

A review on medicinal herb: *Allium Cepa*

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ABSTRACT

Herbal medicines have gained global importance with both medicinal and economic implications these days. The scientific assessment has become a prerequisite for acceptance of health claims. Onion (*Allium cepa*) a member of genus *Allium*, is the second most important horticulture crop all over the world. It is used as important source of phytoconstituents and food flavor. *Allium cepa* is one of the richest source of flavonoids and organosulphur compounds. Wide spectrum of biological activities makes *A. cepa* a potential therapeutic agent.

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KEYWORDS

Allium cepa;
Quaracetin;
Flavonoids;
S-cysteine sulphoxides;
Therapeutic agent.

INTRODUCTION

Herbs have been called part of “Nature’s pharmacy”. Although their action can in some ways be similar to modern drugs, herbal remedies are generally gentler and safer. Many of the drugs used in conventional medicine are derived from the herbs. Herbalism uses the whole plant or parts of the plant such as leaves, flowers or roots^[1]. Herbal medicines have become more popular in recent years because it is believed that these do not show many side effects, adverse or toxic effects compared to synthetic medicines^[2].

The use of herbs to treat disease is almost universal among non-industrialized societies and is often more affordable than purchasing expensive modern pharmaceuticals. The World Health Organization (WHO) estimates that 80 percent of the population of some Asian and African countries presently uses herbal medicine for some aspect of primary health care. Studies in the United States and Europe have shown that their use is

less common in clinical settings, but has become increasingly more in recent years as scientific evidence about the effectiveness of herbal medicine has become more widely available.

All plants produce chemical compounds as part of their normal metabolic activities. These phytochemicals are divided into (1) primary metabolites such as sugars and fats, which are found in all plants; and (2) secondary metabolites—compounds which are found in a smaller range of plants, serving a more specific function.

Onion:

It is estimated that around the World, over 9,000,000 acres (3,642,000 ha) of onions are grown annually making it the second most important horticultural crop after tomatoes. Due to their storage characteristics and durability for shipping, onions have always been traded more widely than most vegetables and this holds true even today. About 170 countries cultivate onions for domestic use and about eight percent of the

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global production is traded internationally.

The onion also known as the bulb onion^[3] or common onion, is the most widely cultivated species of the genus *Allium*^[4,5]. The genus *Allium* also contains a number of other species variously referred to as onions and cultivated for food, such as the Japanese bunching onion (*A. fistulosum*), Egyptian onion (*A. proliferum*), and Canada onion (*A. canadense*)^[6]. The name "wild onion" is applied to a number of *Allium* species. The onion is most frequently a biennial, although it can also be a triennial or a perennial.

Onion (*Allium cepa*) is widely used around the world as a food product and has also been used for medicinal applications. Most of the available research has focused on scar prevention, but the results are mixed in this area. Onion has been used in the treatment of diabetes, cancer, heart disease, and alopecia areata (hair loss).

As onion is a commonly consumed food, it is considered likely safe in smaller amounts, although there are reports of skin rash and gastrointestinal problems in sensitive individuals.

Onions were also prescribed by doctors in the early 16th century to help with infertility in women, and even dogs, cats and cattle and many other household pets. This was a mistake as recent evidence has shown that dogs, cats, guinea pigs, and other animals should not be given onions in any form, due to toxicity during digestion^[7,8].

Parts of onion:

Basal plate - especially of leaves; located at the base of a plant or stem; especially arising directly from the root or rootstock or a root-like stem

Bulb - a plant underground resting stage consisting of a short stem base bearing one or more buds enclosed in thickened storage leaves

Immature flower - a stage of early development

Scale leaf - a specialized leaf or bract that protects a bud or catkin

Root - the usually underground organ that lacks buds or leaves or nodes; absorbs water and mineral salts; usually it anchors the plant to the ground

Peel - an enveloping or covering membrane

Bulb

Fresh bulbs of *A. cepa* L. consist mainly of water (about 88 %), saccharides (about 6 %) and proteins

(about 1.5 %). However, the particular composition depends on a large number of factors, such as growing conditions, time of harvest and length and conditions of storage^[9]. *A. cepa* is a rich source of various compounds and has been thoroughly investigated by phytochemists during the last 100 years. The species of the genus *Allium*, are especially characterized by a high content of organosulphur compounds. The most predominant of these genuine sulphur-containing compounds are the amino acids cysteine and methionine, the S-alk(en)yl-substituted cysteine sulphoxides and the glutamyl peptides^[10,11]

Sulphurous compounds reduce the accumulation of platelets, improving blood flow and cardiovascular health in general. They also have a positive effect on antioxidant and anti-inflammatory systems in mammals.

Skin:

Onion skin is a natural source of ingredients with high functional value, because this vegetable is rich in compounds that provide benefits for human health. The brown skin could be used as a functional ingredient high in dietary fibre (principally the non-soluble type) and phenolic compounds, such as quercetin and other flavonoids (plant metabolites with medicinal properties). The two outer fleshy layers of the onion also contain fibre and flavonoids.

SCIENTIFIC CLASSIFICATION OF ONION

Domain	Eukarya
Kingdom	Plantae
Division	Angiosperms
Class	Monocots
Order	Asparagales
Family	Alliaceae
Genus	<i>Allium</i>
Species	<i>cepa</i>
Binomial nomenclature	<i>Allium cepa</i>

VERNACULAR NAMES OF ONION IN INTERNATIONAL LANGUAGES

French	Oignons
German	Zwiebeln
Italian	Cipolla
Spanish	Cebolla

VERNACULAR NAMES OF ONION IN LOCAL LANGUAGES

English	Onion
Hindi	Pyaz
Telugu	Ullipaya, Yerra gaddalu
Sanskrit	Polanduh
Kannada	Niruli
Tamil	Venkayam, Ulligadda
Malyalam	Cyvannulli
Marathi	Kandaa
Gujarati	Dungri/Kanda

NUTRITIONAL VALUE per 100 g

Energy	166 kJ (40 kcal)
Carbohydrates	9.34 g
Sugars	4.24 g
Dietary fiber	1.7 g
Fat	0.1 g
Water	89.11 g
Thiamine (vit. B1)	0.046 mg (4%)
Riboflavin (vit. B2)	0.027 mg (2%)
Niacin (vit. B3)	0.116 mg (1%)
Pantothenic acid (B5)	0.123 mg (2%)
Vitamin B6	0.12 mg (9%)
Folate (vit. B9)	19 µg (5%)

TYPES OF ONION
















Image	Type of Onion	Description
	Baby Onion	These can be distinguished from bulb onions due to their simple storage leaf. They are sweeter than bulb onion.
	Bermuda Onion	This is a sweet onion that is not very pungent when compared to other varieties. It is a big onion that has white flesh and a mild flavor.
	Boiling Onion	Boiling onions are storage onion varieties. They have a very thin skin. This makes them a favorite ingredient in stew recipes.

Image	Type of Onion	Description
	Cipollini	Cipollini are small onions and the name is derived from Cipolla, Italian for onion. They have a very rich and sweet taste. They are used in baking dishes as they have high sugar content in them.
	Egyptian Onions	These are a cluster of bulblets. They have a strong flavor and have a tough skin. They are elongated in shape and look similar to leeks and scallions.
	Green Onions	Green onions are small varieties that are harvested when the shoots are still green. They are often confused with scallions. These are used as toppings for many dishes.
	Leeks	Mild flavored and pale green in color, leeks are a type of white onions. The stalk or stem of leeks is also edible. These can be eaten raw or used in leek soup. Leeks are never boiled, but fried.
	Pickling Onion	These are picked when they are still very young. Pickled onions have a very pungent flavor and pickled in malt vinegar.
	Red Onion	The red onion is also called purple onion, because of the shades of purple on its skin. These are mild and sweet in flavor. They are really big in size and eaten with salads or added to different home recipes.

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Image	Type of Onion	Description
	Shallot	The sweet cousin of an onion is shallot. The shallot has a mild flavor.
	Southport Red Globe	These are large onions that have a glossy purple-red skin. The flesh has a pinkish purple ting and pungent flavored.
	Spanish Onions	These are storage varieties that come in yellow, white and red colors. Each variety has a distinct taste and flavor.
	Spring Onions	They are also known as fresh onions or summer onions. They come in three different varieties red, yellow and white. They are very thin-skinned and light in color. They have high water and sugar content. They are usually used for salads and recipes. These have a white skin. They have a strong flavored flesh that is usually used in Mexican recipes.
	White Onions	These can be sautéed to a deep brown color. They are great to be used in recipes that require a sweet and sour flavor.
	Yellow Onion	These are the most common variety of onions. They are also known as brown onions in Europe. They have a pungent flavor and used in a variety of cuisines.

Dosage

Most human studies that have shown an effect from onions used at least 25 grams per day and often two to

four times that amount. Though some studies have found cooked onions acceptable, several studies suggest that onion constituents are degraded by cooking and that fresh or raw onions are probably most active.

Quercetin:

The consumption of onion has increased due to its flavor and health benefits. These beneficial properties seem to strongly relate to the high content of sulfur compounds and flavonoids, Onions are rich in two chemical groups that are believed to have beneficial effects on human health, flavonoids and S-alk(en)yl cysteine sulphoxides (ACSOs)

Flavonoids are plant polyphenols found frequently in fruits, vegetables, and grains. Divided into several subclasses, they include the anthocyanidins, pigments chiefly responsible for the red and blue colors in fruits, fruit juices, wines, and flowers; the catechins, concentrated in tea leaves; the flavonones and flavanone glycosides, found in citrus and honey; and the flavones. flavonols and flavonol glycosides, found in tea leaves, fruits, vegetables, and honey. Flavonoids are known for their hydrogen-donating antioxidant activity as well as their ability to complex divalent transition metal cations. Moreover, they promote human health. These compounds are active against allergies, inflammation, viruses, hypertension, arthritis, and are reported to prevent mutations, carcinomas, cancer, and AIDS. Quercetin is part of the flavonol and flavonol glycosides group and it was stated by Caltagirone et al. (2000) that quercetin and apigenin inhibit the growth, the invasiveness, and metastatic potential of melanoma. Quercetin has also the potential to become a chemotherapeutic agent for prostate cancer as is reported by Xing et al. (2001)^[12]. Flavonols are also reported to have antioxidative function^[13].

Quercetin is widespread in plant food products and is consequently a commonly consumed flavonoid. It is present in tea, wine, onions, lettuce, cabbage, broccoli, beans, apples, peaches, and buckwheat, among others. A considerable number of studies have dealt with determining quercetin bioavailability and most of them have shown that onion is an excellent source of quercetin.

PHARMACOLOGICAL ACTIVITIES

Allium cepa has many pharmacological properties such as:

Pharmacological Activity	Type of Extract	References
Antimicrobial activity	Methanolic Extract	[14,15]
Antioxidant activity	Methanolic extract	[16-19]
Anticarcinogenic	Methanolic extract	[20-27]
Antimutagenic activities	Methanolic extract	[28,29]
Anti-hyperglycaemic or Anti-diabetic potential	Methanolic extract	[30-32]
Antiplatelet or Anti-thrombotic effect	Aqueous extracts	[33-36]
Hemostatic effects	Alcoholic Extracts	[37-40]
Osteoclastic effects	Ethanollic Extract	[41-43]
Cicatrizant effects	Methanolic Extract	[44-49]
Anti-melanogenesis	Methanolic Extract	[50]

CONCLUSION

Onion, pharmacologically known as *Allium cepa*, is found in every household. Herbal medicines have gained global importance with both medicinal and economic implications these days. The scientific assessment has become a prerequisite for acceptance of health claims. It is used as an important source of phytoconstituents and food flavor. Onion is one of the richest sources of flavonoids and organosulphur compounds. They possess a high level of antioxidant activity attributable to flavonoids, quercetin and pigments such as anthocyanins. A wide spectrum of biological activities makes *A. cepa* a potential therapeutic agent. *Allium cepa* has many pharmacological properties such as antimicrobial activity, antioxidant activity, anticarcinogenic activity, antimutagenic activity, anti-hyperglycaemic or anti-diabetic potential etc. Although rarely used specifically as a medicinal herb, the onion has a wide range of beneficial actions on the body, when eaten (especially raw) on a regular basis will promote the general health of the body.

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