

Therapeutic Potential and Phytoconstituents of *Allium cepa* Linn

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Description

In the present scenario, herbal medicines have gained global importance with both medicinal and economic implications. Widespread use of herbs all over the world has raised serious concerns over their quality, safety, and efficacy. Thus, accurate scientific assessment has become a prerequisite for the acceptance of health claims. Onion (*Allium cepa* Linn.) is a member of the genus *Allium*, is the second utmost important horticulture crop all over the world. It is used as an important source of phytoconstituents and food flavor. Onions are the richest sources of flavonoids and organosulphur compounds. They possess a high level of antioxidant activity attributable to flavonoids quercetin, kaempferol, myricetin; pigments such as anthocyanins, and organosulphur compounds. The most important among the sulphur compounds are the cysteine derivatives non-volatile S-amino acids, S-alk(en)yl-substituted cysteine sulfoxides and their decomposition products such as thiosulfates and polysulfides. These sulfur compounds and flavonoids possess antioxidant, antidiabetic, anti-inflammatory, anticancer, antimicrobial, antihyperlipidaemic, anticholesterolaemic, fibrinolytic, antiatherosclerotic, anticataractogenetic, antiplatelet aggregation, immunomodulatory, neuroprotective in ischemia and reperfusion-induced cerebral injury, and various other biological activities. A wide spectrum of biological activities makes *A. cepa* a potential therapeutic agent. *Allium*, a large genus containing about 4000 species are distributed throughout temperate regions of the world including Europe, Asia, North America, and Africa. *Allium* species have a long history of folklore use and are potential sources of therapeutic principles. Of approximately 700 edible members, including economically important vegetables, flowering ornamentals and wild species, plants such as onion (*A. cepa* Linn.), garlic (*A. sativum* Linn.), chives (*A. schoenoprasum* Linn.), leek (*A. porrum* Linn.) and Welsh onion (*A. stulosum* Linn.) are highly prized. Onion, the underground bulb of *A. cepa* is a member of the family Liliaceae. Members of Liliaceae show a variety of different habits and have varied classes of phytoconstituents. Therefore, the classification of the Liliaceae

has been discussed for a long time. Hutchinson in 1959 assigned *A. cepa* to the subfamily Allioideae of the family Amaryllidaceae. But, because of the lack of alkaloids which are normally present in the family Amaryllidaceae, Allioideae was later classified as a subfamily of the Liliaceae. Recent taxonomic revisions assigned the plants of the genus *Allium* to an independent family Alliaceae. *A. cepa* is of great economic importance. It is widely cultivated all over the world and was possibly one of the first domesticated vegetables by man. World onion production has increased by at least 25% over the past ten years with current production being around 44 million tonnes per year making it the second most important horticulture crop after tomatoes. Onion is famous for its use as a food flavor, and as an important source of phytoconstituents.

Onions have been shown to acquire antibacterial and antifungal properties. The volatile oil of onion has been shown to be highly effective against gram-positive bacteria, dermatophytic fungi, growth, and aflatoxin production of *Aspergillus* fungi genera including *Aspergillus niger*, *Brettanomyces anomalus*, *Candida albicans*, *C. lipolytica*, *Cladosporium werneckii*, *Fusarium oxysporium*, *Geotrichum candidum*, and *Saccharomyces cerevisiae*. Aqueous extract or the juice of onion has been reported to inhibit in vitro growth of *Escherichia coli*, *Serratia marcescens*, *Streptococcus* species, *Acetobacillus odontolyticus*, *Pseudomonas aeruginosa*, and *Salmonella typhosa*. A petroleum ether extract of onion repressed the in vitro growth of *Clostridium parapatrificum* and *Staphylococcus aureus*. Welsh onion extracts have been reported to exert more inhibitory activity towards aflatoxin production than the preservatives sorbate and propionate at pH values near 6.5, even at concentrations 3-10 folds higher than the maximum level used in foods. Organosulphur compounds have been reported to be responsible for the antibacterial effects of onion extract against oral pathogenic bacteria causing dental caries. In addition to inhibitory effects against pathogenic bacteria, onions have been found to promote beneficial micro-organisms.

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