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International Journal of Complementary & Alternative Medicine

Review Article

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Meta-analysis of 10 herbs of Iowa for traditional, homeopathic and modern medicinal uses

Abstract

Background: Taking herbal supplements has become an easy way for the community in Iowa, USA to benefit from the medicinal qualities of herbs; however, cultivation of medicinal herbs in Iowa permits the ability to make preparations with herbs to treat health ailments. Direct cultivation of herbs allows Iowa residents to reap the advantages of medicinal properties in plants using traditional methods. Numerous studies conducted have combined herbal medicine with modern medicine, exhibiting promising results for treating specific health related issues. Scientific evidence is discussed to show how modern medicine practices have researched the medicinal properties of these herbs. The review provides educational knowledge about the general properties, phytochemistry, and medicinal properties of selected culinary herbs.

The meta-analysis of 10 medicinal herbs in Iowa explains the history and origin of each plant, describing physical characteristics and growing conditions in Iowa. In addition to that, the analysis discusses economic parts of the plant used for traditional, modern medicine, and homeopathic remedies. Many plants that are weeds growing in Iowa have medicinal properties that could be used for alleviating ailments and improving the health of the community. Cultivation of medicinal herbs in Iowa reduces the amount of herbal supplements the community uses to treat and alleviate health imbalances. Ethical growing practices can take place in Iowa, reducing monetary support for companies that use irresponsible growing practices to produce mass-scale supplements. The advantage of fertile soil and regular growing seasons in Iowa enable personal cultivation of medicinal herbs. Iowa offers a diverse climate, offering numerous cultivation methods to grow these herbs for personal use and medicinal purposes.

Keywords: medicinal, herbs, history, healing, homeopathic, Iowa, antioxidants

Volume 11 Issue 6 - 2018

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Received: October 31, 2018 | **Published:** November 14, 2018

Introduction

There are approximately 75-100 medicinal herbs and flowers according to the National Library of Medicine in Bethesda, Maryland, United States of America.[1] Traditional knowledge is available regarding the uses of medicinal herbs, and these selected herbs offer a great scope to access the medicinal qualities through cultivation and post-harvest technologies. All herbs contain unique chemical properties and, therefore, have varying medicinal uses. This review will expound the medicinal properties of 10 herbs found in Iowa for their traditional and modern medicinal uses. Cultivation of local medicinal herbs offers a tremendous potential for sustainable living and addressing climate change.

A quote from Rudolf Steiner states, "If we penetrate into Nature, it is possible to fight against those things which, appearing in the form of some illness, have fallen away from their normal evolution".[2] Plants have evolved with humans over millennia to correct the imbalances in human and animal health. In the book *The Complete Herbal* by Culpeper it documents the benefits of these plants, and their medicinal uses with the first edition written over 350years ago.[1]

Iowa is a Midwestern state known as an agricultural region of the United States of America with 89% of the land area being used for cultivation. Soil in Iowa is fertile and high in carbon content, providing suitable conditions for cultivating a wide variety of plants, including medicinal herbs. The geographical location of Iowa is located between 89.58 and 96.58 west longitudes, and 40.58 and 43.58 north latitude with a total area of 145,743km^2, and elevation ranging from 146-509 m above mean sea level.[3]

Northwest Iowa is prone to having a dry climate. Southeast Iowa stays wetter throughout the year, changing the overall moisture levels of the soil based on precipitation patterns. Iowa has a pronounced annual soil cycle of (April-June) being the wet phase, (June-September) as the drying phase, and a recharging stage during (September-November), which will determine the soil moisture for the following spring season. Climate changes according to the soil moisture, due to the influence of constant water and energy exchange between the terrestrial and the atmosphere.

Iowa soil is equipped for agriculture due to the continuous cycle of rainfall during spring months making up the wet phase (April-June) and regular snowmelt before summer to keep soil moisture suitable for cultivation throughout the warmer months until fall (September-November). There are 22 different soil types found in Iowa, making up the 3 parent materials in the soil as: glacial till, loess, and alluvium. Regions of Iowa surrounding the Mississippi River tend to contain more loess soil, which can be characterized as being well-drained, fertile, and fine silt. Glacial till, the second most prevalent soil type in northern Iowa, tends to be infertile, poorly drained, and fine loom. Southwest and southeast areas are predominantly alluvial soil, being exceptionally fertile, also found present in the flood plains.[4] Based on these diverse soil types identified in combination with observable

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climate patterns grants the potential for cultivation of medicinal herbs in Iowa.

With recognizable temperature changes due to the geographical location of Iowa, the mean annual temperature in Iowa ranges from 5.5℃ to 11℃. Summers are shown to provide ample rainfall and warm temperatures. Winter brings dryness, heavy wet snowfall and frozen ground, which can lead to more moist soil in the spring due to snowmelt. With an average precipitation of 860 mm annually, it varies within the state; giving South Iowa an additional 200 mm of rainfall compared to northern Iowa.[4] Medicinal herbs can be cultivated during the distinct seasons in Iowa. The meta-analysis discusses the cultivation and processing of 10 medicinal herbs and their healing properties in traditional, homeopathic, and modern medicine.

Methodology

The geographical information regarding Iowa and medicinal qualities of herbs was collected from peer-reviewed academic journals. History of the herbs was sourced from books on medicinal herbs and traditional uses. The approach for analyzing the information was to include all relevant aspects of plant identification and growing conditions in Iowa, as well as valuable results based on studies conducted with medicinal herbs. The photochemistry and results from studies were used to formulate claims on utilizing medicinal herbs for the therapeutic qualities. Climate, location, and soil composition of Iowa is included to show the agricultural opportunities for cultivating medicinal herbs. Data regarding cultivation of these medicinal herbs in Iowa was gathered by visiting local farms, collecting literature, and through cultivation.

Aloe

Plant history

Aloe vera or *Aloe barbadensis,* is native to north Africa and one of the oldest and most utilized herb in the world, with documentation dating back to biblical times. Belonging to the Asphodelaceae family, Aloe grows in tropical-like conditions and is drought resistant. Aloe is not equipped to handle freezing temperatures; hence, it is grown mostly in the southern hemisphere such as Africa, Australia, South America, as well as in southern parts of the United States such as Texas, California, and Florida.[5] In Iowa, Aloe can be cultivated during the summer months (April-September) outdoors, during the winter months (September-March) in heated greenhouses or potted indoors.

As the plant matures and increases in size, the roots become fibrous and plentiful. Aloe grows from the center outward in a rosette pattern, with leaves starting thick at the base and tapering at the ends. The leaves have a thin crunchy skin and a pulpy gelatinous inside, lined with spines on both sides. To harvest the benefits of aloe, leaves are cut at the base and left at an angle to drain the yellow juice from the pulp. The juice becomes concentrated from natural evaporation and may be turned into a thick syrupy consistency after boiling. This solution can be used in a tonic or for making various formulations.[6]

Medicinal qualities

Aloe vera contains over 200 bioactive chemicals present in the photochemistry. The gel in Aloe is known to provide minerals, vitamins, enzymes, proteins, polysaccharides, biological stimulators, and amino acids. In Ayurveda or ancient Indian medicine, Aloe is referred to as Kumari or translated to "Young Girl" for its popular belief of bringing youthful and feminine energies. Aloe is used as tonic for the female reproductive system, used to alleviate constipation, worm infestations, colic, infections, and skin diseases in Ayurveda. When consumed internally, Aloe is used as a laxative, to treat hemorrhoids, fight against parasitic worms, and as a stimulus to the uterus for menstrual regulation.

There are six enzymes reported in Aloe, including bradykinase, cellulose, carboxypeptidase, catalase, amylase, and oxidase. Bradykinase activates from a cut or wound, producing pain from vasodilatation, or the dilation of blood vessels. The carboxypeptidase in Aloe inactivates bradykinin and produces a pain-relieving and anti-inflammatory result. Aloe helps to relieve pain and inflammation when applied topically to wounds. Histamine produced during an allergic reaction causes profound pain and itching Studies show the magnesium lactate in Aloe inhibits the histidine decarboxylase and stops the formation of histamine from the amino acid histidine.[5] Aloe relieves pain and inflammation from wounds based on this information.

Basil

Plant history

Basil or *Ocimum basilicum* is in the Lamiaceae family and is native to Asia and India. The genus contains a variety of strains varying in size and shape of leaves. This well known herb is used in a variety of different cuisines; such as Italian, French, Indian and Thai food. The common Basil is typically a darker shade of green and the leaves are soft, bruise easily, and curl downward. It has a square shaped stem and this characteristic is what shows it is in the mint family. All mint family members have square stemmed and are edible, despite the level of bitterness. Every strain of Basil will flower on their own, or auto flower. This can be maintained by trimming the flowers, so the plant does not stop producing basil leaves. Flowering basil may cause the leaves to lose some of their taste, becoming hardier in texture, however, the flowers may still be used for flavor.[7] Basil grows best in greenhouses during the summer months (June-September) in Iowa, producing plentiful leaves and tremendous taste. It can also be cultivated indoors, in warm temperatures and indirect sunlight during spring months (March-June).

Medicinal qualities

O. *basilicum* is profound in the ability to block nociception, which are sensory responses connected to the nervous system that react to harmful stimuli. This herb has been used traditionally to ease many ailments such as constipation, diarrhea, headaches, coughing, worms, warts, or kidney issues. Basil has also been utilized for the high antioxidant content. Basil essential oil was combined with standard antibiotics in a study, the combination proved to help combat harmful strains of bacteria. It significantly reduced the number of bacteria, creating a molecular synergy between the two medicines. Ultimately, showing signs of increased antibacterial activity against disease related and antibiotic resistant bacteria strains such as *S. aureus*, *E. coli*, and *P. aeruginosa*. This study provides information showing herbal medicine working with modern medicine to combat antibiotic resistant strains of bacteria. Linalool is the predominant compound found in Basil, with studies suggesting this monoterpene is accountable for the boost in antibacterial activity, making up 57% of the essential oil.

Chamomile

Plant history

Cereus grandiflorus, or better known as *Chamomile*, is a yellow

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flower that was used by the Egyptians, Romans, and Greeks. Today, it is known for being a safe sleep aid or bedtime tea for children and adults.[8] While considered safe, Chamomile has been known to cause drowsiness, mental confusion, hallucinations, delirium, and may cause gastric irritation if an excess is consumed. A diuretic sedative and cardiac stimulant, Chamomile contains restful and relaxing properties when a tea is made from the dried flowers. This rooting shrub has cylindrical stems that hold large sweet apple or vanilla scented flowers, about 8-12 inches in diameter of the bulb. Chamomile only flowers during the evening and usually lasts at most 6hours. After wilted, the plant is done producing flowers causing the ovaries to enlarge and become an acidic juicy berry.[6] Chamomile can be grown outdoors in Iowa during the spring and summer months (May-August) helping attract pollinators.

Medicinal qualities

Chamomile is one of the most widely utilized plant medicines in households with an annual use of 4,000tons of Chamomile flowers globally. The most common method of consumption is making a tea from the dried leaves.[9] The flavonoids and essential oils varying between 0.2-1.99%. These amounts are found in the flowers and released into the tea. It has been observed to have qualities such as alleviating gastrointestinal spasms and inflammation of the gastrointestinal tract.[10] These results show Chamomiles ability to help alleviate gastrointestinal tract inflammation or spasms from drinking the tea.

Animal-based studies suggest Chamomiles ability to suppress blood glucose levels. In the same study, Chamomile strengthened serum insulin and increased levels of C-peptide in diabetic rats. Chamomile proves effectiveness in reducing hyperglycemia during these animal studies. Use of Chamomile for treating diabetic humans may be possible with further research. Therapeutic agents found in Chamomile include 11 bioactive phenolic compounds, such as caffeic acid, chlorogenic acid, herniarin, umbelliferone, apigenin, along with sesquiterpenes, flavonoids, and coumarins. Chamomile shows to protect the hyperglycemic oxidative stress on the pancreas insulin producing cells based on pharmacological activity.[8]

Dandelion

Plant history

Dandelion, or *Taraxacum officinale*, is typically perceived to be a weed found in most parts of North America, originating in Europe. Belonging to the Asteraceae family, the flower is not always used for the medicinal benefits.[11] Due to the invasive nature and spreading its own seed throughout the year, Dandelion is known in the agriculture world as a weed, and has no real profitable value. Despite Dandelions constant efforts to grow in unfavorable conditions, such as wastelands, it continues to hold a capacity to help heal. The name can be linked to several perspectives based on the flower petals resembling that of a lion's mouth or teeth. The roots were never shown nor documented for its purpose, as only the herb was used. Each blossom is made of several skinny bright gold yellow segments.

Dandelion weed is loved by honey producing bees for its large production of pollen and nectar at the beginning of spring, when the bees are about done getting their food supply from fruit trees. Dandelion is also praised by beekeepers and farmers in Iowa for the herbs natural tendency to continue bloom through the start of autumn when most flowers has ceased. This trait keeps local pollinators fed and extends the honey harvesting season to avoid feeding the bee's artificial sugar before winter.[6] Dandelion plays an important role in extending the agricultural season in Iowa. Dandelion can be harvested from wild locations in Iowa, or cultivated outdoors for medicinal purpose during spring until fall (April-September).

Medicinal qualities

The roots and leaves of Dandelion can be used as a diuretic. In addition to that, Dandelion can treat several disorders including diabetes, skin issues, liver disorder, and rheumatic pain.[11] Chinese medicine and Ayurveda date over 2000years of utilizing the plant Dandelion as a diuretic (Bevin, *et* al., 2009). Numerous reports find Dandelion flower extract containing antioxidants, as well as a good source of Vitamin A with up to 1400 IU per 100 grams. While evidence from science-based studies is lacking due to the sporadic nature of wild herbs spreading their seed and genes beyond what science can observe and evaluate, their remains the claims throughout history for the various uses of dandelion for healing. Similar to other bitter herbs, dandelion has been used to stimulate appetite, detoxify the gallbladder and liver, reduce fever, stimulate menstrual period, and treat urinary tract infection among many other uses.[12]

Echinacea

Plant history

Echinacea angustifolia, is a coneflower with deep purple petals arranged around a protruding cone center, belonging to the Asteraceae family. Also known as the Black Sampson or more commonly called Echinacea, this flower is native to North America. In 1939, it was unknowingly spread to Germany by seed. German doctors cultivated Echinacea and made preparations used to treat respiratory issues. It has been reported the Native Americans utilized Echinacea for treating insect bites, rattlesnake bites, as well as influenza.

In 1885, Echinacea was first sold commercially by John Uri Lloyd. By 1912, the usefulness of Echinacea grew, ranking number 11 for the most important botanical medicines in clinical use by physicians. Germany also recognizes Echinacea, defined as treatment for lower urinary tract infections, upper respiratory conditions, wound application, and topical infections while listed in the German Commission E botanical medicine monographs. Consuming Echinacea leaves a tingling sensation in the mouth and has a slightly sweet flavor. An extraction of Echinacea can be made from dying the roots and used for boosting immunity by adding to the bodies' resistance to fight off infection.[13] Echinacea is a commonly found growing outdoors in Iowa and used frequently in landscaping. It grows best with full sun exposure and well draining soil. Mid-spring or fall is when (April-September) Echinacea can be planted outdoors in Iowa.

Medicinal qualities

One of the most prevalent compounds found in Echinacea are hydroxycinnamic acids, containing immuno-enhancing qualities. These are essentially the powerful antioxidants qualities or phenolic acids present in the plant (Mahdavi, *et* al., 2018). It is also used for treating boils, erysipelas, septicemia (bacterial infections), cancer, syphilis. Echinacea removes impurities in the blood, since it acts as an antiseptic. When used as an injection, Echinacea can help treat hemorrhoids. The fresh root in a tincture helps with terminal fevers and deathly diphtheria, a bacterial infection that coats the throat. Echinacea has been studied and shown to have antioxidative, antiviral, antifungal, and antibacterial properties on various aspects of the immune system. Due to these immune-boosting qualities, it has

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been tested in AIDS therapy in treating the effects of having a low functioning immune system (Zolgharnein, *et* al., 2010).

The most potent active chemical compounds found in Echinacea is called hydroxycinnamic acid and its derivatives. These compounds are an active anti-inflammatory and antioxidants that protect from diabetes, insulin resistance, weight gain, renal dysfunction, oxidative stress, cardiovascular disease, and has shown to improve liver function (Alam, *et* al., 2016). Echinacea has also been tested for fighting influenza and the common cold. A recent study gave human subjects a dose of 4,000mg/day showed effectiveness of using Echinacea to treat the common cold. The same study showed using a dose of 2,400mg/day as a prophylactic or preventative measure for avoiding catching the upper respiratory illness.[14] These results show the effectiveness of using Echinacea to prevent and treat illnesses that lower the human immune system.

Fennel

Plant history

Fennel, or *Foeniculum vulgare* belonging to the Apiaceae family, is a hardy perennial plant that produces yellow flowers and offers a strong fragrance. Native to the Mediterranean region, Fennel can be quite versatile in that the bulb, seeds, young shoots, leaves, ripened or dried fruit, and root can be used in cooking or medicinally.[15] Throughout time, Fennel held a high economic value from international trading for therapeutic and culinary uses. Fennel tea can be made from the dried powered seeds and is typically used in households for treating gastrointestinal and respiratory tract issues.

For centuries in China, Fennel is called Xiaohuixiang and is recognized by Traditional Chinese medicine for the fruits' ability to treat infants with dyspeptic disorders. Fennel is also recommended for treating defection of sperm, kidney stones, bronchitis, chronic cough, vomiting, diarrhea, dysmenorrhea, and considered as a diuretic from the volatile compounds present in the plant (He and Huang, 2011) Iowa provides a climate for Fennel to grow outdoors in full sun exposure after the last spring frost. Fennel seeds can be prepared during late spring (March-April) in preparation for transplanting outdoors.

Medicinal qualities

With studies conducted on the phytochemicals in Fennel it was found that the herb contained volatile compounds, essential fatty acids, phenolic compounds, and secondary metabolites, most of which were available from the essential oil. Other studies have suggested that plant-derived antioxidants help protect the brain from further neural damage and oxidative stress. The neural damage could ultimately lead to depression, psychosis, or other mental disorders. Using Fennel as preventative treatment for neurological disorders could be considered based on the results. Fennel oil was reported in an animal study to determine the ant depressive effects compared to prescription drugs. The effective results are linked to the neural protection qualities of Fennel. It has been reported from pharmacological studies that Fennel contains not only antioxidants, but also antibacterial, antiviral, antiprotozoal, antifungal, antithrombotic, anti inflammatory, antihepatotoxic, relaxant, and analgesic properties.[8]

Garlic

Plant history

Allium sativum, or better known as Garlic, belongs to the Liliaceae family. Being a member of onion family, Garlic a widely cultivated plant for its health benefits and more commonly used in food for the savory, spunky flavor. Due to the prolific nature of garlic, it is hard to determine the exact origin. It is believed to have started in west Siberia before spreading to Europe and soon spread naturally to Sicily. This herb has been regarded for its uses back in the 10th to the 16th century, where it was noted by Turner in 1548. Even further documented by the Sumerians in 2600-2100 B.C., stating it was already being widely cultivated. Egyptians recorded a high regard for garlic, despite the fact it is not native to their region and had to have been imported. Garlic is mentioned in The *Codex Ebers*, which is a papyrus with over 800 medical formulas, 22 of which contain garlic.[16]

Japanese and Chinese culture reveals the regular consumption of garlic back in 2000 B.C., typically with raw meat and in limited amounts. Garlic was also prescribed in Chinese medicine for stronger digestion, alleviating headache, insomnia, fatigue as well as diarrhea and internal worms or parasite infestations. It is suggested that garlic was also utilized as a food preservative, as well as treat depression and sadness. The most common method used by the Chinese medicine was a healing tonic with other plants or herbs rather than used alone to remedy aliments.[18]

In 1916 during war times, the United States government used fresh garlic as an antiseptic, buying it by the pound. The raw juice was pressed and diluted with water before being applied with sterilized Sphagnum moss to wounds. This was done to control the production of pus, which was documented to have saved thousands of men's lives.[6] Garlic can be planted in Iowa during fall when covered with mulch, or during the early spring season (March-April). Requiring full sun, garlic only needs to be watered weekly due to the shallow roots.

Medicinal qualities

Only cultivated garlic is used medicinally, yet wild varieties contain similar properties in differing amounts. Oil can be made from this plant through distillation process, creating stinging oil rich in sulfur. The first to study garlic through steam distillation was German chemist Wertheim in 1844.[16] Both garlic and onion contain compounds called thiosulfinates, which are sulfur compounds that help break down blood clots and lower blood pressure, as well as cause our eyes water when chopping these ingredients. The chemical compounds present in garlic offer multiple benefits for the body, conveying the ability to keep blood pressure low and treat blood clots.

The most well known active metabolite in garlic is Allicin, which is proven to increase heart health from its ability to breakdown into organic polysulfides. Once raw garlic has been exposed to oxygen by cutting, smashing, or ingesting the chemical Alliin is activated to turn into Allicin, which is known for the health benefits of supplying antioxidants and reducing inflammation.[18] Based on the results, Garlic has proven to improve blood flow, regulation of blood pressure, and heart health.

Lavender

Plant history

Lavendula mairei is considered a wild rare species native to the Mediterranean area, as well as the Canary Islands and India. The violet flower can be found growing wild along the South Mountains of Morocco. Lavender in the Lamiaceae or Mint family, which is the largest family containing many aromatic herbs and shrubs known for medicinal properties from the high content of volatile oils.[19] Most common cooking herbs likely come from the Lamiaceae family such as previously mentioned Basil and Mint, along with Rosemary,

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Oregano, Marjoram, Thyme, and Sage; with over 7,000 species, totaling 236 genera.[20]

This perennial shrub grows to be 0.40-0.80 m tall, producing erect purple flowers. Lavender is found in many folk medicine traditions around the world, such as Europe, Asia, ancient Rome and Greece using it to treat depression, inflammation, stress, and headaches. The Algerian people utilized Lavender as a stimulant and antiseptic agent.[21] Lavender can be planted outdoors in Iowa, favoring full sun exposure and well-drained soil. The flower can be planted in spring and survive until fall (April-September).

Medicinal qualities

Traditional medicine recognizes Lavenders ability to alleviate gastrointestinal issues through consumption. Microbial infection can be treated by applying the essential oil topically. It can also be used for asthma and cough treatment through aromatherapy, with the most common use of Lavender being aromatherapy of the essential oil.[20] The observed properties include antiseptic, antifungal, antibacterial, antioxidant, anti-inflammatory, sedative, and insecticidal activity (Hamdaoui, *et* al., 2017). High amounts of phenolic compounds and flavonoids found in Lavender contain a variety of health-promoting benefits from being antioxidants.[22] Studies have shown Lavender oils neuro protective qualities from glutamate-induced toxicity. The same study showed Lavenders ability to inhibit the acetyl cholinesterase, an enzyme stopping the excitation of a nerve transmission after impulse, which are essential preventative actions for patients suffering from dementia.[23] This shows Lavenders ability to be used to prevent and treat those prone to degenerative neurological diseases.

Mint

Plant history

Mentha or *Mint* was found growing wild in Great Britain, when it became cultivated by people in 1750. Later spreading to the rest of the continent in 1770, Mint is a member of the Lamiaceae family. Mint is a plant medicine that has been utilized for more than 3,000years. With over 650 species of mint, one of the most common strains is Spearmint or *Mentha spicata.* Spearmint gives a fresh flavor without leaving behind the menthol taste and is known to invigorate one with energy after inhaling or consuming. Spearmint grows with pointed serrated leaves and square stems. It contains essential oils excellent for respiratory issues or chronic bronchitis. Spearmint also aids in digestion, anti-inflammatory properties and can help thin out mucus.

Peppermint or *Mentha x Piperita* is a hybrid of both Spearmint and Watermint (M. *aquatica*), the other most common variety of mint releasing clean menthol flavor. Purple stems and longer leaves physically differentiate Peppermint from Spearmint. A variety of Mint strains grows very easily outdoors in Iowa and can handle full sun exposure. Mint is a perennial shrub that grows lower to the ground and produces flowers.[24] The shrub typically lasts through the start of fall or the first frost and the plant tends to flower during the warmer months (July-September).

Medicinal qualities

Mentha spicata has shown to contain considerable amounts of phenolic compound levels. This could increase antioxidant activity and can help increase bioactive secondary metabolites available to human health through food.[24] The chemical composition of Peppermint essential oil is 48% Menthol and 30% Methone, making it a great stimulant for blood flow to specifically the heart, brain, and pancreas.[25] Several studies have shown Peppermint to be antifungal, antiviral, and antibacterial, as well as the essential oil and other extraction methods containing antioxidants. Essential oil (EO) of Peppermint has been used externally and applied topically as an astringent, anti-itching, antiseptic, and rubefacient. Peppermint applied topically increases circulation and blood flow, while causing redness of the skin.

In a study, Peppermint EO was combined with fluconazole, amphotericin B, and miconazole. This combination showed synergistic antifungal activity against yeast strains, specifically C. albicans and C. guilliermondii. During the same study, Peppermint EO was combined with anti bacterial strain gentamicin and miconazole. A powerful concoction proving a synergistic effect by inhibiting 4 bacterial strains, such as Bacillus cereus and Staphylococcus, which are known for developing antibiotic resistance (Rosanto, *et* al., 2018). These results show Peppermints capacity to combat antibiotic resistant strains of bacteria when combined with modern medicine.

Yarrow

Plant history

Achillea Millefolium is also called Yarrow, which is a perennial herb native to the Albanian region. Yarrow produced an erect flower and belongs to the Asteraceae family. It is one of the oldest plant medicines utilized by humans with pollen dating back to 65,000 B.P. and currently one of the most widely used plant medicines. Yarrow has an invasive rhizomatous growth, can provide one or numerous stems to be 0.2- 1m tall, and grow leaves to be 5-20cm long. Yarrow flowers can be white to pink in color, producing 3-8 larger buds containing 15-45 smaller disk flowers. The leaves and flowers can create tonic for the blood, stimulating circulation, lowering blood pressure, and alleviating menstrual issues. The plant releases a heavy sweet aroma, before producing small single seeded dry fruits called Cypsela. In some rare cases, Yarrow can cause increased photosensitivity of the skin and result in allergic rashes. In Iowa, Yarrow can grow outdoors in full or partial sun. It can bloom numerous times throughout the year and can last from spring to fall (March-September).

Medicinal qualities

Traditional medicine recognized Yarrow for the anti-inflammatory and astringent qualities, as well as intensifying other herbs when taken together. A bitter tonic can be made to flush bile out, improve digestion, and can induce perspiration to lower fever. Preclinical studies show the Yarrow containing anti-ulcer, anti-pathogenic, anti-anxiety, and anti-inflammatory properties. Yarrow is used predominantly for healing wounds, respiratory infections, digestion issues and stimulating appetite. It is also utilized for treating skin conditions, liver disease, menstrual problems, and as a mild sedative.[26] Long used in traditional medicine for the astringent qualities, Yarrow is reported to be used to treat bleeding, pain, antiphlogistic, gastrointestinal disorders, choler tic inflammation, stomach-ache, and stimulate menstrual flow. Steam-distilled Yarrow flowers produce dark blue oil, used for chest rubs for colds, anti-inflammatory properties, and influenza. The essential oil shows to contain isovaleric acid, salicylic acid, coumarins, sterols, flavonoids, bitters, tannins, and asparagines.[27,28]

Conclusion

Cultivation of medicinal herbs in Iowa proposes solutions to health problems by using methods from traditional practice. Many of these plants come from the same genus or families and have varying constitutes when used for treating health imbalances. Plant medicines

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are considered an easy or safe method for healing and alleviating symptoms. Precaution needs to be taken prior use by research and consulting a physician for the use of any concentration, supplement, or excessive consumption of herbs and plants. Cultivation of medicinal plants in Iowa presents an alternative to taking pre-made herbal supplements, due to the soil and climate being suitable for regular growing seasons. Starting herbal gardens in the community and sharing knowledge helps in creating awareness about the local herbs. Conducting community hands-on workshops, a walk in the park to identify plants with medicinal uses, or provide useful information regarding how to cultivate herbs would help to involve the community. Local libraries could include medicinal herbs in their regular seminars on vegetable cultivation around growing season and may even offer free seeds (Table 1).

Table 1 Ten Medicinal plants of Iowa and their uses

Common name	Scientific name	Family name	Origin	Part of plant used	Medicinal qualities	Recognized in modern medicine	Homeopathic uses	References
Aloe Vera	*Aloe barbadensis*	Asphodelaceae	Arabian peninsula, genus found in South Africa	Leaves, gel, juices	Bradykinase, abdominal pain, diabetes	Yes	Topical: burns, wounds, skin/hair care Internal: digestion	Gupta et al.,[28]
Basil	*Ocimum basilicum*	Lamiaceae	Asia, India	Leaves, flowers	Essential oil, antioxidants, antinociceptive	Yes	constipation, diarrhea, headaches, coughing, worms, warts, diuretic	Abramovič et al.,[24]
Chamomile	*Matricaria chamomilla*	Asteraceae	Europe, India, Asia	Flowers, dried	Essential oils, flavonoids	Yes	Anti-allergic, depression, insomnia, anti-cancer	Din et al.,[9]
Dandelion	*Taraxacum officinale*	Asteraceae	North America	Roots, leaves	Diuretic, stimulate appetite, liver cleanse	Yes	Diuretic, liver cleanse	Sweeney et al.,[12]
Echinacea	*Echinacea angustifolia*	Asteraceae	North America	Root, leaves	Immune booster	Yes	Treating common cold	Saunders et al.,[13]
Fennel	*Foeniculum vulgare*	Apiaceae	Syria	Fruits, Seeds	Digestion	Yes	Common cold, constipation, indigestion, anuria	Roy et al.,[15]
Garlic	*Allium sativum*	Liliaceae	West Siberia, Central Asia	Bulbs, skins	Antibacterial, treat parasites	Yes	Parasites, diarrhea, insomnia, depression, respiration, digestion	Harris et al.,[16]
Lavender	*Lavendula*	Lamiaceae	Morocco, India, Canary Islands	Flowers, dried	Anti-fungal, anti-bacterial, antioxidant, alleviate asthma and cough	Yes	Insomnia, sleep aid, anti-inflammatory agent, hyperactivity, blood metabolism	Khoury et al.,[20]
Mint	*Mentha*	Lamiaceae	Africa, Asia	Leaves, stems	Chronic bronchitis, asthma, respiratory issues,headache	Yes	Toothaches, inflammation, ache,skin problems, motion sickness, mental strain, dandruff/ scalp, menstrual cramps	Alkhsabah et al.,[24]
Yarrow	*Achillea Millefolium*	Asteraceae	Albania region, Jordan	Flowers, leaves	Spasmodic disease, dyspepsia, wounds	No	Hemorrhages, inflammation, headaches, wounds, flatulence	Salihila and Nuro[27]

Citation: Hernandez JA, Thimmaiah A. Meta-analysis of 10 herbs of Iowa for traditional, homeopathic and modern medicinal uses. *Int J Complement Alt Med.* 2018;11(6):423–429. DOI: 10.15406/ijcam.2018.11.00419

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This meta-analysis expounds the history of these medicinal herbs to explain how the plants were used traditionally. The benefits of these 10 wild and cultivated herbs have been utilized to address health throughout human evolution. The traditional knowledge has been recorded and researched with scientific studies to understand the medicinal qualities of each herb. Information on how to dose each herb properly, in addition to finding out how it interacts with the body and other drugs is important for safety. Scientific studies demonstrate the research on the select herbs from Iowa and their medicinal uses. Iowa climate and soil supply ample opportunity to cultivate medicinal herbs.

Acknowledgements

None.

Conflict of interest

Author declares that there is no conflict of interest.

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