatment of many diseases from diabetes to cancer. Today, cancer is one of the most important life-threatening diseases for human. Some of the methods used in the treatment of cancer include herbal sources. The scientific world is not oblivious to many herbal drugs used for cancer in traditional treatment methods. Due to the limited effectiveness of drugs, an increasing number of studies have been conducted in the last decade to increase the success of cancer treatments. In recent years, the importance given to the herbal drugs used for medicinal purposes and the studies on the medicinal uses of plants have increased in our country. In this review, researches about the herbal drugs traditionally used against cancer by the local people were investigated. As a result of the study, 160 plant taxa and 17 multi-herbal formulas were reported for cancer treatment in Turkish traditional medicine.

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Türk Geleneksel Tıbbında Tıbbi Bitkilerin Antikanser Kullanımları

ÖZET

Bitkilerin terapötik ajanlar olarak kullanımı, antik çağlardan beri bilinmektedir. Gelişmekte olan ülkelerde, geleneksel şifalı bitkiler hastalık tedavisi için kritik öneme sahiptir. Bu bitkilerden terapötik kullanım için çeşitli bitkisel ilaçlar elde edilmiştir. Bu bitkisel ilaçlar diyabetten kansere kadar birçok hastalığın tedavisinde kullanılır. Günümüzde kanser, insan yaşamını tehdit eden en önemli hastalıklardan biridir. Kanser tedavisinde kullanılan bazı yöntemlerin de bitkisel kaynakları vardır. Bilim dünyası, geleneksel tedavi yöntemlerinde kansere karşı kullanılan pek çok bitkisel ilaca kayıtsız kalmamıştır. Kanser tedavisinde ilaçların sınırlı etkinliği nedeniyle, tedavi başarısını arttırmak için bitkisel ilaçların kullanımında son on yılda artan sayıda araştırma yapılmıştır. Son yıllarda ülkemizde tıbbi amaçla kullanılan bitkisel ilaçlara verilen önem artmış ve bitkilerin tıbbi kullanımınlarına ilişkin çalışmalar çoğalmıştır. Bu derlemede, yerel halk tarafından kansere karşı geleneksel olarak kullanılan bitkisel ilaçlar hakkındaki araştırmalar incelenmiştir. Çalışmanın sonucunda, Türk geleneksel tıbbında kanser tedavisinde kullanılan 160 bitki taksonu ve 17 çoklu-bitkisel formül bildirilmiştir.

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INTRODUCTION

In the first ages, it was thought that people benefit from medicinal plants began with the observation

that the injured animals were trying to heal themselves with the plants around them (Altan et al., 1999).

Starting from the prehistoric period, the civilizations more advanced than other civilizations such as Mesopotamia, Ancient Egypt, Hittite, Greek, Roman, Seljuk and Ottoman, gave importance to the use of plants as natural therapeutics and transferred this information to later generations. They used the plants for medicinal purposes and made the nomenclature in a way to draw attention to their medicinal properties. It is known that the civilizations living in Anatolia have been using medicinal plants since the first ages. In the Republican Period, traditional medicinal researches were conducted to collect and transfer information to future generations (Özbek, 2005).

Producing and using synthetic drugs was one of the most important developments occurred with the industrial revolution (Van Overwalle, 2006). After the industrial revolution, synthetic drugs were found to have side effects. Because consumers were provided more information about health, their tendency has shifted towards medicinal plants instead of synthetic drugs (Başer, 1998). Drugs containing the composition of medicinal substances, which are synthesized by one or more plants belonging to the group of medicinal plants are called herbal drugs (Van Overwalle, 2006).

According to the report prepared by the WHO and studies from 91 countries, the total amount of medicinal plants used for treatment purposes were around 20,000 (WHO, 1979; Penso, 1983). It is believed that this number is far from the actual amount. Because, although up to only 140 medicinal plants were recorded for Turkey, which were registered in the Turkish codex of 1948 and 1974 (Penso, 1983), the number of medicinal plants currently used in the treatment purposes are known to be at least about 500. It is emphasized that the actual amount of medicinal plants used in the world should be around 100.000 (Baytop, 1999).

Because of its important geographical location, Turkey is one of the leading countries in aromatic and medicinal plant trade. The superiority provided by its geographical location has brought wealth to Turkey in terms of aromatic and medicinal plants compared to other countries and this has enabled the creation of many industrial inputs (Bayram et al., 2010).

Instead of ignoring the benefits that can be obtained from plants used for centuries, it has been thought that it would be more appropriate to investigate local formulas or recipes with the studies (Faydaoğlu and Sürücüoğlu, 2011). In recent years, the importance given to the plants used for medicinal purposes and the number of related studies have increased in our country (Başer et al., 1986; Malyer et al., 2004; Çömlekçioğlu and Karaman, 2008; Monteiro et al., 2010; Polat et al., 2011; Tulukçu and Sağdıç, 2011; Selvi et al., 2012; Canli et al., 2016; Canli et al., 2017a; Canli et al., 2017b; Canli et al., 2017c; Canli et

al., 2017d; Bozyel and Merdamert, 2018; Canli et al. 2019; Bozyel et al., 2019).

This study examines the recent ethnobotanical studies to form a compilation on medicinal plants used as anticancer in Turkish Traditional Medicine with their local names, parts and usage forms.

The Importance of Medicinal Plants in Cancer Treatment

Cancer can result from abnormal proliferation of any of the different kinds of cells in the body, so there are more than a hundred distinct types of cancer, which can vary substantially in their behavior and response to treatment. The most important issue in cancer pathology is the distinction between benign and malignant tumors. A tumor is any abnormal proliferation of cells, which may be either benign or malignant. A benign tumor, such as a common skin wart, remains confined to its original location, neither invading surrounding normal tissue nor spreading to distant body sites. A malignant tumor, however, is capable of both invading surrounding normal tissue and spreading throughout the body via the circulatory or lymphatic systems (metastasis). Only malignant tumors are properly referred to as cancers, and it is their ability to invade and metastasize that makes cancer so dangerous. Whereas benign tumors can usually be removed surgically, the spread of malignant tumors to distant body sites frequently makes them resistant to such localized treatment (Cooper and Hausman, 2007).

Studies have shown that DNA sequence changes or mutations caused by various chemical, physical or toxic agents are responsible for cancer (Herceg and Hainaut, 2007). Overall, 80% of all cancers are thought to be due to environmental factors (Higginson and Muir, 1977).

Both benign and malignant tumors are classified according to the type of cell from which they arise (Cooper and Hausman, 2007). Cancers are usually divided into four groups based on the cell type. Leukemia and lymphomas are composed due to the excessive proliferation of leukocytes and lymphocytes. Sarcomas are recognized as tumors of tissues that develop from embryological mesoderm, such as muscle, bone and cartilage. Carcinomas constitute 85% of cancers and they originate from glands, breast, skin and urogenital tissues (such as prostate, cervix) (Dilsiz, 2009).

Tumors are further classified according to tissue of origin (e.g., lung or breast carcinomas) and the type of cell involved. For example, fibrosarcomas arise from fibroblasts, and erythroid leukemias from precursors of erythrocytes (red blood cells) (Cooper and Hausman, 2007).

One of the main reasons for the difficulties associated

with cancer treatment is the metastatic nature of cancer. The asymptomatic nature of certain cancers and the lack of diagnosis allow the cancer to spread to different parts of the body from its site of origin without any medical intervention. The first site where the cancer starts is called the “primary cancer site” whereas the sites in which cancer has spread is known as the “secondary or metastatic site”. In order to spread the cancer cells, primary sites have acquired the ability to invade and colonize a distant site and eventually spread into different parts. There are three major methods of cancer metastasis: local spread, through blood circulation and via the lymphatic system. So, when cancer metastasizes the treatment should not only be directed towards the primary cancer but also needs to eliminate the secondary ones. This poses a great problem. Moreover, there are certain metastatic events in cancer which are too small to be detected. These are called micro metastases events. For a few cancers, blood tests can detect the marker proteins released by the cancer cells. These markers can indicate the presence of cancer spread which is difficult to identify by normal scanning. But unfortunately, most of the cancer specific markers have not yet been identified (Chakraborty and Rahman, 2012).

Cancer is a disease, which has a rapid increase in incidence and mortality rate. Although it took place in 7th-8th places in the list of diseases causing death at the beginning of the century, today it is the second place in many countries after cardiovascular diseases (Haydaroglu, 2007). The most common types of cancer are lung, colorectal and prostate cancer in men; breast, colorectal and cervical cancer in women (Tuncer, 2009).

Today, the active substance of many drugs, such as paclitaxel, used in the treatment of cancer is derived from natural sources. Most of these natural sources are plants that can synthesize a wide variety of chemicals. Plant chemicals show their anticancer effects by mechanisms such as carcinogen inactivation, antiproliferation, cell cycle suspension, induction of apoptosis and differentiation, suppression of angiogenesis, antioxidation and reduction of multiple drug resistance (Vauzour et al., 2010).

In recent years, studies of cancer treatment with herbal drugs has increased in Turkey (Ceylan et al., 2002; Inanç et al., 2006; Tarhan et al., 2009; Tuna et al., 2011; Arslan et al., 2013; Koçuşlı and Demircan, 2017; Yalcin et al., 2017).

According to the World Health Organization (WHO) data (WHO, 2001), 80% of the world's population is treated with herbal drugs (Sarı et al., 2010; Chikezie and Ojiako, 2015; Msomi and Simelane, 2018). In this case, ethnobotanical knowledge transferred from the first ages to the present day comes to the fore and the use of medicinal plants is gaining importance (Bozyel and Merdamert, 2018).

Since there are many plants with this feature, only the most used 160 taxa from 53 families are listed (Table 1). However, most studies have addressed unspecified cancer as mentioned in Figure 1.

In addition, 17 different multi-herbal formulas are also listed (Table 2). However, most studies have addressed unspecified cancer as mentioned in Figure 2.

Table 1. Anticancer Plants in Turkish Traditional Medicine

Plant species	Local name*	Parts	Usage form	Disease type	References
Adoxaceae					
<i>Sambucus ebulus</i> L.	Mürver otu	Fruits	raw eaten (mature)	Unspecified cancer	Koçyiğit and Özhatay, 2006, Tuzlacı, 2016
<i>Viburnum opulus</i> L.	Gilaburu	Whole plant	-	Unspecified cancer	Tarakçı, 2006
Amaranthaceae					
<i>Spinacia oleracea</i> L.	Ispanak	Leaves	-	Unspecified cancer	Deniz et al., 2010
Amaryllidaceae					
<i>Allium ampeloprasum</i> L.	Pirasa	Whole plant	raw eaten, cooked	Unspecified cancer	Güzel et al., 2015
<i>Allium cepa</i> L.	Soğan	Bulbs	infusion	Unspecified cancer	Hayta et al., 2014
<i>Allium sativum</i> L.	Sarmısak	Bulbs Leaves	crushed and mixed with lemon juice raw eaten (fresh)	Unspecified cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
** <i>Allium tuncelianum</i> (Kollmann) Özhatay, B.Mathew and Şiraneci	Tunceli sarmısağı	Bulbils Bulbs	raw eaten -	Unspecified cancer	Tuzlacı and Doğan, 2010; Altundag and Ozturk, 2011, Tuzlacı, 2016
<i>Narcissus tazetta</i> L.	Nergis	Stems Flowers	decoction	Blood cancer	Çömlekçioğlu and Karaman, 2008
Anacardiaceae					
<i>Cotinus coggygria</i> Scop.	Boyacı sumacı	Leaves Wood	decoction	Unspecified cancer Colon cancer Skin cancer	Kültür, 2007, Tuzlacı, 2016, Güzel et al., 2015
<i>Pistacia terebinthus</i> L.	Menengiç	Branches Leaves	raw eaten	Unspecified cancer	Tetik et al., 2013
<i>Pistacia terebinthus</i> ssp. <i>terebinthus</i> L.	Menengiç	Leaves	fresh or boiled mixed with olive oil	Unspecified cancer	Tuzlacı, 2016
<i>Pistacia palaestina</i> Boiss.	Çöğre	Branches Leaves	decoction	Unspecified cancer	Polat et al., 2013
Apiaceae					
<i>Eryngium campestre</i> L. var. <i>virens</i> Link	Yer kestanesi, Kengel	Roots Whole plant	decoction	Prostate cancer Breast cancer	Tuzlacı and Şenkardeş, 2011; Tuzlacı, 2016
<i>Heracleum trachyloma</i> Fisch. and C.A.Mey.	Poğluk	Leaves Stems	decoction raw eaten	Unspecified cancer	Polat et al., 2013, Tuzlacı, 2016; Altundag and Ozturk, 2011
Apocynaceae					
<i>Nerium oleander</i> L.	Zakkum	Flowers Leaves Flo. branches Buds Pedicel Scape Latex Roots Whole plant	decoction infusion - decoction (grind) -	Unspecified cancer	Tuzlacı, 2016; Akaydin et al., 2013, Karcı et al., 2017, Sargin et al., 2015, Tuzlacı, 2016
Araceae					
<i>Arum elongatum</i> Steven	Yılancücüğü	Tubers	raw eaten	Unspecified cancer	Diker, 2008
<i>Arum italicum</i> Mill.	Domuz lahanası	Fruits Tubers	raw eaten (fresh) decoction grated and mixed with honey	Unspecified cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Dracunculus vulgaris</i> Schott	Yılanbıçağı	Fruits Tubers Leaves	raw eaten - -	Unspecified cancer	Bulut, 2008, Tuzlacı, 2016
Asparagaceae					
<i>Asparagus acutifolius</i> L.	Tilkisen	Fruits	raw eaten (fresh)	Unspecified cancer	Tuzlacı, 2016
Aspleniaceae					
<i>Asplenium ceterach</i> L.	Dalakotu	Leaves	decoction	Unspecified cancer	Tuzlacı, 2016
Asteraceae					
<i>Achillea arabica</i> Kotschy	Hazanbel	Leaves Flowers Aerial parts	infusion	Unspecified cancer	Tekin, 2011 Tuzlacı, 2016
<i>Achillea pannonica</i> Scheele	Kurpotu	Aerial parts Leaves	decoction infusion	Lung cancer Unspecified cancer	Kültür, 2007; Tuzlacı, 2016
<i>Anthemis kotschyana</i> var. <i>kotschyana</i> H.Duman	Koç papatyası	Capitula	infusion	Prostate cancer	Tuzlacı, 2016
<i>Artemisia absinthium</i> L.	Acı pelin	Leaves Flowers	infusion	Unspecified cancer	Çömlekçiöğlü and Karaman, 2008
<i>Calendula arvensis</i> M.Bieb.	Portakal nergisi	Aerial parts Capitula	infusion crushed	Skin cancer	Sargin et al., 2015, Tuzlacı, 2016
<i>Calendula officinalis</i> L.	Aynısafa	Aerial parts	infusion	Unspecified cancer	Ugulu et al., 2009; Tuzlacı, 2016
<i>Carduus nutans</i> L.	Eşekdikeni	Fruits	decoction (crushed)	Unspecified cancer	Tuzlacı, 2016
<i>Carduus nutans</i> ssp. <i>nutans</i> L.	Eşekdikeni	Flowers	mixed with honey or sugar	Throat cancer	Tuzlacı, 2016
<i>Carduus nutans</i> ssp. <i>leiophyllus</i> (Petrovič) Stoj. and Stef.	Kerbeş	Aerial parts	decoction	Unspecified cancer	Yeşilyurt et al., 2017
<i>Centaurea depressa</i> Bieb.	Peygamber çiçeği	Capitula	infusion	Intestinal cancer Colorectal cancer	Tuzlacı and Şenkardeş, 2011, Tuzlacı, 2016
<i>Cichorium intybus</i> L.	Hindiba	Roots Aerial parts Flo. branches Stems	- raw eaten - infusion	Unspecified cancer Blood cancer	Tuzlacı, 2016, Sezik et al., 2001, Tuzlacı, 2016, Sargin et al., 2015
<i>Cirsium</i> sp.	Deve dikeni	Roots	decoction	Unspecified cancer	Simsek et al., 2004; Tuzlacı, 2016
<i>Cirsium haussknechtii</i> Boiss.	İncekangal	Aerial parts	decoction	Unspecified cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Cirsium rhizocephalum</i> C.A.Mey.	Bargana	Capitula	raw eaten	Unspecified cancer	Tuzlacı, 2016
<i>Cota tinctoria</i> (L.) J.Gay ex Guss. var. <i>tinctoria</i>	Boyacı papatyası	Flowers Leaves Aerial parts	decoction infusion decoction	Unspecified cancer Lung cancer	Cakilcioglu et al., 2011, Tetik et al., 2013 Tuzlacı, 2016
<i>Helichrysum arenarium</i> (L.) Moench	Ölmezçiçek	Aerial parts	infusion	Unspecified cancer	Tuzlacı, 2016
<i>Helichrysum arenarium</i> ssp. <i>rubicundum</i> (K.Koch) P.H.Davis and Kupicha	Yaylagülü	Aerial parts	infusion	Unspecified cancer	Tuzlacı, 2016
<i>Helichrysum plicatum</i> DC. ssp. <i>plicatum</i>	Mantuvar	Flowers Aerial parts	infusion	Unspecified cancer Laryngeal cancer	Güneş et al., 2017, Tuzlacı, 2016
<i>Matricaria chamomilla</i> L.	Alman papatyası	Aerial parts Flo. branches Flowers	infusion	Throat cancer	Sargin et al., 2015
<i>Onopordum acanthium</i> L.	Galagan	Seeds Fruits	powder mixed with honey mixed with honey	Unspecified cancer	Özgen et al., 2012, Tuzlacı, 2016
<i>Onopordum tauricum</i> Willd.	Atdiken	Stems	raw eaten (peeled-fresh)	Unspecified cancer	Tuzlacı, 2016
<i>Onopordum turcicum</i> Danin	Bozkangal	Flowers	mixed with honey or sugar	Throat cancer	Tuzlacı, 2016
<i>Picnomon acarna</i> (L.)Cass.	Kılçıkdiğer	Leaves	infusion	Unspecified cancer	Sargin et al., 2015
<i>Sonchus asper</i> ssp. <i>glaucescens</i> (Jord.) Ball	Gevirtlek	Leaves Aerial parts	decoction salad with vinegar and garlic raw eaten	Unspecified cancer	Tuzlacı, 2016
<i>Tussilago farfara</i> L.	Öksürükotu	Root barks	decoction	Unspecified cancer	Tuzlacı, 2016
Boraginaceae					
<i>Heliotropium circinatum</i> Griseb.	Deli bambulotu	Flo. branches	infusion	Unspecified cancer Liver cancer	Tuzlacı and Doğan, 2010; Altundag and Ozturk, 2011, Tuzlacı, 2016
<i>Trachystemon orientalis</i> (L.) G.Don	Kaldirik	Leaves	decoction	Breast cancer	Karcı et al., 2017
Brassicaceae					
<i>Brassica cretica</i> Lam.	Adalahanası	Flo. parts	raw eaten decoction	Prostate cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Capsella bursa-pastoris</i> (L.) Medik.	Çobançantası	Leaves Shoots Seeds	-	Unspecified cancer	Doğanoğlu et al., 2006
<i>Nasturtium officinale</i> R.Br.	Suteresi	Aerial parts	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Raphanus sativus</i> L.	Turp	Tuber	inside of tuber scooped out and filled with honey; after one night, water that spilled over from the pit is drunk.	Unspecified cancer	Günbatan et al., 2016
<i>Sinapis arvensis</i> L.	Hardal	Leaves	decoction	Unspecified cancer	Tuzlacı, 2016
Capparaceae					
<i>Capparis sicula</i> ssp. <i>sicula</i> Veill.	Delikarpuzu	Fruits Roots	mixed with honey decoction	Unspecified cancer	Akaydin et al., 2013; Tuzlacı, 2016
Caprifoliaceae					
** <i>Cephalaria speciosa</i> Boiss. and Kotschy	Yıldız pelemiri	Flo. branches Aerial parts	decoction	Unspecified cancer Lung cancer	Tuzlacı and Doğan, 2010; Altundag and Ozturk, 2011, Tuzlacı, 2016
<i>Dipsacus laciniatus</i> L.	Feşçitarağı	Aerial parts Stems	decoction poultice decoction poultice	Unspecified cancer	Tuzlacı and Doğan, 2010, Tuzlacı, 2016, Altundag and Ozturk, 2011
Cistaceae					
<i>Cistus laurifolius</i> L.	Karağan	Flower buds Leaves	decoction	Unspecified cancer	Günbatan et al., 2016, Tuzlacı, 2016
Colchicaceae					
<i>Colchicum</i> sp.	Acıçiğdem	Seeds	decoction	Unspecified cancer	Tuzlacı, 2016
Convolvulaceae					
<i>Convolvulus arvensis</i> L.	Tarla sarmaşığı	Aerial parts	raw eaten (fresh) infusion	Unspecified cancer	Tuzlacı, 2016
Cucurbitaceae					
<i>Citrullus lanatus</i> (Thunb.) Matsum. and Nakai	Karpuz	Exocarp	dried, burnt, and made into ash/applied/ext.	Mouth cancer	Güneş, 2017
<i>Cucurbita maxima</i> Lam.	Helvacı kabağı	Fruits Seeds	raw eaten	Prostate cancer	Güzel, et al., 2015
<i>Cucurbita pepo</i> L.	Sakız kabağı	Seeds	decoction (crushed)	Prostate cancer	Tuzlacı, 2016
Cupressaceae					
<i>Cupressus sempervirens</i> L.	Servi	Cones	decoction	Unspecified cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Juniperus oxycedrus</i> ssp. <i>oxycedrus</i>	Katran ardıcı	Cones	decoction with sugar decoction	Prostate cancer Unspecified cancer	Tuzlacı, 2016
Equisetaceae					
<i>Equisetum giganteum</i> L.	Kırk kilitotu	Leaves Shoots	-	Unspecified cancer	Doğanoğlu et al., 2006
Ericaceae					
<i>Rhododendron caucasicum</i> Pall.	Kafkas ormangülü	Leaves	-	Unspecified cancer	Saraç et al., 2013; Tuzlacı, 2016
Fabaceae					
<i>Astragalus amblelepis</i> Fisch.	Kütgeven	Aerial parts	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Astragalus brachycalyx</i> Fisch. ex Boiss.	Yağlı geven	Gum	mixed with honey	Unspecified cancer	Tuzlacı and Doğan, 2010; Tuzlacı, 2016, Altundag and Ozturk, 2011, Polat et al., 2013
		Roots	- decoction		
<i>Astragalus microcephalus</i> Willd.	Anadolu kitresi	Stems Leaves	oil	Unspecified cancer	Korkmaz and Karakurt, 2014
<i>Ceratonia siliqua</i> L.	Keçiboynuzu	Fruits	grind and boiled	Unspecified cancer	Kültür, 2007; Tuzlacı, 2016, Güzel et al., 2015
<i>Genista albida</i> Willd.	Akborcak	Whole plant	mixed with honey	Throat cancer	Elçi and Erik, 2006, Tuzlacı, 2016
		Shoots Aerial parts	boiled powdered and mixed with honey decoction		
<i>Glycyrrhiza glabra</i> L.	Meyan	Roots	decoction	Unspecified cancer	Altundag and Ozturk, 2011
<i>Glycyrrhiza glabra</i> var. <i>glabra</i> L.	Meyan	Roots	syrup	Unspecified cancer	Tuzlacı, 2016
<i>Lotus corniculatus</i> var. <i>corniculatus</i> L.	Gazal boynuzu	Aerial parts	infusion	Unspecified cancer	Tuzlacı, 2016
Hypericaceae					
<i>Hypericum perforatum</i> L.	Kantaron	Aerial parts	with olive oil infusion	Skin cancer Unspecified cancer	Yeşilada et al., 1995, Tuzlacı, 2016; Sargin et al., 2015, Karcı et al., 2017, Tuzlacı, 2016, Sargin et al., 2015
		Flowers		Lung cancer	
		Flo. branches			
<i>Hypericum tetrapterum</i> Fr.	Çizgili kantaron	Flowers	decoction	Unspecified cancer	Tuzlacı, 2016
Iridaceae					
<i>Crocus biflorus</i> Mill. ssp. <i>tauri</i> (Maw.) B.Mathew	Berfan	Roots	infusion	Unspecified cancer	Korkmaz and Karakurt, 2014

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
Juglandaceae					
<i>Juglans regia</i> L.	Ceviz	Leaves	decoction	Unspecified cancer	Tuzlacı, 2016, Karcı et al., 2017
Lamiaceae					
<i>Melissa officinalis</i> L.	Oğulotu	Leaves	decoction infusion	Unspecified cancer Stomach cancer Lung cancer	Tuzlacı, 2016
<i>Melissa officinalis</i> L. ssp. <i>officinalis</i>	Oğulotu	Aerial parts	infusion	Unspecified cancer	Kültür, 2007; Tuzlacı, 2016
<i>Mentha longifolia</i> (L.) L.	Pünk	Flowers	infusion	Unspecified cancer	Tekin, 2011
<i>Mentha x piperita</i> L.	Nane	Leaves	decoction	Unspecified cancer	Yeşilyurt et al., 2017
<i>Lamium garganicum</i> ssp. <i>striatum</i> (Sm.) Hayek	Tek balıçak	Aerial parts, Flowers	infusion	Unspecified cancer	Sargin et al., 2015
<i>Lavandula stoechas</i> L.	Karabaş	Leaves	infusion	Unspecified cancer	Tuzlacı, 2016
<i>Lavandula stoechas</i> ssp. <i>stoechas</i> L.	Karabaş	Flo. branches Leaves Whole plant Aerial parts	decoction infusion	Unspecified cancer Breast cancer	Tuzlacı, 2016, Tuzlacı and Bulut, 2007, Ugulu et al., 2009, Sezik et al., 1997, Tuzlacı, 2016
** <i>Origanum hypericifolium</i> O.Schwarz and P.H.Davis	Delikmercan	Leaves+ flo. parts	infusion	Breast cancer	Tuzlacı, 2016
<i>Phlomis armeniaca</i> Willd.	Boz şavlak	Aerial parts	decoction	Unspecified cancer	Günbatan et al., 2016; Tuzlacı, 2016
** <i>Phlomis nissolii</i> L.	Öbek çalba	Aerial parts Flo. branches	infusion	Unspecified cancer	Sargin et al., 2015
<i>Rosmarinus officinalis</i> L.	Biberiye	Leaves Flo.+ leaves	Decoction infusion powdered	Unspecified cancer	Güzel et al., 2015, Tuzlacı, 2016
<i>Salvia tomentosa</i> Mill.	Şalba	Aerial parts	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Salvia virgata</i> Jacq.	Fatmanaotu	Leaves	decoction	Uterus cancer	Tuzlacı and Aymaz, 2001; Tuzlacı, 2016
<i>Teucrium chamaedrys</i> ssp. <i>sinuatum</i> (Celak.) Rech.f.	Kısamahmut	Whole plant Aerial parts	- decoction	Unspecified cancer	Uce and Tunçtürk, 2014; Tuzlacı, 2016
<i>Teucrium polium</i> L.	Acıyavşan	Aerial parts	decoction	Unspecified cancer	Karcı et al., 2017; Tuzlacı, 2016
<i>Thymus fallax</i> Fisch. and C.A.Mey.	Catri	Aerial parts	infusion decoction	Unspecified cancer	Tuzlacı, 2016, Altundag and Ozturk, 2011

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Thymus kotschyanus</i> Boiss. and Hohen.	Kekik	Aerial parts	infusion	Unspecified cancer	Polat et al., 2015
<i>Thymus kotschyanus</i> Boiss. and Hohen. ssp. <i>kotschyanus</i>	Kekik	Aerial parts	infusion decoction	Unspecified cancer	Tuzlacı, 2016, Altundag and Ozturk, 2011
** <i>Thymus leucostomus</i> Hausskn. and Velen.	Anakekik	Leaves	infusion	Unspecified cancer	Tuzlacı, 2016
<i>Thymus longicaulis</i> ssp. <i>longicaulis</i> C.Presl	Aş kekiği	Leaves Whole plant	- infusion	Unspecified cancer	Günbatan et al., 2016; Tuzlacı, 2016
<i>Thymus migricus</i> Klokov and Des.-Shost.	Peynir kekiği	Aerial parts	infusion	Unspecified cancer	Altundag and Ozturk, 2011
<i>Thymus praecox</i> ssp. <i>grossheimii</i> (Ronniger) J alas	Yayla kekiği	Aerial parts	infusion	Unspecified cancer	Altundag and Ozturk, 2011
<i>Thymus transcaucasicus</i> Ronniger	Kır kekiği	Aerial parts	infusion	Unspecified cancer	Altundag and Ozturk, 2011; Tuzlacı, 2016
<i>Vitex agnus-castus</i> L.	Hayıt	- Fruits	- crushed and mixed with honey	Unspecified cancer	Tarakçı, 2006, Tuzlacı, 2016
Linaceae					
<i>Linum usitatissimum</i> L.	Keten	Seeds	infusion	Colon cancer	Ugulu et al., 2009; Tuzlacı, 2016
Lythraceae					
<i>Punica granatum</i> L.	Nar	Fruit peels	decoction	Unspecified cancer	Güzel et al., 2015
Malvaceae					
<i>Malva</i> sp.	Ebegümece	Whole plant Aerial parts	decoction	Unspecified cancer	Elçi and Erik, 2006, Tuzlacı, 2016
<i>Malva neglecta</i> Wallr.	Çobançöreği	Roots Whole plant Leaves Roots	- - - decoction raw eaten boiled, eaten with yoghurt	External cancer Stomach cancer Unspecified cancer Stomach cancer	Yeşilada et al., 1995, Yeşilyurt et al., 2017, Günbatan et al., 2016, Yeşilyurt et al., 2017, Karcı et al., 2017
<i>Malva sylvestris</i> L.	Ebegümece	Aerial parts Flo.+Leaves Leaves Flowers	decoction infusion	Breast cancer Unspecified cancer Breast cancer	Tuzlacı, 2016, Güneş, 2017, Tuzlacı, 2016, Kültür, 2007, Akbulut and Ozkan, 2014

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
Moraceae					
<i>Ficus carica</i> L.	İncir	Latex Fruits Leaves Pedicels Branches	- raw eaten - - -	Unspecified cancer	Karcı et al., 2017, Sargin et al., 2015
<i>Morus alba</i> L.	Akdut	Leaves	- decoction	Unspecified cancer	Günbatan et al., 2016, Akaydin et al., 2013; Tuzlacı, 2016
<i>Morus nigra</i> L.	Karadut	Leaves Fruits	- raw eaten molasses	Unspecified cancer	Saraç et al., 2013, Tuzlacı, 2016
Myrtaceae					
<i>Myrtus communis</i> ssp. <i>communis</i> L.	Mersin	Leaves	decoction	Unspecified cancer	Tuzlacı, 2016
Oleaceae					
<i>Olea europaea</i> L. ssp. <i>europaea</i>	Zeytin	Oil	-	Gastrointestinal cancers	Karcı et al., 2017; Tuzlacı, 2016
Orobanchaceae					
<i>Orobanche minor</i> Sm.	Göveotu	Aerial parts	infusion	Unspecified cancer	Tuzlacı, 2016
Papaveraceae					
<i>Papaver rhoeas</i> L.	Gelincik	Flowers	decoction	Lung cancer	Tuzlacı, 2016
Pinaceae					
<i>Pinus brutia</i> Ten.	Kızılçam	Branc. Bark Cones Leaves Resin Bark Pine tar	oil, infusion decoction	Unspecified cancer	Güneş et al., 2017, Sargin et al., 2015
<i>Pinus nigra</i> J. F. Arnold ssp. <i>pallasiana</i> (Lamb.) Holmboe	Karaçam	Cones	decoction	Intestinal cancer	Günbatan et al., 2016
<i>Pinus nigra</i> J. F. Arnold ssp. <i>pallasiana</i> (Lamb.) Holmboe var. <i>pallasiana</i>	Karaçam	Bark	decoction	Unspecified cancer	Bağcı et al., 2016
Plantaginaceae					
<i>Plantago major</i> L. ssp. <i>major</i>	Sinirotu	Leaves Seeds Aerial parts	raw eaten decoction - raw eaten mixed with honey decoction	Unspecified cancer Laryngeal cancer	Tuzlacı, 2016, Tuzlacı and Tolon, 2000; Karcı et al., 2017; Elçi and Erik, 2006; Tuzlacı, 2016, Günbatan et al., 2016, Kültür, 2007, Tuzlacı, 2016
<i>Plantago major</i> L. ssp. <i>intermedia</i> (Gilib.) Pilg.	Yedidamarotu	Leaves Seeds	- raw eaten	Unspecified cancer	Günbatan et al., 2016; Karcı et al., 2017, Kültür, 2007

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Plantago maritima</i> L.	Yıldandili	Leaves	decoction	Uterus cancer	Altundag and Ozturk, 2011
<i>Plantago lanceolata</i> L.	Damarlıca	Leaves	decoction -	Uterus cancer Prostate cancer Unspecified cancer Lung cancer	Tabata et al., 1994, Tuzlacı, 2016 Tarakçı, 2006
Poaceae					
<i>Zea mays</i> L.	Mısır	Corn silks	decoction infusion	Breast cancer Prostate cancer	Tuzlacı, 2016, Tetik et al., 2013
Polygonaceae					
<i>Rheum ribes</i> L.	Işgın	Aerial parts	-	Breast cancer	Uce and Tunçtürk, 2014
Portulacaceae					
<i>Portulaca oleracea</i> L. ssp. <i>oleracea</i>	Semizotu	Aerial parts	raw eaten cooked	Unspecified cancer	Sargin et al., 2015, Günbatan et al., 2016
<i>Portulaca rausii</i> Danin		Aerial parts	plant crushed/applied on warts/ext.; eaten	Unspecified cancer	Güneş, 2017
Primulaceae					
<i>Primula auriculata</i> Lam., Tabl.	Çuha çiçeği	Whole plant	-	Unspecified cancer	Uce and Tunçtürk, 2014
Ranunculaceae					
<i>Clematis vitalba</i> L.	Akasma	Bark	resin applied on/ext.	Mouth cancer	Güneş, 2017
<i>Nigella segetalis</i> Bieb.	Kara çörekotu	Seeds	infusion oil	Unspecified cancer	Korkmaz and Karakurt, 2014
Rhamnaceae					
<i>Rhamnus lycioides</i> ssp. <i>oleoides</i> (L.) Jahandiez and Maire	Topcehri	Leaves+ Shoots	decoction	Lung cancer	Tuzlacı, 2016
Rosaceae					
<i>Armeniaca vulgaris</i> Lam.	Kayısı	Fruits	raw eaten	Unspecified cancer	Tuzlacı, 2016
<i>Crataegus monogyna</i> Jacq.	Alıç	Fruits	infusion	Unspecified cancer	Paksoy et al., 2016
<i>Cydonia oblonga</i> Mill.	Ayva	Fruit shell	decoction	Unspecified cancer	Karcı et al., 2017
<i>Fragaria vesca</i> L.	Çilek	Fruits	raw eaten	Unspecified cancer	Sargin et al., 2015
<i>Prunus spinosa</i> L.	Çakaleriği	Fruits	decoction	Unspecified cancer	Yeşilyurt et al., 2017
<i>Pyrus elaeagnifolia</i> ssp. <i>bulgarica</i> (Kuth. and Sachokia) Vulev	Bulgar ahlatı	Fruits	juice	Stomach cancer	Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Rosa canina</i> L.	Kuşburnu	Fruits Roots Leaves Seeds Galls	juice marmalade decoction cook./inf./dec. decoction mixed with honey	Unspecified cancer Stomach cancer Prostate cancer Unspecied Cancer	Tuzlacı and Erol, 1999, Tuzlacı, 2016, Karcı et al., 2017, Sezik et al., 2001, Akbulut and Ozkan, 2014, Sargin et al., 2015, Elçi and Erik, 2006; Tuzlacı, 2016
<i>Rubus</i> sp.	Böğürtlen	Roots	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Rubus caesius</i> L.	Büküzümü	Leaves Roots	decoction	Unspecified cancer	Paksoy et al., 2016
<i>Rubus canescens</i> DC.	Çobankösteği	Roots	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Rubus canescens</i> var. <i>canescens</i> DC.	Çobankösteği	Fruits	infusion	Unspecified cancer	Tuzlacı and Şenkardeş, 2011; Tuzlacı, 2016
<i>Rubus idaeus</i> L.	Ahududu	Aerial parts Und.gr. parts Whole plant	-	Unspecified cancer	Saraç et al., 2013, Tuzlacı, 2016
<i>Rubus sanctus</i> Schreb.	Böğürtlen	Fruits Leaves Roots	raw eaten (mature) jam decoction infusion infusion decoction decoction	Unspecified cancer	Koçyiğit and Özhatay, 2006, Tuzlacı, 2016 Yeşilyurt et al., 2017, Tuzlacı and Şenkardeş, 2011, Yeşilada et al., 1999; Tuzlacı, 2016
<i>Sorbus aucuparia</i> L.	Kuş üvezi	Leaves	decoction	Unspecified cancer	Kültür, 2007; Tuzlacı, 2016
Rubiaceae					
<i>Galium odoratum</i> (L.) Scop.	Orman iplikçiği	Whole plant	infusion	Unspecified cancer	Korkmaz and Karakurt, 2014
<i>Galium verum</i> ssp. <i>glabrescens</i> Ehrend.	Sarı yoğurtotu	Flowers	powdered	Unspecified cancer	Tuzlacı, 2016
<i>Galium verum</i> L. ssp. <i>verum</i>	Boyalık	Flowers Leaves	- powdered -	Unspecified cancer	Ozturk et al., 2013, Altundag and Ozturk, 2011, Ozturk et al., 2013
Salicaceae					
<i>Populus nigra</i> L. ssp. <i>nigra</i>	Karakavak	Sap (obtained from cut stems)	-	Stomach cancer Intestinal cancer	Tuzlacı and Şenkardeş, 2011; Tuzlacı, 2016

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
Santalaceae					
<i>Viscum album</i> L.	Ökseotu	Whole plant Leaves Stems Fruits Leaves+brances Fruits+leaves	Decoction infusion raw eaten decoction	Unspecified cancer	Günbatan et al., 2016, Elçi and Erik, 2006, Korkmaz and Karakurt, 2014, Tuzlacı, 2016
<i>Viscum album</i> ssp. <i>album</i> L.	Ökseotu	Leaves+brances	keept in water for 8 hours	Unspecified cancer	Tuzlacı, 2016
Smilacaceae					
<i>Smilax excelsa</i> L.	Dikenucu	Shoots	decoction (fresh)	Unspecified cancer	Tuzlacı, 2016
Solanaceae					
<i>Lycopersicon esculentum</i> Mill.	Domates	Fruits	raw eaten	Unspecified cancer	Tuzlacı, 2016
<i>Solanum tuberosum</i> L.	Patates	Tubers	juice	Stomach cancer	Tuzlacı, 2016
Theaceae					
<i>Camellia sinensis</i> (L.) Kuntze	Çay	Leaves	-	Unspecified cancer	Saraç et al., 2013; Tuzlacı, 2016
Urticaceae					
<i>Urtica dioica</i> L.	Isırgan	Leaves Aerial parts Seeds Whole plant Fruits Shoots Leaves+seeds	infusion decoction decoction (fresh) infusion (dried) raw eaten infusion pounded with honey with honey with honey, butter decoction with honey raw eaten decoction	Unspecified cancer Lung cancer Unspecified cancer	Tuzlacı and Bulut, 2007, Akaydin et al., 2013, Güneş, 2017; Tuzlacı and Erol, 1999, Güneş, 2017, Kültür, 2007, Simsek et al., 2004, Tuzlacı and Tolon, 2000, Tuzlacı and Şenkardeş, 2011, Yeşilada et al., 1999, Kültür, 2007
<i>Urtica membranacea</i> Poiret ex Savi	Çinçar	Fruits	crushed and mixed with honey	Unspecified cancer	Tuzlacı, 2016
<i>Urtica pilulifera</i> L.	Dalağan	Fruits - Whole plant Aerial parts	- - - decoction	Unspecified cancer	Tuzlacı and Bulut, 2007, Türkan et al., 2006, Ozturk et al., 2013, Akaydin et al., 2013

Table 1. Anticancer Plants in Turkish Traditional Medicine (contunied)

Plant species	Local name*	Parts	Usage form	Disease type	References
<i>Urtica urens</i> L.	Cılağan	Leaves Aerial parts	decoction decoction decoction (fresh) infusion (dried)	Unspecified cancer	Tuzlacı and Bulut, 2007, Akaydin et al., 2013, Güneş, 2017; Tuzlacı and Erol, 1999, Güneş, 2017
Verbenaceae					
<i>Verbena officinalis</i> L.	Mineçiçeği	Aerial parts	decoction	Unspecified cancer	Tuzlacı, 2016
Vitaceae					
<i>Vitis vinifera</i> L.	Asma	Fruits Seeds Leaves Fruits Branches Seeds Latex	juice raw eaten (fresh and dried) (make boiled wine) decoction crushed, eaten with honey infusion raw eaten -	Unspecified cancer Lung cancer Unspecified cancer Lung cancer	Tuzlacı, 2016, Günbatan et al., 2016, Güneş, 2017, Sargin et al., 2015, Deniz et al., 2010, Sargin et al., 2015
Xanthorrhoeaceae					
<i>Aloe vera</i> L.	Sarısabır	Gel Leaves	Infusion sap	Unspecified cancer	Çömlekçioğlu and Karaman, 2008, Güzel et al., 2015
<i>Asphodelus aestivus</i> Brot.	Kirgiçkökü	Leaves Whole plant	raw eaten (fresh)	Unspecified cancer	Güzel et al., 2015, Sargin et al., 2013

* Güner et al., 2012; ** Endemic taxon; “-”: No information

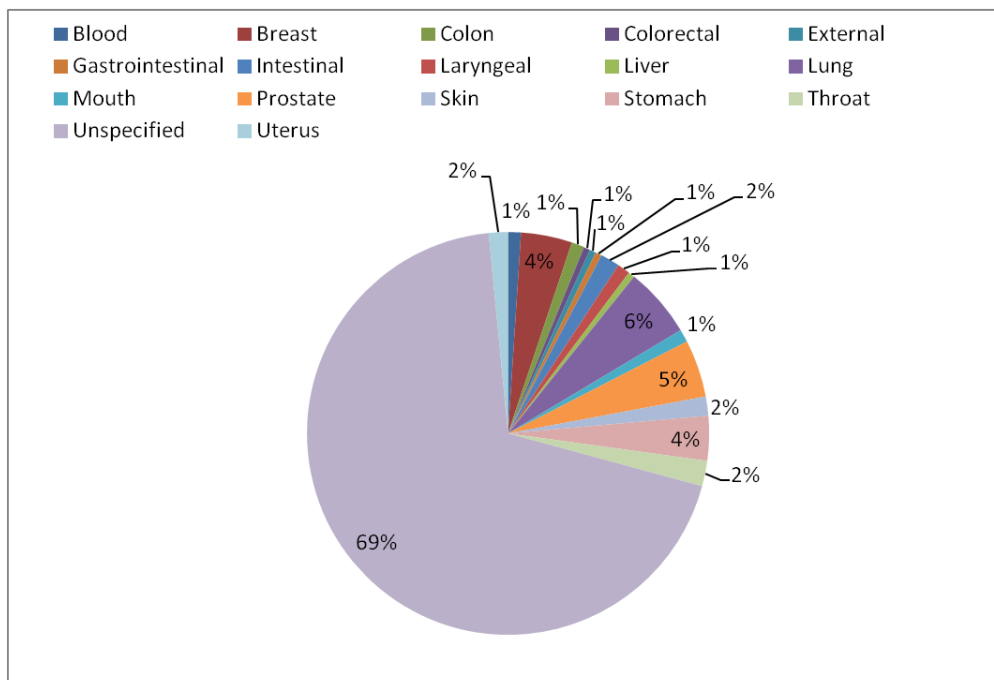


Figure 1. Distribution of Turkish medicinal plants according to different cancer types

Table 2. Multi-herbal Formulas Used As Anticancer in Turkish Traditional Medicine

Plant species	Local name*	Parts	Usage form	Cancer type	References
<i>Juglans regia+</i> <i>Quercus coccifera+</i> <i>Rubus sanctus+</i> <i>Sorghum halepense</i> var. <i>halepense</i>	Ceviz+ Kermes meşesi+ Böğürtlen+ Ekin süpürgesi	Branches, leaves+ Leaves+ Leaves, fruits+ Rhizome	infusion	Unspecified cancer	Tuzlacı and Erol, 1999
<i>Rosa canina+</i> <i>Urtica dioica/Urtica urens</i>	Kuşburnu+ Isırgan/Cılağan	Fruits+ Seeds	decoction	Unspecified cancer	Tuzlacı and Erol, 1999
<i>Hypericum perforatum+</i> <i>Malva neglecta+</i> Şugar	Kantaron+ Çobançöresi+ Şeker	Aerial parts	decoction	Leukemia	Yeşilada et al., 1995
<i>Trachystemon orientalis+</i> <i>Urtica dioica+</i> <i>Rubus sanctus+</i> <i>Smilax excelsa</i>	Kaldirik+ Isırgan+ Böğürtlen+ Dikenucu	Roots	decoction	Breast cancer	Yeşilada et al., 1999; Tuzlacı, 2016
<i>Urtica dioica+</i> <i>Rubus sanctus</i>	Isırgan+ Böğürtlen	Leaves	decoction	Unspecified cancer	Yeşilada et al., 1999; Tuzlacı, 2016
<i>Camellia sinensis+</i> <i>Urtica dioica+</i> <i>Plantago major</i>	Çay+ Isırgan+ Sinirotu	Leaves	decoction	Unspecified cancer	Saraç et al., 2013
<i>Rhododendron caucasicum+</i> <i>Robinia pseudoacacia+</i> <i>Castanea sativa+</i> <i>Bellis perennis+</i> <i>Plantago major+</i> <i>Asplenium trichomanes+</i> <i>Quercus sp.</i>	Kafkas ormangülü+ Yalancı akasya+ Kestane+ Koyungözü+ Sinirotu+ Saçakotu+ Meşe	Leaves	decoction	Unspecified cancer	Saraç et al., 2013
<i>Asphodelus aestivus+</i> <i>Plantago lanceolata</i>	Kirgıçkökü+ Sinirotu	Tubers+ Leaves	decoction	Lung cancer	Tuzlacı, 2016
<i>Capparis spinosa+</i> <i>Citrus limon</i>	Kebere+ Limon	Roots+ Peel	decoction	Breast cancer	Tuzlacı, 2016
<i>Ficus carica+</i> <i>Cicer arietinum</i>	İncir+ Nohut	Latex+ Seed powder	Added 2-3 drops of latex in chickpea powder	Skin cancer	Tuzlacı, 2016
<i>Inula montbretiana+</i> <i>Potentilla speciosa</i>	Kökçayı+ Kaya parmakotu	Aerial parts+ Whole part	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Juglans regia+</i> <i>Quercus coccifera+</i> <i>Rubus sanctus+</i> <i>Sorghum halepense</i> var. <i>halepense</i>	Ceviz+ Kermes meşesi+ Böğürtlen+ Ekin süpürgesi	Branches+leaves+ Leaves+ Leaves+fruits+ Rhizome	decoction	Unspecified cancer	Tuzlacı, 2016
<i>Malva nicaeensis+</i> <i>Rumex sp.</i>	İlmikotu+ Labada	Leaves+ Leaves	cooked with oil	Unspecified cancer	Tuzlacı, 2016
<i>Olea europaea</i> ssp. <i>europaea+</i> <i>Linum usitatissimum</i>	Zeytin+ Keten	Oil+ Seeds	mixed	Unspecified cancer	Tuzlacı, 2016
<i>Origanum onites+</i> <i>Vitis vinifera</i>	Bilyalı kekik+ Asma	Aerial parts+ Fruits	infusion mixed with grape vinegar	Blood cancer	Tuzlacı, 2016
<i>Populus alba+</i> <i>Pinus sp.+</i> <i>Urtica dioica+</i> <i>Thymus sp.+</i> <i>Tagetes minuta</i>	Akkavak+ Çam+ Isırgan+ Kekik+ Kokarot	Flo. branches+ Cones+ Whole plant+ Whole plant+ Whole plant	decoction	Throat cancer	Tuzlacı, 2016
<i>Rosa canina+</i> <i>Urtica dioica+</i> <i>Urtica urens</i>	Kuşburnu+ Isırgan+ Cılağan	Fruits+ Fruits+ Fruits	decoction	Unspecified cancer	Tuzlacı, 2016

* Güner et al., 2012

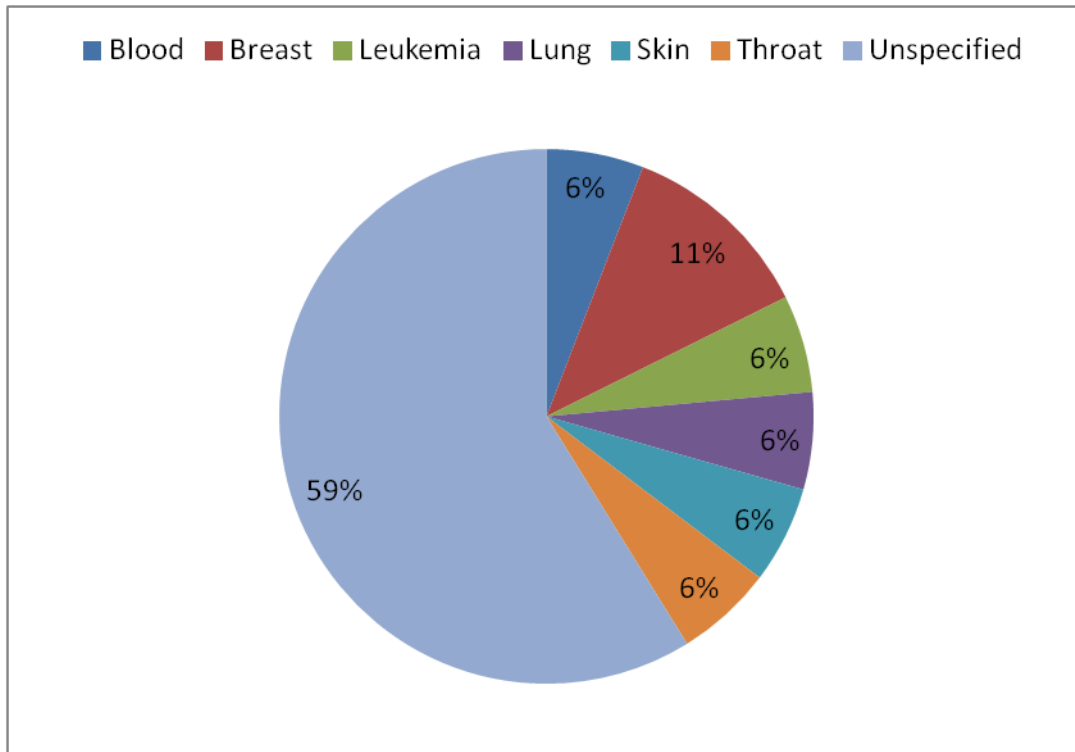


Figure 2. Distribution of multi-herbal formulas according to different cancer types

CONCLUSION

This review includes 160 medicinal plant taxa representing 53 families and also 17 different multi-herbal formulas. The highest number of medicinal plants were observed in the Lamiaceae family. Herbal drugs used by the local people are prepared as decoction, infusion, raw eaten, poultice, powder, etc. The most commonly used plant parts are leaves, flowers and fruits. In addition, other aerial and underground plant parts such as seeds, branches, stems, buds and roots can also be used in the treatment of cancer. Most of these studies have addressed unspecified cancer type.

Cancer, an abnormal malignant growth of body tissue or cell, is main health problem in both developed and developing countries. Today, the active substances of many drugs used in cancer treatment are obtained from medicinal plants. Medicinal plants have to be screened for anticancer activity for more of use. Herbal drugs show their anticancer effects by mechanisms such as carcinogen inactivation, antiproliferation, cell cycle suspension, induction of apoptosis and differentiation, suppression of angiogenesis, antioxidation and reduction of multiple drug resistance.

This review presents some of the medicinal plants possessing anticancer activity for various types of cancer. It is believed that results of this study will help others to explore herbs to further extent and its use in various other disease and toxicity studies along with clinical trials.

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