

A REVIEW OF PHARMACOLOGICAL ACTIVITIES OF CUCURBITA MAXIMA

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Abstract

Cucurbita maxima is a creeper which is found very frequently on the roofs of houses all over India. The used parts are seeds, pulp and fruit stalk. Similar to other Cucurbitaceous plants it constitutes of saponins, fixed oil, resin, protein, sugar, starch. It also contains glutamic acid and calcium in measurable amount. The seeds show anthelmintics, taenicide and diuretic. Oil from the seeds is a nervine tonic. Fruit is largely used by Indians in their curries. The shoots young leaves are used as a pot herb, the seeds are eaten. Dried pulp of the fruit is a remedy in haemoptysis and haemorrhages from the pulmonary organs; it is given in the form of a confection.

Keywords: *Cucurbita maxima*, Glutamic acid, Nervine tonic, Diuretic, Taenicide.

1 INTRODUCTION:

Herbal medicines are currently in demand and their popularity is increasing day by day. About 500 plants with medicinal use are mentioned in ancient literature and around 800 plants have been used in indigenous systems of medicine. India is a vast repository of medicinal plants that are used in traditional medical treatments. WHO too has not systematically evaluated traditional medicines despite the fact that it is used for primary health care by about 80% of the world population. However, in 1991 WHO developed guidelines for the assessment of herbal medicine. Suggestions for herbal medicine standardization are outlined. Safety of some herbal ingredients has been recently called into question, in part because of the identification of adverse events associated with their use and, increasingly, because of the demonstration of clinically relevant interactions between herbs and prescription drugs. But in the last few decades there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin and lesser side effects [1].

The pumpkin (*Cucurbita* spp.), one of the most popular vegetables consumed in the world, has been recently recognized as a functional food. Pumpkin seeds, generally considered agro-industrial waste, are an extraordinarily rich source of bioactive compounds with interesting nutraceutical properties. In recent years, several studies have highlighted the health properties of pumpkin seed oil against many diseases, including hypertension, diabetes, and cancer [2].

These species possess a higher number of proteins, phytosterols, unsaturated fatty acids, vitamins (like carotenoids, tocopherols and microelements (e.g., zinc). Fruits, seeds and leaves from various *Cucurbita* members (pumpkin, watermelon, melon, cucumber squash, gourds, etc.) possess different pharmacological effects [3].

1.1 Botanical aspects

Botanical name: *Cucurbita maxima* Duchesne.

Synonyms: *Cucurbita pepo* var. *maxima* (Duchesne) Delile.

Plant Family: Cucurbitaceae.

Plant Form: Climbers.

Leaves: Ovate, oblong, 5-7 lobed, dentate, cordate, hairy and coarse.

Flowers: Male flowers axillary and solitary, yellow, corolla gamopetalous, campanulate

Fruit: A pepo, very large globose pale yellow-orange.

Time: August-September

Significance: Cultivated everywhere for its fruits which are used as vegetables.

2. PHARMACOLOGICAL ACTIVITIES.

2.1 Anticancer

Anticancer Activity- Anticancer activity of methanol extract of *Cucurbita maxima* against Ehrlich ascites carcinoma. Cancer is a pathological state involving uncontrolled proliferation of tumour cells. The study was carried out to investigate the antitumor potential of MECM (methanol extract of *Cucurbita maximus*) against EAC (Ehrlich Ascites Carcinoma) bearing mice. EAC is a very rapidly growing carcinoma with very aggressive behaviour.

EAC tumour cells in peritoneum were significantly lower in the mice treated with MECM when compared to the tumour control group. These results could indicate either a direct cytotoxic effect of MECM on tumour cells or an indirect local effect, which may involve macrophage activation and vascular permeability inhibition [4].

2.2 Analgesic activity

The acetic acid induced writhing method is an analgesic behavioural observation assessment method that demonstrates a noxious stimulation mouse. The test consists of injecting the 0.7% acetic acid solution intraperitoneally and then observing the animal for specific contraction of body referred as 'writhing'. A comparison of writhing was made between positive control (diclofenac), negative control and test sample given orally 30 minutes prior to acetic acid injection. If the sample possesses analgesic activity, the animal that received the sample will give lower number of writhing than the control [5].

2.3 Antioxidant activity

Spotted on pre-coated silica gel TLC plates and the plates were developed in solvent systems of different polarities (polar, medium polar and non-polar) to resolve polar and non-polar of the extract. The plates were dried at room temperature and were sprayed with 0.02% 1, 1-diphenyl-2-picryl hydrazyl (DPPH) in ethanol. Bleaching of DPPH by the resolved bands was observed for 10 minutes and the colour changes (yellow on purple background) were noted (Sadhu et al., 2003).

DPPH forms deep pink colour when it is dissolved in ethanol. When it is sprayed on the chromatogram of the extract, it forms pale yellow or yellow colour which indicates the presence of antioxidants [6].

The study was undertaken to evaluate in vitro antioxidant activities of petroleum ether, chloroform and methanolic extract of pericarp of *C. maxima*. The activity is shown because of the presence of constituents like steroid/terpenoids, flavonoids, glycosides, tannins, alkaloids and polyphenolic compounds [7].

2.4 Immunogenic Activity

Antigenotoxic spinasterol from *Cucurbita maxima* flowers. The antigenotoxic constituent of squash flowers was isolated by solvent partitioning and repeated vacuum liquid chromatography. The flower of *Cucurbita maximus* contains several sterols which are responsible for the antigenotoxic activity [8].

2.5 Diuretic Activity

Diuretic activity of seeds of *Cucurbita maxima* Duchesne in albino wistar rats. The seeds of *Cucurbita maxima* Duchesne are used traditionally as diuretics and other urinary diseases. The concentration of Na⁺ and K⁺ in urine was determined by flame photometer. The volume of urine and Na⁺ and K⁺ concentration of test group was compared with the control group. The results revealed that the aqueous extract of seeds of *Cucurbita maxima* showed significant increase in urine volume when compared to control group. But the excretion of Na⁺

and K⁺ in urine was not significantly increased in drug treated group when compared to control group. The aqueous extract of *Cucurbita maxima* showed significant diuretic activity [10].

2.6 Antidiabetic Activity

Pumpkin is most widely studied with regard to its antidiabetic effect and the fruit pulp and seeds of this plant have shown hypoglycemic activity in normal animals and alloxan-induced diabetic rats and rabbits. Both common and sugar-removed pumpkin powder showed a significant reduction in blood glucose and an increase in plasma insulin and protected the diabetic nephropathy [66–68]. Reduction on blood glucose, serum total cholesterol and triglyceride was observed in alloxan induced diabetic rabbits applied with pumpkin powder [11].

2.7 Hypoglycemic activity

Water-extracted pumpkin polysaccharides was demonstrated and excelled Glibenclamide in alloxan-induced diabetic rats [12].

2.8 Antihyperglycemic activity

Antihyperglycemic activity of water-extracted pumpkin polysaccharides was observed in normal rats. Crude polysaccharide from pumpkin fruit was reported to reduce branched chain amino acid and have better effect on normal rats than on alloxan-induced diabetic rats.

We report that protein-bound polysaccharide can obviously increase the levels of serum insulin, reduce the blood glucose levels and improve tolerance of glucose. The hypoglycemic effect of big dose protein-bound polysaccharide group (1000 mg/kg body weight) excelled that of small dose protein-bound polysaccharide group (500 mg/kg body weight) and Glibenclamide group.

Eighteen amino acids were identified to be components of the protein bound polysaccharide but the relationship between the contents of amino acids and hypoglycemic activity of pumpkin protein-bound polysaccharide is not clear. We also found that the oil from ungerminated pumpkin seeds and proteins from germinated pumpkin seeds possessed hypoglycemic activity [13].

2.9 Antibacterial activity.

There were reports on broad-spectrum antimicrobial activity of pumpkin extracts. Pumpkin oil inhibits *Acinetobacter baumannii*, *Aeromonas veronii*, *Biogroup sobria*, *Candida albicans*, *Enterococcus faecalis*, *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Salmonella enterica* subsp. *enterica* serotype typhimurium, *Serratia marcescens* and *Staphylococcus aureus* at the concentration of 2.0% (v/v). A peptide (MW: 8 kDa) from pumpkin seeds was proved to inhibit *B. cinerea*, *F. oxysporum* and *M. arachidicola* at a dose of 375 ug and to exerted an inhibitory effect on cell-free translation with an IC₅₀ of 1.2 μM [14].

2.10 Anthelmintic

Pumpkin seed was found to be a vermifuge and was eaten fresh or roasted for the relief of abdominal cramps and distension due to intestinal worms. ([http://www.pfaf.org/database/plants.php?Cucurbita + moschata](http://www.pfaf.org/database/plants.php?Cucurbita+moschata)). The effect of water extracts of pumpkin seeds in the treatment of puppies experimentally infected with heterophyiasis could obtain promising results and combined extracts of areca nut and pumpkin seeds gave an excellent result than when given either extract alone [100]. An Anthelmintic effect was reported at the minimum inhibitory concentration of 23 g of pumpkin seed in 100 ml of distilled water in preclinical studies [15].

3. Conclusion

The pumpkin seeds contained 39.25% crude protein, 27.83% crude oil, 4.59% ash, and 16.84% crude fibre; the corresponding values for the kernels were 39.22, 43.69, 5.14, and 2.13%, respectively. Pumpkin seed kernels contained moderate concentrations of minerals, especially P, Mg, and K. The amino acid profiles indicate that methionine and tryptophan were the most limiting amino acids, while arginine, glutamic, and aspartic acids were the most plentiful amino acids. The high oil and protein content makes the seed a potential source of commercial vegetable oil and protein. As an anthelmintic, especially against worms of the genera *Ascaris*,

Taenia and Oxiuris. Water extracts of areca nut and pumpkin seeds are used for the treatment of heterophyiasis. Pumpkin seeds are also employed as a mild diuretic and to treat childhood enuresis.

4. REFERENCE

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