WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

A Brief Review on Medicinal Uses, Nutritional content, Pharmacological actions and Phytoconstituents of *Cucurbita moschata*

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ABSTRACT :

Cucurbita moschata (pumpkin) belongs to family Cucurbitaceae is often used in folk medicine. The crop is found to be originating in either Central America and northern South America. They are generally more tolerant to hot and humid weather. *Cucurbita moschata* is a multipurpose plant and it has high nutritional value. This plant is highly valued for its dual role in both culinary and medicinal uses. It is rich in macronutrients, vitamins and minerals, phytochemicals and other beneficial compounds. It is monoecious plant, creeping, climber which grows annually .Leaves, flowers, shoot tips, fruits and seeds of *C.moschata* plants are edible. *Cucurbita moschata* is widely cultivated in many parts of the world, particularly in India, China, United states, Brazil and South Africa. The phytochemical analysis of plant extract and fractions showed the presence of alkaloids, flavonoids, terpenoids, steroids, saponins, tannins and phenolic compounds. The pharmacological study of plant showed that it possesses anti-diabetic, antihypertension, antitumor, immunomodulation, antifungal, antibacterial, anti-inflammatory activities and antioxidant effects. It was also used to prevent skin diseases, measles, jaundice, insomnia, colic, eye disorders reducing cell damage in the body, cancer and improve immune function.

KEYWORDS: C*ucurbita moschata*, Phytoconstituents, Pharmacological actions

INTRODUCTION :

Herbs were utilized for medicines, food, and many other purposes in different parts of the world. In various countries, research has been done to discover the potential applications of the medicinal plants in favor of human beings.[1] Worldwide, attention has been paid to the medicinal plants to solve healthcare related problems where plants are used as source of 25% of prescribed drugs in world.[2]

In view of the fact that at the time there was no sufficient information either regarding illnesses or concerning the plant, and how it could be utilized as a curative medicine, everything was based on experiences. During these times the reasons for the usage of specific plants with medicinal value for treatment of several diseases were being discovered.[3]

Natural drugs have the tend to have a long history of utilization in the counteractive action against different human ailments. The continuous utilization of these drugs has significantly increased their global impact in modern medical and healthcare services [4]

There are more than 2500 plants used by traditional herbal practitioners for treating basic illnesses, which has been regarded as one of the best methods in Indian medical practice.[5]

The herbal medicine has been gaining the popularity in both developing and developed countries because of their natural origin and less side effects. Many medicines which are used traditionally are derived from medicinal plants. The herbal constituents are selected because of its reduced toxicity, side effects, low costs and larger availability compared to modern medicine.[6]

One such plants used as ingredients for traditional medicine is *Cucurbita moschata*. *C.moschata* has many benefits because of nutrients content present in it. Pumpkin has long been consumed by the public as a daily food in various processed forms such as being steamed, rejected, boiled, and steamed [7]

Cucurbita moschata is an important horticultural crop that belongs to family Cucurbitaceae, also known as cucurbits. Cucurbitaceae family consists of 90 genera and 700 species approximately. The Cucurbitaceae are characterized by long flexible stems, a crawling or climbing growth habit and fruit that differ widely in color and shape, having a thick and impermeable skin protecting a juicy fibrous pulp. They are grown worldwide.[8]

TAXONOMY:[9]

Kingdom: Plantae
Division: Tracheophyta
Class: Magnoliopsida
Order: Cucurbitales
Family: Cucurbitaceae

Genus: *Cucurbita*
Species: *moschata*
Botanical name**:** *Cucurbita moschata*

VERNACULAR NAMES:[9]

Common name: Pumpkin, squash
Hindi: Kaddu
Tamil: Pucani
Malayalam: Kumpalam
Tulu: Kembude
Kannada: Sihi Kumbala kaayi
Telugu: Gummadi
Bengali: Kumara
Assamese: Kumra

DESCRIPTION:

Fig.1: Cucurbita moschata plant

Leaves: These leaves are green with white spots and are in the form of heart shape, they are alternate without stipules. The length of the petiole varies from 9-24cm. The leaf blade has broadly oval outline with 5-7 shallowly lobed palms of 10-35cm in diameter. It has toothed edge, soft hairs with sometimes white spots disappearing at senescence and 3 veins starting from the base.
Stem: Usually angular with obtuse angle, very running, pubescent at the beginning and often rooting at the tendrils.
Fruit: The fruit is a large berry with a multiform (globular, cylindrical and ovoid). It weighs up to 10 kg. The fruits are covered with green spots and grey streaks. The color of flesh of fruit varies from yellow to orange. The fruits have many seeds. The fruit stalk is angular with five ribs and widened at the apex.
Flower: The length of the pedicels of the male flowers extended up to 16cm. The female flower has a short pedicel (up to 3.5cm).
Seeds: The seeds are obovoid and flattened. The length and width of *C. moschata* seeds will vary. The colour of the seeds can be white or tan or sometimes dark. The seed surface is smooth or a little rough. The seedlings have an epigeous germination.[9]

PHYTOCONSTITUENTS:

The extract and fractions of *C. moschata* leaves of contains bioactive compounds such as alkaloids, flavonoids, tannin, saponin and terpenoids. They are rich in source of calcium, iron, vitamin A, oil, rich in unsaturated oleic and linoleic acids, protein with high amounts of arginine, aspartate and glutamic acid, but deficient in lysine and sulphur containing amino acids. [10]
The chemical composition of the pumpkin pulp varied between 75.8 and 91.33% moisture, 0.2 and 2.7% crude protein, 0.47 and 2.1% crude ash and 3.1 and 13% carbohydrate content. The fruit of *C.moschata* contains polysaccharides, vitamins , proteins, essential amino acids, valuable antioxidants, phenolics, flavonoids, carotenoids and minerals. They are is high in β-carotene, which gives it yellow or orange color which is a major source of vitamin A. It is also high in carbohydrates and minerals. [11,12]
Seeds of *C. moschata* are rich in oil and the variability in the oil. They have a high nutritional value, provides good quality oil, and excellent source of protein. Pumpkin seed oil is rich in many antioxidants and essential nutritional components like essential fatty acids (FAs), vitamins, squalene, carotenoids, tocopherols, phytoestrogens, phytosterols, polyphenols, hydrocarbon, triterpenoids and selenium. Pumpkins are rich source of calcium, iron, vitamin A, oil, rich in unsaturated oleic and linoleic acids, protein (25 – 35%) with high amounts of arginine, aspartate and glutamic acid, but deficient in lysine and sulphur containing amino acids.[13]

MEDICINAL USES:

The whole plant consists of *Cucurbita moschata* having the following properties like anti-diabetic, antioxidant, antihypertension, antitumor, immunomodulation, antiradical, antifungal, anti-inflammatory, antimicrobial, burn wound healing. Traditionally it is used as a folk medicine which is used to treat skin diseases, measles, jaundice, insomnia, cancer, hypertension, arthritis, hypercholesterolemia. Bladder disorders eye disorders reducing cell damage in the body, colic, improve immune function and urethral pressure treatments.[9]

DISTRIBUTION

C. moschata is also popularly called pumpkin in western countries. Originally native to Central America, including regions of southern Mexico, it has spread widely due to its agricultural value. In North America, it is extensively cultivated in the United States and Canada. In South America, it is grown in countries such as Argentina, Brazil, and Peru. European cultivation is prominent in southern countries like Italy, Spain, and France. In Asia, major producers include China, Japan, and India, and it is also grown in Southeast Asian countries. The plant thrives in warm, temperate, and subtropical climates, requiring a long growing season with ample sunlight, well drained fertile soils, and moderate to high rainfall.[14]

PHARMACOLOGICAL ACTIVITY:

Antidiarrheal activity:[15]

Aqueous extract *Cucurbita moschat*a leaf showed that it has antidiarrheal activity in which number of wet stools were reduced. It has been also found that *C.moschata* has antimotility and anti-entero-pooling effects. It revealed that it has more efficiency than loperamide. The aqueous extract of *C. moschata* has antidiarrheal potential.

Antiradical activity:[16]

*Cucurbita moschat*a leaves have antiradical activity, in which the ethyl acetate fraction exhibits the strongest antiradical property. The correlation between the total phenolic, flavonoid content is high and the radical's inhibition is very high. These showed that the bioactive compounds which are responsible as antiradical are phenolic and flavonoid compounds. Thus, *C. moschata* leaves can be developed as functional food.

Antidiabetic activity:[17]

Cucurbita moschata has shown variety of health benefits. *Cucurbita moschata's* pulp and seed has shown hypoglycaemic activity in both normal animals and tetraoxopyrine-induced diabetic rats. The novel tetrasaccharide which was extracted from *Cucurbita moschata* found to reduce the levels of blood sugar of diabetic mice significantly. These glycerol glycolipids could be used as a drug candidate for the treatment of type II diabetes mellitus.

Antioxidant activity:[18]

The *C. moschata* extract was found to have the highest ferric-reducing antioxidant power (FRAP) value which shows the antioxidant activity.

Anti-obesity:[19]

The anti-obesity properties of fermented extract of *Cucurbita moschata* showed that the extract inhibited the presence mRNA expression of fat genes in the mice. Thus, they concluded that the fermented *Cucurbita moschata* extract could be used as the potential drug to control obesity.

Antibacterial activity: [20]

The new type of antifungal peptide was isolated from Cucurbita moschata seeds at a dose of 375µg, which has inhibited the microorganisms Botrytis cinerea, Fusarium oxysporum, and Mycosphaerella oxysporum, and it also inhibited the translation of acellular rabbit reticulocytes.

Anti-helminthic:[21]

Cucurbita moschata seeds can be used as insect repellent and it can be eaten as fresh or roasted, which can relieve the symptoms of bloating and abdominal cramps caused by the intestinal worms. The study was reported that pumpkin seeds has a minimum inhibitory and can produce anti-helminthic effects.

Anticancer activity:[22]

The proteins and polysaccharides found in *C.moschata* has potential anticancer effects against leukemia and melanoma cells. The moschatin present in *C.moschata* will effectively inhibits the growth of melanoma cells which is potential in the treatment of cancer.

Anti-inflammatory activity:[23]

Cucurbita moschata peel extract has the wound healing ability on burn wounds. Thus, the results had shown that *Cucurbita moschata* could act as a wound and burn healing agent due to the presence of high mucus contents and the strong antioxidant capacity.

NUTRITIONAL CONTENT: [24],[25]

C. moschata has high nutritional value which is essential for human health. Various research studies about *C. moschata* revealed that it contains protiens, lipids, fats, ash and moisture content. Whole plant of *C. moschata* has nutritional beneficial health benefits. Protein content in seed is found to be between 30 and 35%. Lipid content in seed is found to be between 29.31 and 32.78%. The pulp of *C. moschata* fruit contains high levels of potassium, Calcium, phosphorus, Magnesium and Copper. It is also found that it is rich in Vitamins A, C and E, carotenoids and dietary fibers. It has various medicinal uses as the whole plant and parts of plants.

CONCLUSION :

Cucurbita moschata is grown in many parts of the world. It is known that in many countries it has been used as traditional medicine. The available literature reports showed that *Cucurbita* moschata contains large amount of phytoconstituents, chemical constituents and has prominent nutritive value. It contains wide variety of health benefits. The *Cucurbita moschata* plant and its various parts has potential ability to induce anti-obesity, anti-diabetic, anti-helminthic, antidiarrheal, antibacterial, and anticancer effects. The preliminary phytochemical analysis of the plant *C.moschata* indicates that it contains various constituents which is responsible for the various pharmacological actions. Each part of the plant contains a different medicinal value.

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