
COMMENTARY

Herbs as a Food Source in Turkey

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Abstract

Medical benefits of herbs have been known for centuries. Many examples contain powerful active components that, if used correctly, can help in healing the living organism. These herbs can also be provided in the form of capsules and powders, as dietary supplements, and thus differ from conventional foods or food ingredients. The traditional Turkish kitchen is rich of various herbs which have been employed as ingredients since ancient times. The present paper provides a brief overview of some important herbs in the Turkish flora, including fennel, sage, rosemary, mallow, sweet basil, savory, chicory, nettle, thyme, flax, cumin, caper, coriander, milk thistle, spanish lavender, marjoram, dandelion, rocket, purslane, spanish salsify, amaranthus, wild radish, and wild mustard. Studies on these herbs have revealed that they contain powerful active components that might be effective for increasing human health and preventing cancer.

Key Words: Herbs - Nutrition - Food consumption - Turkish flora

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Introduction

Herbal ingredients have been used as food flavorings for hundreds of years; some herbs have also been traditionally regarded as natural remedies for common ailments, yet it is only in recent years that food producers have focused on the health benefits of such ingredients in food products. The use of herbs as medicines has played an important role in nearly every culture on earth, including Asia, Africa, Europe and the Americas. Records of native American, Roman, Egyptian, Persian, and Hebrew medical practices show that herbs were used extensively to cure practically every known illness. Recent surveys suggest that one in three Americans uses dietary supplements daily and the rate of usage is much higher in cancer patients (in some cases, up to 50% of patients treated in cancer centers). Many of these supplements are herbal in nature. Among the many reasons cited by the general public for use of herbal medicines is the belief that botanicals will provide some measure of benefit over and above traditional allopathic medical approaches. There is also the sense that taking supplements will allow some measure of self-choice in medical care (Balch, 2000; Wargovich et al., 2001).

Approximately 80% of the world's population depends exclusively on plants for their health and healing. In the developed world, reliance on surgery and pharmaceutical medicine is more usual, but increasingly, more and more people are complementing their treatment with natural

supplements. Today's renewed interest in herbs reflects increasing concern about the side effects of powerful synthetic drugs, as well as the desire of many people to take charge of their own health, rather than merely submitting themselves to a sometimes impersonal health care system. We are also rediscovering the healthful benefits of tasty herbs for cooking and aromatic herbs for enhancing and helping to balance mental, spiritual, and physical health. Herbal supplements are generally taken for two reasons, i.e., to alleviate symptoms or to prevent illness. In the second case, herbal products are taken specifically in the hopes of avoiding or mitigating the effects of risk for certain diseases. Many botanicals and some common dietary supplements are good sources of antioxidants and anti-inflammatory compounds. The latter, as we shall see, may have extraordinary utility in the prevention of colon and breast cancer. In the area of cancer prevention, herbs may act through several mechanisms to provide protection. Induction of phase I and phase II metabolic enzymes by herbal products is very common and may account for some of this activity (Balch, 2000; Wargovich et al., 2001; Ward, 2002).

Turkey is leading producer and exporter of various herbs and other botanicals. The aim of this review was to assess the situation with regard to epidemiologically-identified herbs in our country associated with decrease in risk of different cancers.

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Active Compounds in Foods and Health Effects

For thousands of years prior to the advent of modern allopathic medicine, herbs and substances derived from plants have been the mainstays of traditional medicines around the world. But in terms of their use with cancer, most plants used in traditional medicines have been used with easily diagnosed skin cancers. Internal cancers can be difficult to diagnose, even with the aid of modern technology. Therefore, there are fewer plants traditionally used for these cancers, and many of the plants that have been used for skin cancers are too toxic to be taken internally. Nevertheless, many chemotherapeutic drugs currently in use were first identified in plants, including taxol, vinblastine and vincristine, etoposide and teniposide. The potential wealth of as yet undiscovered medicinal substances from plant sources is one of the rallying cries for those rightfully concerned about the catastrophic decline in the number of plant species globally. Researchers in Asia, Europe and America have recently been analyzing herbs chemically and have been testing these on animals and assessing their influence in people. Modern experience in using these herbs,

however, is exceedingly limited when compared to Oriental herbs which have been taken by hundreds of millions of people over thousands of years. The US Food and Drug Administration (FDA) classifies herbs as health foods and not medicine (Bailey, 2002; Lethcamo and Craker, 1996; McNamara, 1997; <http://www.commonweal.org/herbs.html>; <http://www.orientalmedicineandcancer.com/OT/ot.htm>). Phytochemicals are a major line of defense in the fight against cancer, and herbs rich in these powerful substances have an important role to play in our diet.

Table 1 summarizes the bioactive compounds and health effects of herbs grown in Turkey (Balch, 2000; Bendich and Deckelbaum, 2001; Etherton et al., 2002; Goulart, 1995; Wildman, 2001; <http://plants.usda.gov>; www.ars-grin.gov; www.fesflowers.com; www.ienica.net; www.natrindex.com; www.vitacost.com).

Agriculture and Economics

As noted above, in 80% percentage of the world, medical treatment for health cares depends largely on plants. A very large percentage of the world population is accounted for

Table 1. Bioactive Compounds and Health Effects of Herbs Grown in Turkey

Food	Phytochemicals	Potential Benefit
Amaranthus (<i>Amaranthus</i> <i>spp.</i>)	azo compounds, naphthalene, squalene, sulfonates	has been used effectively as an astringent for stopping diarrhea, bloody stools and urine, and excessive menstruation; has an effect of lowering cholesterol; is an excellent wash for skin problems such as acne and eczema to psoriasis and hives; is used as a douche for vaginal discharges; as a mouthwash for sore mouths, gums, teeth and throat and as an enema for colon inflammation and rectal sores; is useful for colon cancer.
Caper (<i>Capparis</i> <i>spinosa L.</i>)	Alkaloids, beta-sitosterol, cappaprenols, coumarin, glucocapangulin, indole-glucosinolates, isothiocyanate, kaempferol, quercetin, rutin, saponin, sinigrin, tannin	is a hepatic stimulant used for improving the functional efficiency of the liver; has antiageing, antiarthritic, anticancer (breast, kidney and prostate), antiinflammatory activities.
Chicory (<i>Cichorium</i> <i>intybus L.</i>)	Alpha-linolenic acid, apigenin, astragaline, beta-carotene, betain, caffeic acid, tannins, chlorogenic acid, cichoriin, coumarin, ferulic acid, inulin, kaempferol, lactucin, PUFA, quercetin, rutin, taraxasterol, vanillic acid	is a powerful hepatic stimulant which increases bile secretion and promotes digestion; promotes liver glycogen synthesis; aids in the inhibition of free radicals and as an antidote to the liver toxicity of certain chemicals; has anticancer (breast, colon, forestomach, kidney, stomach, prostate and skin) effects.
Coriander (<i>Coriandrum</i> <i>sativum L.</i>)	Borneol, 1,8-cineole, alpha-terpinene, angelicin, beta-carotene, beta-pinene, beta-sitosterol, borneol, caffeic acid, campesterol, camphor, carvone, chlorogenic acid, cinnamic acid, coriandrin, ferulic acid, gamma-terpinene, geraniol, kaempferol, limonene, linalool, myrcene, p-coumaric acid, p-cymene, petrocelinic acid, phytosterols, quercetin, rutin, tannin, tymol, vanillic acid	has analgesic, antiHIV, antiageing, antiallergic, antiasthmatic, antiatherosclerotic, anticancer (breast, colon, forestomach, liver, pancreas, skin) activities.
Cumin (<i>Carum</i> <i>carvi L.</i>)	Carvone, 1,8-cineole, alpha-pinene, alpha-terpinene, beta-carotene, beta-pinene, beta-sitosterol, caffeic acid, campesterol, carvacrol, carvaol, geraniol, kaempferol, limonene, linalool, p-coumaric acid, petrocelinic acid, phytosterols, quercetin, stigmasterol, tannin	has analgesic, anesthetic, antiaggregant, anti-allergic, antiasthmatic, antibacterial, anticancer (breast, cervix, pancreas), anticataract, antidiabetic, antiepileptic, antiflu, antihypertensive, anti-inflammatory, antimutagenic, antiseptic effects.

Food	Phytochemicals	Potential Benefit
Dandelion (<i>Taraxacum officinale L.</i>)	Beta-carotene, beta-sitosterol, caffeic acid, cryptoxanthin, lutein, p-coumaric acid, saponin, stigmasterol	cleanses the blood and liver, increases bile production, reduces serum cholesterol, relieves menopausal symptoms, prevents age spots and breast cancer.
Fennel (<i>Foeniculum vulgare L.</i>)	Alpha-pinene, benzoic acid, bergapten, beta-carotene, beta-carotene, beta-phellandrene, beta-sitosterol, caffeic acid, camphor, cinnamic acid, cynarin, ferulic acid, fumaric acid, isopimpinellin, isochlorogenic acid, kaempferol, limonene, linalool, myristicin, 1, 8-cineole, p-coumaric acid, protocatechuic acid, psoralen, quercetin, rutin, scopoletin, sinapic acid, stigmasterol, vanillic acid, vanillin	used as an appetite suppressant and as an eyewash; promotes the functioning of the kidneys, liver, and spleen, and also clears the lungs; relieves abdominal pain, colon disorders, gas, and gastrointestinal tract spasms; useful for acid stomach; good after chemotherapy and/or radiation treatments for cancer.
Flax (<i>Linum mucronatum</i>)	Apigenin, beta-carotene, beta-sitosterol, campesterol, chlorogenic acid, cyclo-artenol, lecithin, luteolin, myristic acid, squalene, stigmasterol, vitexin, w-3 fatty acids	promotes strong bones, nails, and teeth, as well as healthy skin; useful for colon problems, female disorders, and inflammation.
Mallow (<i>Malva sylvestris L.</i>)	Anthocyanins, beta-carotene, malvidin, leucocyanidins, mucilage	useful as anti-inflammatory agent for the respiratory tract, the skin, and the gastrointestinal tract; has anti-allergic, antiarthritic, antiasthmatic, anticancer, antiherpetic, anti-histaminic, antihypertensive activities.
Marjoram (<i>Origanum onites L.</i>)	1,8-cineole, alpha-pinene, alpha-terpinene, borneol, camphor, carvacrol, eugenol, farnesol, flavonoids, geraniol, limonene, linalool, oleanolic acid, p-cymene, rosmarinic acid, sterols, thymol, ursolic acid	has antibacterial, antifungal, anti-inflammatory, anticancer/anticarcinomic (breast, colon, lung, pancreas, prostate) effects.
Milk thistle (<i>Silybum marianum L.</i>)	Apigenin, beta-carotene, fumaric acid, kaempferol, naringenin, quercetin, silandrin, silybin, silychristin, silydianin, silymarin, silymonin, taxifolin	protects the liver from toxins and pollutants by preventing free radical damage and stimulates the production of new liver cells; has shown anticancer effects against prostate and breast cancer.
Nettle (<i>Urtica urens/dioica L.</i>)	Acetic acid, beta-carotene, betaine, caffeic acid, ferulic acid, lecithin, lycopene, p-coumaric acid, scopoletin	acts as a diuretic, expectorant, pain reliever, and tonic; good for benign prostatic hyperplasia, anemia, arthritis, rheumatism, hay fever, and other allergic disorders, kidney problems, and malabsorption syndrome.
Purslane (<i>Portulaca oleracea</i>)	Alkaloids, beta-carotene, beta-sitosterol, caffeic acid, catechol, chlorophyll, coumarins, DHA, EPA, ferulic acid, flavanoids, saponins, tannin	acts as an analgesic, antiaggregant, antiarthritic, antiatherosclerotic, anticancer (breast, colon, forestomach, liver, skin) activities.
Rocket (<i>Eruca sativa</i>)	glucosinolate methylsulphanylbutyl isothiocyanate	has stimulant, stomachic, diuretic, antiscorbutic, rubefacient and stomachic activities; induces enzymes which have anticancer activity.
Rosemary (<i>Rosmarinus officinalis L.</i>)	Alpha-pinene, apigenin, beta-carotene, beta-sitosterol, betulonic acid, borneol, caffeic acid, camphor, carnosol, carvacrol, carvone, caryophyllene, chlorogenic acid, diosmin, genkwanin, geraniol, hesperidin, limonene, linalool, luteolin, oleanolic acid, 1,8 cineole, phytosterols, rosmarinol, rosmarinic acid, salicylates, squalene, tannin,	fights free radicals, inflammation, bacteria, and fungi; relaxes the stomach, stimulates circulation and digestion, and act as an astringent and decongestant; improves circulation to the brain; can be used as an antiseptic gargle; helps detoxify the liver, and has anticancer and antitumor properties. thymol, ursolic acid
Sage (<i>Salvia officinalis L.</i>)	Alpha-amyrin, alpha-pinene, alpha-terpineol, apigenin, beta-carotene, beta-sitosterol, betulin, borneol, caffeic acid, campesterol, camphene, camphor, carnosolic acid, caryophyllene, catechin, chlorogenic acid, citral, farnesol, ferulic acid, gallic acid, genkwanin, geraniol, hispidulin, limonene, linalool, luteolin, maslinic acid, oleanolic acid, 1,8-cineole, p-coumaric acid, pinene, rosmarinic acid, saponin, stigmasterol, tannins, terpineol, thymol, ursolic acid, vanillic acid	stimulates the central nervous system and digestive tract, and has estrogenic effects on the body; reduces sweating and salivation; good for hot flashes and other symptoms of estrogen deficiency, whether in menopause or following hysterectomy; beneficial for disorders affecting the mouth and throat, such as tonsillitis.

Food	Phytochemicals	Potential Benefit
Savory (<i>Satureia hortensis</i> L.)	1,8-cineole, alpha-pinene, beta-carotene, beta-sitosterol, borneol, campesterol, camphene, camphor, carvacrol, geraniol, limonene, linalool, p-cymene, pentosans, rosmarinic acid, stigmaterol, tannin, thymol, ursolic acid	acts as anesthetic, antiHIV, antiacne, antiallergic, anticancer (breast, colon, pancreas), antifu, antihistaminic, antihypertensive, antiinflammatory, antiseptic, antispasmodic, antitumor (breast, cervix, colon, lung, pancreas, prostate, stomach), antiulcer, antiviral, hypocholesterolemic.
Spanish lavender (<i>Lavandula soechas</i> L.)	Alpha-pinene, beta-pinene, beta-santalene, borneol, camphor, caryophyllene, coumarin, geraniol, limonene, linalool, luteolin, 1,8-cineole, rosmarinic acid, tannin, umbelliferone, ursolic acid	relieves stress and depression; beneficial for the skin; good for burns, headaches, psoriasis, and other skin problems.
Spanish salsify (<i>Scolymus hispanicus</i>)	Isorhamnetin glycosides, bioactive nitrogen compounds, caffeoyl, flavonoids, rosmarinic acid, beta-carotene	has antiarthritic, antibacterial, antihypertensive, antiinflammatory, antispasmodic and antitumor (colon, kidney, lung) activities.
Sweet basil (<i>Ocimum basilicum</i> L.)	1,8-cineole, alpha-terpinene, anethole, apigenin, anthocyanins, beta-sitosterol, borneol, campesterol, camphor, carvacrol, citronellol, eugenol, farnesol, flavonoids, geraniol, kaempferol, limonene, linalool, menthol, myrcenol, p-coumaric acid, phytosterols, quercetin, rosmarinic acid, rutin, safrole, tannin, terpinene, tymol, ursolic acid	may help people with type 2 diabetes control their blood sugar levels; has antibacterial, antifungal, antiviral, anticancer (breast, cervix, colon, pancreas), anticataract, antiinflammatory activities.
Thyme (<i>Origanum vulgare</i> L.)	Alpha-pinene, apigenin, beta-carotene, borneol, caffeic acid, camphor, caprylic acid, carvacrol, carvone, chlorogenic acid, cinnamic acid, citral, eugenol, ferulic acid, gallic acid, geraniol, kaempferol, lauric acid, limonene, linalool, luteolin, myristic acid, naringenin, oleanolic acid, p-coumaric acid, p-cymene, phytosterols, rosmarinic acid, salicylates, tannin, tymol, ursolic acid, vanillic acid	eliminates gas and reduces fever, headache, and mucus; has strong antiseptic properties; lowers cholesterol levels; good for asthma, bronchitis, croup and other respiratory problems.
Wild mustard (<i>Sinapis arvensis</i> L.)	Allyl isothiocyanate, caffeic acid, chlorogenic acid, ferulic acid, p-coumaric acid, protocatechuic acid, sinapic acid, vanillic acid	improves digestion and aids in the metabolism of fat; applied externally, helpful for chest congestion, inflammation, injuries, and joint pain.
Wild radish (<i>Raphanus raphanistrum</i> L.)	Beta-carotene, caffeic acid, ferulic acid, p-coumaric acid, phytosterols, PUFA, raphanusin, sinapic acid, sinigrin	acts as anesthetic, antiHIV, antiacne, antiarthritic, antiatherosclerotic, antibacterial, anticancer (breast, cervix, colon, pancreas), antihistaminic.

by the developing countries. Therefore, as the efficiency of treatment with plants is increasingly supported by scientific investigations, phytochemicals are becoming the biggest branch of therapeutics (Ozhatay et al., 1997; Bozan, 1995).

Today we can conjuncture that there are 750,000-1,000,000 plants species in the world. About 500,000 of these have been identified and named. Every year nearly 2,000 new plant species are added. About 9,000 are grown in Turkey (Davis, 1970; Davis, 1982; Bianco, 1995).

According to some estimates, over the next 30-40 years, about 20% of the biodiversity of the world may be lost for a variety of reasons. This can happen in any country and the pressures of economic and social life to promote prosperity are sources of problems. In the rich flora, about 3,000 plant species are presently grown for food purposes, and approximately 10,000 species could be used as food sources. Although they are not commercially grown, individuals may collect them from nature (Kalcas, 1974). Unfortunately 3,000 plant species which are very important in the flora are in

danger of extinction because of encroaching agriculture, industry, drainage and salinity, tourism, construction of ponds and dams, building of roads and railways, agricultural pests and disease pollution, fire, erosion, and afforestation (Artukoglu and Uzmay, 2003).

In Turkey, field crops, medical and aromatic plants are much influenced by environmental conditions especially in recent years. Temperature affects distribution of plants and the vegetative period is limited by temperature requirements and adaptation to ecological conditions. The growth period may be important; essential oil content is much higher in young than in old leaves. High temperature and dry weather conditions stimulate flowering. Light quality and intensity influence plant growth and development, and it is thought that the amount of light determines the levels of essential total oils. Soil conditions are a main determinant, herbs mainly preferring sand-clay and well drained clay-sand soil.

Different parts of plants may be used as vegetables and for medicinal purposes. Young leaves, flowers and flower

Table 2. Herbs as a Food Source Grown in Turkey

Foods	Genus	Families	Growing season	Edible part
Amaranthus	<i>Amaranthus spp.</i>	Amaranthaceae	Early spring	Fresh shoots and leaves
Caper	<i>Capparis spinosa L.</i>	Capparidaceae	Summer	Fresh shoots, floral parts, immature fruits
Chicory	<i>Cichorium intybus L.</i>	Compositae	Winter, early spring	Fresh leaves
Coriander	<i>Coriandrum sativum L.</i>	Umbelliferae	Spring, summer	Fresh leaves, seeds
Cumin	<i>Carum carvi L.</i>	Umbellifere	Spring, summer	Fresh leaves, seeds
Dandelion	<i>Taraxacum officinale L.</i>	Compositae	Winter, early spring	Fresh leaves
Flax	<i>Linum mucronatum</i>	Linaceae	Winter, Spring	Fresh leaves, seeds
Fennel	<i>Foeniculum vulgare l.</i>	Umbelliferae	Winter, early spring	Fresh leaves and shoots
Mallow	<i>Malva silvestris L.</i>	Malvaceae	Winter, early spring	Fresh leaves and shoots
Marjoram	<i>Origanum onites L.</i>	Labiatae	Spring, summer	Fresh leaves
Milk thistle	<i>Silybum marianum L.</i>	Compositae	Winter, early spring	Fresh leaves and roots
Nettle	<i>Urtica dioica L.(U. Urens)</i>	Urticaceae	Winter, spring	Fresh leaves, seeds
Purslane	<i>Portulaca oleracea</i>	Portulacaceae	Spring,summer,autumn	Fresh leaves and shoots
Rocket	<i>Eruca sativa Mill.</i>	Brassicaceae	All years	Fresh leaves
Rosemary	<i>Rosmarinus officinalis L.</i>	Labiatae	Winter, spring, summer	Fresh leaves and flowers
Sage	<i>Salvia officinalis L.</i>	Labiatae	Winter, spring, summer	Fresh leaves and shoots
Savory	<i>Satureia hortense L.</i>	Labiatae	Winter, spring, summer	Fresh leaves
Spanish lavender	<i>Lavandula stoechas L.</i>	Labiatae	Spring	Fresh leaves and flowers
Spanish salsify	<i>Scolymus hispanicus</i>	Acenthaceae	Winter, spring	Fresh leaves and roots
Sweet basil	<i>Ocimum basilicum L.</i>	Labiatae	Spring, summer	Fresh leaves
Thyme	<i>Origanum vulgare L.</i>	Labiatae	Spring, summer	Fresh leaves and flowers
Wild mustard	<i>Sinapis arvensis L.</i>	Brassicaceae	Winter, spring	Fresh leaves and shoots
Wild radish	<i>Raphanus raphanistrum L.</i>	Brassicaceae	Winter, spring	Fresh leaves and shoots

stems, young shoots and roots may all find application (Wichth, 1994; Treben, 1984; <http://www.alternative-medicines.com/feature/features.htm>).

In Turkey, mainly these plant grow in the habitat naturally although a few are cultivated as vegetables. Therefore, regarding production and consumption, it is difficult to obtain accurate data. In Turkey, especially people who live in the rural areas use plants more than countrymen residing in cities. Clearly, in the countryside people are in a better position to collect fresh herbs and use them as food source. Turkey is at the forefront in exporting the medical and aromatic plants. This is really very important for the evaluation of country sources (Izmir Ticaret Odas_, 1997), particularly since they do not require irrigation, fertilization and use of agrichemicals.

Discussion

Herbs contain low amounts of protein and carbohydrate, and are rich in water, vitamins and minerals. Their fat content is low, but they taste good because of aromatic compounds. When consumed consciously and systematically, many wild plants are very important for human health because of such constituents. Most medicines are produced synthetically today and many microorganisms can develop resistance very quickly against them, which is in the case of phytochemicals is not possible. In recent years, especially developed countries, there is a tendency towards increased use of phytochemicals. Wild herbs can help people to stay fit, and

combine human with nature (Ackurt and Okan, 1988). Healing and nourishing processes may go together (Koc, 2002). Clearly, more research into their effects on carcinogenesis in different organs is warranted, both from the epidemiological perspective and in animal and cell models.

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