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Review Article

Milk Thistle, Myrrh and Mint: Herbal Plants as Natural Medicines

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ABSTRACT

Herbs are natural products and herbal medicine has become a popular form of healthcare. Herbal-derived remedies may increase pharmacological qualities and improve prevention and treatment of several diseases. In this study, all relevant articles in English language were collected. Keywords of milk thistle, myrrh, mint and natural products were searched in Google Scholar, Scopus, Research Gate and PubMed databases. Milk thistile is a valuable widely-consumed botanical used for its various health benefits. The plant is an annual herb, belonging to *Asteraceae* family, which ripe seeds contain flavonoid substances. Myrrh is a sap-like substance, which is released from cuts in the barks of trees. The plant is a member of *Commiphora* genus. *Mentha spicata* is a species of mint native to Europe and South-East Asia. Mint is a creeping rhizomatous and perennial herb. In this mini-review, key roles and pharmaceutical benefits of milk thistle, myrrh and mint are described.

Keywords: Milk thistle, Myrrh, Mint, Health benefits, Natural medicine

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Introduction

Herbal medications have been reported in Egyptian papyri, traditional Indian, Chinese and Greek Ayurveda and ancient Iranian texts [1–5].Herbal medicines are types of dietary supplements, which are sold as tablets, capsules, powders, teas, extracts and fresh or dried plants [6–8]. The most important health benefits of herbal medicines include their cost effectiveness, immune system strengthen, less side effects, natural healing potency, hormone and metabolism stabilizing, and affordability, compared to conventional medicines [9–14]. Medicinal plants are potential sources for the development of novel herbal drugs [15–17]. Therefore, herbal plants can be considered as promising medicines for preventing and treating diseases [18–20]. Milk thistle is a flowering plant, which grows in Mediterranean countries and is used to prepare natural remedies. Myrrh is a reddish-brown dried sap from a thorny tree, *Comminphora myrrha*, which is native to Southwest Asia and Northeastern Africa. Mint belongs to the Lamiaceae family, which is a rich-source of polyphenols cultivated in areas with climates ranging from tropical to temperate. The major goal of this study was to review the most important pharmaceutical benefits of milk thistle, myrrh and mint.

Methods

Online databases of ScienceDirect, PubMed, Scopus and Google Scholar were searched using keywords of milk thistle, myrrh, mint, health benefits and natural medicine for articles published between 1970 and 2020.

Resultsand Discussion

Milk thistle (*Silybummarianum*)

Milk thistle (*S.marianum*) is a valuable widely consumed botanical plant used for its multiple health benefits [21]. It is an annual plant belonging to the Asteraceae family, whose ripe seeds contain flavonoid substances [22]. Milk thistle has been originated from the Mediterranean region and spread to other countries in Europe, Asia, Australia and America. Milk thistle seed oil has been authorized as a novel food resource, which presents a complex unique melting profile [23]. The plant growth criteria are significantly affected by chicken manure and yeast extract. Moreover, the plant silymarin production is enhanced by chicken manure and yeast extract as well [24]. Nitrogen and potassium fertilization and plant spacing significantly affect seed yield and content of the active, antiheptotoxic flavonolignans silybin (silymarin), silidianin and silicristin of *S. marianum* (L.) Gaertn [25]. Milk thistle includeshigh proteins, fats, flavonolignans and linoleic and oleic acids [26]. The plant

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primary extract is termed silymarin, a complex mixture thatcontains a number of structurally linked flavonolignans, flavonoids, taxifolinand other constituents. The major flavonolignans present in most extracts includesilybin A, silybin B, isosilybin A and isosilybin B, silydianin, silychristin and isosilychristin [27,28]. The most important therapeutic uses of silymarinincludetheir anti-diabetes, anti-dermatitis, anti-cancer, anti-Alzheimer, anti-Parkinson and hepatoprotectiveuses [29].Silymarin derived from the milk thistle plant has been used as a natural remedy for diseases of the liver and biliary tract [30–32], which appears to be safe and well tolerated [33,34]. The seeds are promising natural drugs [35]. Milk thistle botanical supplements were reported to include a wide variety of fungal species. The most important pharmaceutical benefits of milk thistle are shown in Table 1.

Table 1. Pharmaceutical benefits of milk thistle

Benefit	Mechanism and impact	Reference
Antioxidant activity	a. Milk thistle syrup has high antioxidant activity. b. The films with milk thistle extract has shown higher antioxidant activities and lower solubility. c. The bioactive properties were positively correlated with phenolics/flavonoids content.	[36-42]
Anti-cancer	a. Silymarin and a flavonoid antioxidant isolated from milk thistle have shown the cancer chemopreventive and anti-carcinogenic effects. b. Silymarin has anti-cancer activity in human breast cancer, skin cancer, colon cancer, cervical cancer, prostate cancer, ovarian cancer, bladder cancer and lung cancer cells.	[43-47]
Liver protective effects	a. Milk thistle appears to be relatively safe, with long-term use for its potentially protective effects on the liver.	[48-50]
Anti-diabetic activity	a. The potent hypoglycaemic and antihyperglycaemic activities of an aqueous extract of milk thistle have also been demonstrated animal models of diabetes.	[51]
Anti-melanogenesis	a. Milk thistle has a potent potential to tyrosinase inhibition.	[52]
Anti-carncerogenic	a. The silymarin compounds are anticancerogenic substances.	[53]
Hepatoprotective effects	a. Silibin, a flavinoligand derived from milk thistle, is a dietary supplement reported to exert hepatoprotective.	[54-56]
Antiviral effects	a. Silymarinflavonolignans had antiviral effects.	[57-60]
Anti-inflammatory effects	a. Anti-inflammatory effects of silymarin are related to inhibition of the transcription factor nuclear factor-κB (NF-κB), which regulates and coordinates the expression of various genes involved in inflammation, cell survival, differentiation and growth.	
Anti-aflatoxin activity	a. It has beneficial properties of milk thistle on poultry growth performance in experimentally induced aflatoxicosis.	[61]

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Myrrh (Commiphora spp.)

The Genus includes nearly 190 species and is distributed in Southern Arabia (Yemen and Oman), Northeastern Africa (Somalia, Ethiopia and Sudan) and Subcontinent (India and Pakistan) [62,63]. Myrrh is a natural gum or resin extracted from a number of small, thorny tree species of the *Commiphora* genus. It is an herbal product, which has been used since ancient ages for traditional medications and other purposes [64,65]. The most important species of myrrh are *C.africana*, *C.angolensis*, *C.boranensis*, *C. caudate*, *C.erythrae*, *C.gileadensis*, *C.glandulosa*, *C.guidottii*, *C.guillaminii*, *C.habessinica*, *C.harveyi*, *C.holtziana*, *C.humbertii*, *C.kataf*, *C.madagascariensis*, *C.mossambicensis*, *C.myrrha*, *C.schimperi*, *C.simplicifolia*, *C.sphaerocarpa*, *C.stocksiana* and *C.wightii*. Since ancient eras, the plant has been used as a medicine and wound dressing, closely linked to the health and purification of rituals of women. Furthermore, the herbal was first described in Chinese medical literatures. The first use of myrrh was recorded in China during Tang Dynasty [66]. Traditional uses of *C. molmol* for the treatment of pain, inflammation and hyperlipidemia have been recorded [67]. Traditional use of *C. molmol* as a poultice for the treatment of cutaneous fungal infections has also been suggested [68]. Myrrh is an effective anti-microbial agent, which is reported as an excellent external remedy for mouth, throat and skin infections as well as glandular fever and brucellosis [69]. Myrrh essential oil is a promising antibacterial and cytotoxic agent[70]. Myrrh extract can be used alone or in combination with sublethaldoses of certain insecticides to control cotton leaf worms [71]. It shows antimicrobial properties on wool and silk fabrics [72]. Furthermore, myrrh essential oil includes potentials to qualify as an alternative of synthetic fungicides, particularly managing post-harvest fungal infections [73]. The oil of *C.kua* has shown moderate antifungal activities against *Cladosporium cucumerinum*[74]. Antibacterial and anti-inflammatory activities of myrrh are suggested based on the results from several studies. Moreover, anti-inflammatory activity of dual combination of myrrh and chamomile is reported[75]. Myrrh provides novel indications for itch treatment, which cannot be treated with histamine receptor blockers alone[76]. Hard gelatin capsules of myrrh extract are effective as pharmaceutical dosages against schistosomiasis[77]. Myrrh helps maintain increased levels of white blood cells (WBC) through the healing period[78]. The native myrrh use for severe vulvar edema in ovarian hyperstimulation syndrome may result in substantial improvement [79].

Mint (Menthaspicata L.)

Mint (*Mentha* spp.) includes diverse uses, including pharmaceutical, perfumery, food and confectionery uses [80,81]. The *M.spicata* is a species of mint native to Europe and South-East Asia [82]. The major essential oil of *M.spicata* L. includes piperitenone oxide, carvone, limonene, 1,8-cineole, menthone and isomenthone [83,84]. Kofidis et al. [85] reported that the essential oil from the leaves of *M.spicata* included high contents of linalool. The *M.spicata* can improve lipid profile of blood, meat quality and microbial population in small intestine [86]. The herbal oil can decrease pains in osteoarthritis patients [87]. The most significant pharmaceutical benefits of mint are presented in Table 2.

Table 2. Pharmaceutical benefits of mint

Benefit	Mechanism and impact	Reference
Antimicrobial activity	a. *M. spicata* essential oil can be considered as a natural source of bioactive phytopchemicals bearing antimocribal activities. b. The recovered and decanted essential oils of Mentha species demonstrated low to moderate antimicrobial activity against five bacterial strains. c. The oil showed great potential for its antimicrobial activities against *Escherichia coli*, *Candida albicans*, *Candida tropicalis* and moderate activities against *Staphylococcus aureus*.	[88-92]
Anti-bacterial	a. *M. spicata* essential oil has antibacterial activities.	[93-95]
Antibiotics	a. High total antioxidant activity in *M. Spicata* (79-85%) has proved the possible use of Mentha oils as alternative antibiotics.	
Anti-fungal activity	a. The extract of *mentha spicata* L. completely inhibited the mycelia growth of the pathogen.	[96,97]
Anti-inflammatory	a. Two monoterpenoid glycosides, spicatoside A and spicatoside B isolated from the whole plant has shown anti-inflammatory and hemostatic activity.	[98,99]
Antioxidant activity	a. S-Carvone isolated from *Menthaspicata* possess high antioxidant activity compared to α-tocopherol. The aqueous fraction of *M. spicata* mediates their antigenotoxic effects by modulation of lipid peroxidation (LPO) and antioxidant enzymes.	[100-105]
Anticarcinogenic properties	a. Piperitenone oxide is the first potential medical benefits of anticarcinogenic properties.	[106]
Pesticide	a. *M. spicata* essential oil is recommended as plant based pesticide.	[107]

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Conclusions

The most health benefits of milk thistle support liver health, promote skin health, decrease cholesterol, support weight loss, decrease insulin resistance, improve allergic asthma symptoms, limit spread of cancers and support bone health. The most significant benefits of myrrh oil include killing harmful bacteria, supporting oral and skin health and healing sores. The plant includes powerful antioxidant characteristics, which fight oxidative damages and kill parasites. Moreover, the herb may help kill or slow the growth of cancer cells. Myrrh compounds may help treat intestinal spasms linked to irritable bowel syndrome (IBS) as well as killing molds. The most important health benefits of mint include its goodness for digestive upsets, high antioxidant contents, memory improvement, popularity in toothpaste flavoring, breath mints and chewing gums, blood sugar decrease properties, stress reduction power, relaxation promotion and joint pain relieve due to arthritis. In conclusion, traditional medicine herbs play important roles in sustainable agriculture and food systems. They also offer significant approaches to prevent diseases.

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Authors' Contribution

All authors contributed equally to searching literatures and writing the manuscript.

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The authors declare no competing interests.

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