



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2022; 11(5): 146-149

Received: 09-06-2022

Accepted: 16-07-2022

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Therapeutic potential and phytoconstituents of traditionally used Indian spices

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DOI: <https://doi.org/10.22271/phyto.2022.v11.i5b.14506>

Abstract

Spices are a diverse group of wide variety of dietary additives consumed all over the world. Study of spices is a good example to illustrate anyone the complementarity of science and tradition. A spice may be any dried part, of an herb, pleasantly aromatic like seed, fruit, root, bark or flower of a plant, which is commonly used for flavor, color, as a preservative and medicine. From ancient time spices have been playing a major role in lifestyle of people and used for many purposes mainly as a medicinal for different ailments. Indian spices serve various medicinal functions such as food additives, laxatives, preservatives, expectorant, purgative, diuretic, flavoring agents etc. These all activities are due to potential active constituents such as flavonoids, terpenes, anthocyanine, phenylpropanoids etc. present in them. Many commonly used household spices such as turmeric, methi, black pepper, garlic, and cloves have a wide range of biologically active constituents and their synergistic action is helpful in enhancing human health and combating various diseases to human beings. Since each of the spices possesses so many beneficial properties, their uses in daily diet not only make life spicier but also make healthy. The aim of the present review is to provide information on some commonly used Indian spices for their therapeutic uses, phytoconstituents present in them and doses as per Ayurvedic system of medicines.

Keywords: Spices, ayurveda, therapeutic, chemical constituents, preservatives, health

Introduction

There are three major traditional medicinal systems in India i.e. Ayurveda, Siddha, and Unani. These systems are also mentioned even in the ancient Vedas and other scriptures. The literal meaning of Ayurveda is "science of life," because in our country traditional system of living care mainly focused on views of man and his illness. Food is the only major source for living beings for their nutritional needs. In current scenario, medicinal plant research work is increasing because of the increasing demands of herbal medicines and immense benefits of the traditional health care system with less or no side effects. A number of Indian medicinal plants are used as rejuvenators as well as to treat various disease conditions. They may be tonics, antimalarials, antipyretics, aphrodisiacs, expectorants, hepatoprotectives, antirheumatics, diuretics etc ^[1]. The widespread interest on these medicinal plants can give tremendous information about different herbs and its uses in different diseases. Spices being widely used in every kitchen and easily available have immense benefits in treating various diseases. Medicinal herbs and spices are an important part of human nutrition in all the cultures of the world ^[2]. Every spice has its own nutritional values so besides adding taste to food, it also provide us inevitable benefit in treating disease and maintaining health. All type of spices were used from ancient times till today in our daily life which not only increases our appetite but also helpful for our health. There is a growing amount of literature related to the potential benefits of these spices from a health perspective especially in conferring protection against various diseases. Many of these spices also used in our traditional medicines in curing many diseases besides giving various flavors to food. The medicinal value of any particular spice depends upon the potency of the plant parts that act on specific systems such as digestive system, respiratory system etc. Therefore usage of specific plant parts has been recommended in Ayurveda in case of particular ailments ^[3]. However, one should be aware that Ayurvedic nutrition is not a "magic bullet" system but requires the full participation of the patient to succeed ^[4].

Ayurveda uses many spices in medicine to alter long term conditions by eliminating metabolic toxins. As these herbs are easily available in everyone kitchen and effective in cost for every people, these can be used as home remedies in curing many diseases. A number of commonly consumed spices are reported from the Apiaceae (Umbelliferae) family. It was found that they are an outstanding source of phenolic compounds and showed good antioxidant activity ^[5]. In the current scenario many spices such as turmeric, etc. are used as in emergency treatment where hospitals are not in reach.

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Spices are called as functional foods having specific beneficial effect on certain target organ beyond basic nutritional needs [6]. Spices occur in various varieties contributing a wide range of nutrients to food. Spices help in combating various diseases because of their chemical constituents, marked pharmacological and medicinal properties. Keeping all the above beneficiary characteristic of spices, the main aim of this review article is to provide scientific information on the chemical constituents, their effects, therapeutic doses and their formulations that are available in the market so that hidden benefit of these valuable spices explored among common people to utilize their nutritional and medicinal benefit. Their uses in the form of different formulations can play in the management of different diseases and may be useful as a cost effective interventions for the healthcare.

Some common medicinal spices used in traditional medicines

Turmeric

Botanical Name: *Curcuma longa* L.

Family: Zingiberaceae

Chemical composition: Curcumine, Eugenol, VitA, beta-sitosterol etc.

Parts used: Rhizome

Dose: Powder 1-3gm, Fresh juice 10-20ml

Therapeutic uses [7, 8, 9, 10]

1. In all allergic disorders.
2. It is used as blood purifier and it is used in the treatment of atherosclerosis.
3. Being anti-inflammatory this herb is used to reduce inflammation and used in the treatment of bone related disorders.
4. Its paste is used in the treatment of acne, pimple, wound healing.

Formulations: Haridrakhand, Rajanyadi churna, Nishamalaki yoga etc.

Black Pepper

Botanical Name: *Piper nigrum* L.

Family: Piperaceae

Chemical composition: Piperolein, Citronellol, Piperine, B-caryophyllene, Vitamin A, C, B6, Riboflavin, Thiamine, Na, K etc.

Parts used: Fruit

Dose: Powder 0.5-1gm

Therapeutic uses [8, 9, 11]

1. The pungent taste trigger the stomach to release HCL which helps in the breakdown of proteins. The release of HCL also increase the appetite and show the cleansing effect on intestine.
2. The extracts of black pepper play important role in cold, cough etc. It also provides relief from sinusitis and nasal congestion.
3. It helps in the breakdown of fats in body due to which fat cells are broken down into small parts and processed by other body parts as a good energy sources.

Formulations: Shankhvati, Lavangadi vati, Vyoshadi vati, Hingvashtak powder, Trikatu powder, Lashunadi vati etc.

Methi

Botanical Name: *Trigonella foenum graecum* L.

Family: Fabaceae

Chemical composition: Silicon, Fe, Sodium, Thiamine as well. The seeds contain alkaloids i.e. Gentianine, Trigonelline, carpine compounds, fiber etc.

Parts used: Seed, whole plants.

Dose: Powder- 1-3gm

Therapeutic uses [8, 9, 12]

1. The presence of amino acids in this herb show anti-diabetic properties.
2. The presence of galactagogue in this herb increases the production of breast milk in breast feeding mothers
3. Methi is used for Gastritis and Bloating.
4. Methi increase libido.
5. In Hair growth and Dandruff.

Precautions

1. Patients facing nasal bleeding and heavy menstrual problem should avoid this herb.
2. Methi herb is not safe during pregnancy.
3. Methi acts as a laxative so the patient facing diarrhoea should avoid using this herb.

Formulations: Chaturbeej powder, Methimodak, Panchjeerakpaak.

Garlic

Botanical Name: *Allium sativum* L.

Family: Liliaceae

Chemical composition: Volatile oils- .06-.1V

Carbohydrates: Arabinose, Galactose etc.

Vitamins: Folic acid, Niacin, Riboflavin, Thiamine, VitC.

Amino acids- Arinic, Asparagic acid, methionine etc.

Enzymes: allinase, volatile compounds-allyl alcohol, allylthiol, allylpropyl disulphide etc.

Antibiotic- allicin, allisetine 1 and 2

Parts used: Bulb, oil

Dose: Paste- 1-6gm

Juice extracts 5-10ml once or twice a day

Oil 1-2ml in single or multiple doses

Therapeutic uses [8, 9, 13]

1. This herb helps to maintain the healthy cholesterol levels in body. It helps to lower the LDL cholesterol and increases HDL levels in the body. Hence it is quiet good in hypertension.
2. It acts as the laxative hence relieves the constipation.
3. It is useful for sciatica and chest pain due to its anti-inflammatory properties.

Formulations: Rasonpaak, Lasunadi vati, Rasonpinda, Lasunadi ksheer, Lasunadi ghrita

Clove

Botanical Name: *Syzygium aromaticum* L. Merr. & Perry.

Family: Myrtaceae

Chemical composition: Eugenol composes 72-90% of the essential oil is responsible for most of the characteristic aroma of cloves.(4).Other important constituent include eugenol acetate, caryophyllene, methyl salicylate (pain-killer), riboflavin, thiamine, nicotinic acid etc.

Parts used: Clove buds

Dose: Powder 1-2gm, oil 1-3 drops

Therapeutic doses [8, 9, 14]

1. In Orodental disorder- by chewing of clove.
2. In rheumatoid arthritis, Backache, Sciatica, Neurological disorder- by applying clove oil massage
3. Toothache- cotton plug of lavang tail.

Formulations: Lavangadi vati, Khadirarishta, Avipattikar churna, Suparipaak etc.

The detailed chemical constituents – present in these above spices and their therapeutic uses are given in Table - 1

Table 1: Indian spices, their Chemical constituent and Therapeutic uses

Indian spices	Botanical Name and Family	Chemical Constituent	Therapeutic uses	References
Turmeric	<i>Curcuma longa</i> L. Zingiberaceae	Curcumine, Eugenol, Vit A, Beta-sitosterol, curcuminone, Cineole, calcium, phosphorous, sodium, iron, potassium.	1. In all allergic disorders. 2. In the treatment of atherosclerosis and used as blood purifier. 3. Its paste used in the treatment of acne, pimples, wound healing.	[15, 16, 17]
Black pepper	<i>Piper nigrum</i> L. Piperaceae	Piperine, Piperolein, Vit A, C, B6, B-caryophyllene, Riboflavin, Thiamine, Citronellol, Sodium, Potassium, iron.	1. Ghee + Trikatu + Rock salt – In Vomiting 2. Toothache: used as an ingredient in herbal tooth powder combination such as Dashanasamskar churna. 3. In Hiccup: 1gm powder of Black Pepper + 2gm sugar + Honey	[8, 18, 19, 20, 21]
Methi	<i>Trigonella foenum graecum</i> L. Fabaceae	Trigonelline, Gentianine, silicon, Fe, Thiamine, fiber, diosgenin, gitogenin, folic acid, riboflavin, Vit A, C, B6, K, niacin, copper, potassium, calcium, selenium	of it. 1. Diabetes: 5gm powder twice daily with water or soak 1Tsf of seed in a glass of water and drink this water early in morning on empty stomach. 2. In Gastritis and Bloating: 1 Tsf methi powder + a cup of fatless buttermilk. 3. Hair growth and Dandruff: Apply a paste	[22, 23, 24, 25]
Garlic	<i>Allium sativum</i> L. Liliaceae	Folic acid, Niacin, Riboflavin, Thiamine, VitC, allylpropyl disulphide, allyl alcohol, Allicin, Asparagic acid, Arabinose, Galactose, volatile oil.	1. In Spleen diseases: Garlic powder+ Pippali powder+ Haritaki powder with 50ml gomutra, acts as a cardiac tonic, reduces cholesterol deposition inside the blood vessels, useful in cold and cough, relieves constipation, anorexia, abdominal colic pain.	[26, 27, 28]
Clove	<i>Syzygium aromaticum</i> L. Myrtaceae	Eugenol, methyl salicylate (painkiller), stigmaterol, kaempferol, beta-caryophyllene, crategolic acid, galloannic acid, ferulic acid, elagic acid, salicylic acid.	It is useful in Asthma, COPD, abdominal colic pain, frozen shoulder, good for eyes, used as an anti-inflammatory, as an anti-oxidant.	[29, 30]

Discussion

India is blessed with a wide variety of climatic variation. Each of its state produces a huge amount of many spices used in kitchen and for medicinal purposes also. Spices are used and imported from India since ages. Apart from adding color, flavor and taste to food, consumption of spices provide infinite health benefits like anti-diabetic, anti-oxidant, laxatives, expectorant, anti-hypertensive etc. These all activities are remarkable due to its chemical constituents found in spices. There are various health effects of spices towards preventing or ameliorating chronic diseases such as cardiovascular disease, arthritis, cancer, and neurological disorders emerged to be medicated through the direct action due to their phytochemicals (particularly polyphenols or flavonoids etc) targeting specific receptors or enzymes involved in various anti-inflammatory pathways or immune responses [31]. These benefits can make spices a substitute for costly beauty products and even “medicine”. The major class of polyphenols found in spices are the phenolic acids and flavonoids (mainly flavones and flavonols). However, polyphenols, terpenoids, and other spice-derived alkaloids are also recognized to have antibacterial, antiviral, and antifungal properties. This is one reason why spices are so often used as stabilizer or preservative agents in food. The antimicrobial properties of spices have been attributed to their distinctive aroma due to volatile oils and oleoresins present in them [32]. Many of these species not only form the basis of food but also serve as a good remedy for common health problems. These unique properties of spices have created a huge demand for several common spices around the world. These huge demands of Indian spices are high due to their rich texture, taste and aroma. These all benefits of spices making the spices a slot of research and economical benefits and to be focused by the researcher to explore more health benefits linked with each spice and to explore Ayurveda all over the world.

Conclusion

Spices have been essential for the wellbeing of humanity. Many scripts like The Bhagwat Gita, Epic of Gilgamesh described its uses dotting ancient times. By evaluating the nutritional benefit, therapeutic uses, it is found that these spices have wide range of health benefits. By knowing its common uses and being easily available in every house, these spices can provide medicinal benefits to all those common people who cannot afford costly medicines and their disease can easily be cured to stay healthy for long term. Keeping in mind the tremendous benefits of these spices, there is need for further research and validation of these valuable spices for more enhancements of their uses in many diseases, for invention of new constituents and its benefits and for more development of spices. Although some uncertainty exists about the safety, effectiveness of these spices intake mode and doses form, and cost-effectiveness of the developed formulations, expanding their use, where reasonable evidence of their effectiveness and good evidence of their safety exists, might yield health, social, and economic benefits. These steps will not only help in the research field but also help Ayurveda, the traditional system of medicine to remain powerful and globalised system of medicine. Due to this globalization of both Ayurveda and spices will be successful all over the world. Improving the information on these medicinal herbs and spices as well as services provided in local pharmacies, those are involved in developing traditional health formulations are the primary source of treatment for many ailments in rural areas, these might serve as an effective substitute for allowing unregulated use of conventional medical treatment. Thus, expanding our traditional system would require significant investment of time, knowledge and resources if it is to be done appropriately then it will have an impact on health of common peoples. Also given the widespread use of spices and their potential health benefits, there is clearly a need to better understand the consumption

patterns of spices to get more potential benefits to human health.

Acknowledgement

The author¹ is thankful to the Director and Head of Department of Dr. Vijay Ayurvedic Medical College Hospital & Research centre, Varanasi, UP, for their encouragement to carry out this work.

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