

## Herbal remedies and medicine; introducing some Iranian plants

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### ABSTRACT

The overall goal of this review is to discuss the potential efficacy of herbal treatments. Plants are considered among the main sources of biologically active chemicals. Plant based drugs usage in our past decay became very renowned due to their fewer side effects and being less expensive than chemical ones. Recently, more abrupt tendency in this field has been increased. Furthermore, advances in molecular and cellular determinations revealed effective properties of these herbal components. Some plants extracts have shown multi-functional properties such as anti-oxidant, anti-amyloid, antimicrobial, and anti-inflammatory; further studies, besides, are required for detailed chemical characterization and more extensive biological evaluation of the most active ingredients. In summary, herbals can be considered as novel therapeutic approach against wide range of diseases. This review article draws the attention to some species of plants possessing biological activities on human health.

**Keywords:** Herbal Plants; Cancer; Disorders of Nervous System; Lavender; *Scrophularia striata*

### INTRODUCTION

Plants have been widely used for diverse purposes during centuries. Some plant extracts have the potential to be developed as pharmaceuticals that can be considered as remedies in different types of diseases [1, 2]. It is reported that that five billion people still rely on traditional plant-based medicine as their primary form of health care [3]. In fact, herbals have the ability to produce a great number of chemical compounds with biological properties as part of their normal metabolic activities to defend against attack from predators such as insects, fungi, and herbivorous mammals[4]. These products are taken particularly in the hopes of preventing disease or mitigating the effects of risk for definite diseases[5]. At least 12,000 of these compounds have been isolated so far which is estimated to be less than 10% of the total. Many of these phytochemicals are considered to have noticeable effect on human health. The popularity of herbal plants as medicines has helped drug production and for precursory new drugs

worldwide [6, 7]. The usage of herbal plants goes back in ancient times[8]; a great number of archaeological facts are available which indicates that humans were using herbals during the Paleolithic, about 60,000 years ago[9]. Many of the nutraceutical at present accessible to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine, and opium. In addition, different aspects of the usage is currently proved by high technology systems herbal medicine has long been used in chronic disease but there was a little confirmative evidence for their actions at that time [10, 11]. About 80 percent of compounds currently isolated from the plants and widely used in modern medicine today show a positive correlation between their modern therapeutic use and the traditional use of the plants from which they are derived [12]. For instance, the major beneficial aspect of herbal treatment in cancer studies is to reduce the side effect of current therapies such as chemotherapy[13]. Recently, there is a wide interest in herbal plants in the field of cancer [14].

Lots of researches have been done to find out antitumor activity of some beneficial herbal plants. This indicates that, some herbals can possibly reduce tumor cells and in another word, possess cytotoxic activity against tumor cells. Since there is no exact treatment for curing malignant diseases [15-17], screening different sources for their treatment is prominent[18]. More plants are needed to be further studied. Moreover, more investigations has to be done to evaluate the probable side effects accompanied with the beneficial of the herbals[19].

This review underlines advantages of some most recent studied beneficial plants, which have been assessed for anticancer, antibacterial, and other curing purposes; however, still many herbals remain to be evaluated for probable biological effects.

### **Examples of medicinal plants and their common uses**

#### **Lavender**

Lavender (*Lavandula*) is a genus of 39 species of angiosperms plants and is a member of *Lamiaceae* (the mint family)[20]. The different types of this plant range in height from 9 inches to 3 feet, while some may grow taller with age. It is popular for its multicolored flowers, its fragrance and capability to adjust itself with low water consumption. Lavender are consist of four major categories: *L. angustifolia*, is a frost hardy species that has many pretty cultivars, habit, and blossom color (formerly known as *L. vera* or *L. officinalis*); *L. stoechas* is a large plant with greenish-grey foliage and late blooming with a very strong odor (sometimes known as French lavender); *L. latifolia*, a Mediterranean grass-like lavender; and *L. intermedia*, which is a sterile cross between *L. latifolia* and *L. angustifolia*. The various lavenders have similar ethnobotanical aspects and foremost chemical essentials [21]. This popular plant distributed from Micronesia across Africa, the Mediterranean, South-West Asia, Arabia, Western Iran and South-East India. *L. angustifolia* commonly famous as English Lavender is one of the most popular plants which have been used in therapeutic purposes. English lavender has been shown different promising

properties according to some studies [22-24]. In fact, investigations have been shown that it has biological activities such as anticancer, antibacterial, antifungal, analgesic, antioxidant, and sedative effects relating to its linalool and linalyl acetate component which have been determined by gas-chromatography and mass spectrometry [25, 26]. Lavender oil, in addition, has no potential for drug abuse[27]. Recent studies on aqueous extract of this plant indicate that in the value of 200 mg/ml, it has shown significant memory improvement, while other studies have been shown that the dosage below 200 mg/ml can have potential anti-proliferative activities; according to one study there are significant changes in gastric cancer proteome after exposed to lavender extract [22, 28]. Considering the fact that lavender oil can be a powerful allergen, and other probable side effects can accompanied with its extract more studies are needed to be established.

#### ***Scrophularia striata***

*Scrophularia striata* is the member of flowering plants family called *Scrophulariaceae*. This family consists of about 3000 species and 220 genera. The plants are annual or perennial herbs with flowers with bilateral or rarely radial symmetry. It has a cosmopolitan distribution, most of them found in temperate areas, as well as tropical mountains [29-31]. Many *Scrophularia* plants have long been used in Asian countries as a medicine for treatment of diseases; it has been used traditionally to treat eczema, wounds, goiter, ulcers, cancer and fistulae[32].Some species of the family were used as relaxant and alleviation of abdominal pain, whereas their aqueous extracts have been used as a bath to lessen rheumatic pains. Recently, it is mostly known for antimicrobial, antiviral, anticancer, wound healing, and anti-inflammatory properties[33-37]. There are also some antiviral activates related to this extract which has been investigated against Newcastle disease virus (NDV) [37]. Biologically active compounds of numerous species of it have been identified; they have been known to be rich in iridoid glycosides, mainly aucubin and catalpol. Iridoids represent a large group of cyclopentan-[c]-pyran monoterpenoids occurring as

constituents of sympetalous plants including ornamental as well as wild ones[38]. Recent studies have been shown that different dosages of leaf and seed extract of this plant can possibly have significant antibacterial properties [38-40]; according to one study the 5mg/ml of this extract has significant antibacterial activity on both *E. coli* and *Staphylococcus aureus* [38]; additionally, other studies have been confirmed that this extract can have both anticancer activities, and also growth inducing potential on normal cells at certain values[41]. Further studies have been shown that, inasmuch as anti-metalloproteinase activities of this extract which is key factor in metastasis, *Scrophularia striata* is a potent cancer healer[42, 43].

### ***Rosa Damascena***

Roses are one of the most notable groups of ornamental plants and their fruits and flowers are applied in a large number of different foods, nutritional products and a variety of traditional medicines. It is mostly grown in Turkey, Bulgaria, and Russia[44]. It is one of the most important species of Rosaceae family flowers with large and colorful flowers[45]. *Rosa Damascena* well known as Damask Rose is mostly grown for its wild application in perfumery, cosmetics and pharmacy purposes[46]. Several pharmacological effects of this plant such as therapeutic effect on premenstrual breast tenderness and reduction of inflammation, antimicrobial, antioxidant, mood relaxing, anti-spasmodic have been reported relating to its essential oil extract of the petals [47]. Bacteriostatic properties against some kinds of bacteria such as *Xanthomonas axonopodis* spp. *Vesicatoria* has been reported[51]. Anticancer properties have been evaluated on different types of cancers such as colon cancer which according to one study, it was effective on it mostly in its vapor phase[28]. The antioxidant activity is related to methanolic extracts from fresh flowers of three rose species (*Rosa damascena*, *Rosa bourboniana* and *Rosabrunonii*)[48]. It is also reported that, this plant acts on central nervous system including brain with inhibition of reactivity of the hypothalamus and pituitary systems in rat; ethanolic and aqueous extract improves sleeping time comparable to Diazepam [49]. Ethanolic

extract and essential oils of *Rosa damascena* has relaxant effects[50]. Ultra-performance liquid chromatography coupled with electrospray ionization-quadrupole time-of-flight mass spectrometry (UPLC-ESI-QTOF-MS) has been shown that phenolic composition in the methanolic extracts from the fresh flowers of rose species. The phenolic constituents were further investigated by direct infusion-ESI-QTOFMS/MS in negative ion mode. Characteristic Electrospray ionization tandem mass spectrometry (ESI-MS/MS) spectra with other diagnostic fragment ions generated by retro Diels–Alder (RDA) fragmentation pathways were recorded for the flavonoids[48]. The partially purified acetone fraction (AF) from silica gel column chromatography was found to be the active fraction with antioxidant properties[51].

### ***Cuminum cyminum***

*Cuminum cyminum* is from the flowering family an annual herb native to Egypt and Syria. It is widely cultivated as a cold season crop on the plains and as summer crop on the hills in Northern India, Himalayas and the Punjab, Balochistan, Kashmir, Kumaon and Garhwal etc. They have also been reported from several New Kingdom levels of ancient Egyptian archaeological sites[52]. Cumin oil is employed beneficially in many kinds of flavoring preparations. It is also used to an extent in soap perfumery and in flavoring beverages. In addition, *Cuminum cyminum* has a powerful odor and is used as a spice compounding synthetic floral perfumes in many countries[53]. Seeds reduced to powder, mixed with honey, salts and butter are practical to scorpion bites[54]. It is also used in the indigenous medicines as a stimulant and carminative. Several therapeutic effects is accompanied with effective ingredients of this plant; anticancer, antidiabetic, antimicrobial, anticonvulsant properties are the most well-known[53, 55, 56]. It has been investigated that this plant can be useful for the control of bacterial diseases[57, 58]. The major components in the oil extraction of this plant composes of this plant is Cuminal (36.31%), cuminic alcohol (16.92%),  $\gamma$ -terpinene (11.14%), safranal (10.87%), *p*-cymene (9.85%) and  $\beta$ -pinene (7.75%) [59]. Cancer

chemopreventive properties of this plant could be attributed to its ability to modulate carcinogen metabolism[60]. In fact, analytical data provide considerable information about pharmaceutical properties of this plant against colon cancer. Essential oil effects on cell survival by two different ways; evaporation part reduces the cell growth enormously of both cancer and fibroblast cells. Soluble part, on the other hand, stimulates cell growth of fibroblast cells, while reduces cell growth of cancer cells[61].

### ***Thymbra spicata***

The genus *Thymus* has about 400 species, all of which are majorly low spreading evergreen perennial sub shrubs. About 40 species are native around the Mediterranean region and in countries of Western Europe to North Africa and in countries lying eastward to Japan. *Thymbra spicata* L. var. *spicata* L family Labiaceae is lasting plant that the height of them varies between 15-40 cm and the plants are known with purple white flowers [62]. *Thymbra spicata* is used as a spice in meals in the Silopi region. Besides, the dried plant is boiled and the hard part of it is applied on the wounds as a drug [63]. There are some effective biological properties related to the essential oil of this plant. Biological effects of this plant consist of antioxidant properties, antibacterial, antimycotic, [64-66]. It has been reported that this plant has mostly antimicrobial effects [40, 67]. The essential oil main components were determined by GC/MS

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techniques are carvacrol, *p*-cymene, myrcene,  $\gamma$ -terpinene,  $\alpha$ -terpinene and *trans*-caryophyllene. This component have been tested against against *E. coli*, *S. epidermidis*, *B. subtilis*, *S. aureus*, *S. typhimurium*, *K. pneumoniae*, *P. aeruginosa*, *E. faecalis* and *C. albicans*. The essential oil and carvacrol showed strong activity against all microorganisms, while *P. aeruginosa*, *trans*-caryophyllene showed activity only on *C. albicans*. Another study revealed the extract composition by the mean of GLC and GC-MS. The main components of the oils were carvacrol, thymol,  $\gamma$ -terpinene and *p*-cymene. Moreover, eleven monoterpene hydrocarbons, two sesquiterpene hydrocarbons and nine oxygenated monoterpenes were identified.[68] The essential oil and carvacrol also showed strong antimycobacterial activity[69].

### **CONCLUSION**

On the whole, herbal plants can be worthy sources for applying in a verity of diseases. Therefore, more chemical analysis of herbals compounds accompanied with further investigation on different plants as potential remedies is required.

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