OVERVIEW ON 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 anthelminitic, 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.

Pumpkin is a creeper and is extensively found very frequently on the roofs of houses all over India. The parts which are used are seed, pulp, and fruit stalk. The fruits of pumpkin are large weighing 8 to 10 kg, sometimes up to 20kg. The medium sized fruit of “Arka Chandan”, an old variety from Indian institute of horticulture research, Hessaraghatta, weighs 2 to 3 kg and has orange color flesh. Various plants have been used already as nootropic plants. In Cucurbita maximus also having some constituent this may be responsible for the memory enhancing activity. Pumpkin seeds contain many valuable functional components and have been traditionally used for herbal, therapeutic as well as clinical application. Pumpkin seeds have been used as safe deworming and diuretic agents, and the seed oil as a nervine tonic.

Pumpkin seed oil has a strong antioxidant property, and has been recognized for several health benefits such as prevention of the growth and reduction of the size of prostate, reduction of bladder and urethral pressure and improving bladder compliance, alleviation of diabetes by promoting hypoglycemic activity, and lowering level of gastric, breast, lung, and colorectal cancer.

Pumpkin is cultivated throughout India and in most warm region of the world.

1.2 Taxonomical position of Cucurbita maximus

Division: Spermatophyta; Sub-Division: Angiospermae; Class: Dicotyledonae; Sub-Class: Polypetalae; Series: Caliciflorae; Order: Passiflorales; Family: Cucurbitaceae; Genus: Cucurbita; Species: maximus

1.3 Description of plant: Pumpkin leaves are orbicular in outline and not pointed or much lobed, with deep sinus at base.
In general, pumpkin stems are more rigid, prickly, and angular (with an approximate five-degree angle) than squash stems, which are generally softer, more rounded, and more flared where joined to the fruit.

The pumpkin varies greatly in shape, ranging from oblate to oblong. The rind is smooth and usually lightly ribbed. Although pumpkins are usually orange or yellow, some fruits are dark green, pale green, orange-yellow, white, red and gray.

Leaves nearly orbicular in outline and not pointed or much lobed but with deep sinus at base. Corolla prevailingy with soft abtuse more or less crinkly revolute or hanging lobes, the tube with parallel sides or bulging at base, peduncle short, spongy, nearly cylindrical, not expanded at attachment to fruit.

**1.4 Chemical constituents:** The chemical constituent such as 24 β ethyl 5 α cholesta- 7, 22, 25- trien-3 β ol, 24 β- ethyl-5α- cholesta-7, 25- dien- 3 β ol, avenasterol, spinasterol, 24 dihydrosinasterol, 24-€ methyl lathosterol and 25(27)- dehydrofungisterol can be obtained from seeds. 25-(27) dehydroporiferasterol, clerosterol, isofucosterol, stigmasterol, sitosterol, campesterol, and codisterol, isolated from seeds. 13 C-NMR of chondrillasterol studied, isolation of two new carotenoids-cucubitaxanthins A and B and their structure elucidation. Similar to other cucurbitaceous plant it contains saponin, fixed oil, resin, protein, sugar and starch. The fresh vegetable contains 89.50 % moisture and the completely dried material contains ethereal extract of albuminoids 6.12% (containing nitrogen 0.98%), soluble carbohydrates 77.33%, woody fifer 8.55%, and ash 7.00%. The seeds collected from Pakistan yields an oil (39.1%) having the following physic chemical constituents, the3 fatty acid composition of oil is as follows, myristic, palmitic, stearic, oleic and linoleic acid 30.3%. seeds contains sterol glycosides and sterols fatty acid esters which showed antitumor activity in mouse. The alcoholic and etheral extracts of seeds were found to be active against the nematode Fasciolopsis buski, in vitro and in vivo test systems. The therapeutic efficacy of the seeds in the treatment of nematodiasis in calves below 6 month of age was found to be 40.6% by the oral route. Seeds are reported to be used in Brazil as vermifuge and are non toxic. Chemical composition of the leaves is as follows, moisture 85.9%, lipid 1.75%, protein 4.58% and ash 1.82%. Composition of lipid portion is as follows, non polar lipids 45.1%, glycolipids 24.4%, and phospholipids 30.5%. The major fatty acid present in the lipid was linolenic. The leaves contain (mg/100g) calcium 36.38%, magnesium 38.80, iron 2.04%, zinc 0.76%, copper 0.42%. An esterase was purified from the fruits.

**1.5 Medicinal uses of Cucurbita maximus**
The fruit has flavor; diuretic, tonic; allays thirst; cures “kapha”; indigestible; increases “vata”; causes biliousness and loss of appetite (Ayurveda).
The seeds are used as a taenicide. The oil is prescribed as a nervine tonic. The pulp of the fruit is often used as poultice. The seeds are an old popular remedy for tapeworm Malta, generally considered as very effective and safe.

The fruit is considered as sedative, emollient, and refrigerant. The pulp is applied to burns and scalds, inflammations, abscesses, and boils; it is also prescribed in migraine and neuralgia. The seeds are used as anthelmintics, more especially as taenicides.

2. Known pharmacological activities

2.1 Anticancer Activity - Anticancer activity of methanol extract of *Cucurbita maxima* against Ehrlich ascites carcinoma. Cancer is a pathological state involving uncontrolled proliferation of tumor cells. The study was carried out to investigate the antitumor potential of MECM (methanol extract of *Cucurbita maxima*) against EAC (Ehrlich Ascites Carcinoma) bearing mice. EAC is a very rapidly growing carcinoma with very aggressive behavior. It is able to grow in almost all strains of mice. The Ehrlich Ascitic tumor implantation induces *per se* a local inflammatory reaction, with increasing vascular permeability, which results in an intense edema formation, cellular migration, and a progressive ascitic fluid formation and accumulation. The ascitic fluid is essential for tumor growth, since it constitutes a direct nutritional source for tumor cells. MECM treatment significantly reduced tumor volume probably by lowering the ascitic nutritional fluid volume. Further, the packed cell volume and the number of viable EAC tumor cells in peritoneum were significantly lower in the mice treated with MECM when compared to the tumor control group. These results could indicate either a direct cytotoxic effect of MECM on tumor cells or an indirect local effect, which may involve macrophage activation and vascular permeability inhibition.

2.2 Antiobesity Activity - Potentiative Activity Of *Cucurbita Maxima* Seed Extract With *Beta Vulgaris* & *Smilax Regelii* Root Extract To Reduce Extra Fats From The Body. Root Extracts of *Beta vulgaris*; *Smilax regelii*; & *Cucurbita maxima*. seed is effective for reducing fats individually as well as its combination effort through different mechanism. First one is used to flush out fats from the system and the second & third is used to regulate thyroxine. *Cucurbita maxima*. seed sample reach of manganese having tendency to produce thyroxine get potentiate with *Smilax regelii* extract sample iodine reach, produce thyroxine to regulate fat in body, is additionally benifited with *Beta vulgaris* which flush out fat from tissue and blood corpuscle.

2.3 Antidiabetic Activity – Antidiabetic activity of *Cucurbita maxima* aerial parts. Streptozocin, a glucose analogue is a potent diabetogenic agent and widely used for inducing diabetes in a variety of animals by the selective degeneration and necrosis of pancreatic cells. The study indicates that MECM significantly reduced the elevated fasting blood glucose level with to those of diabetic control animals.

2.4 Hepatoprotective Activity - Evaluation Of Hepatoprotective Activity Of *Cucurbita Maxima* Aerial Parts. The study was to investigate the hepatoprotective activity of methanol extract of *Cucurbita maxima* Duchesne (Cucurbitaceae) (MECM) against carbon-tetrachloride (CCl₄) induced hepatotoxicity. Liver damage induced by CCl₄ is a commonly widely used model for the screening of hepatoprotective drugs. CCl₄ is biotransformed by the cytochrome P- 450 system to produce the trichloromethyl free radical (CCl₃‡), and this further reacts very rapidly with oxygen to yield a highly reactive trichloromethyl peroxide radical (CCl₃OO‡). This free radical in turn covalently binds to cell membranes and organelle to elicit lipid peroxidation, also disturbs Ca²⁺ homeostasis, and finally results in cell death. Estimating the activities of serum marker enzymes, like SGOT, SGPT and ALP can make assessment of liver function. When liver cell plasma membrane is damaged, a variety of enzymes normally located in the cytosol, are released in to the blood stream. Their estimation in the serum is a useful quantitative marker of the extent and type of hepatocellular damage.

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.
2.6 Antioxidant activity- In vitro Antioxidant activity of pericarp of *Cucurbita maxima* Duch. Ex Lam.: 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/terpinoids, flavonoids, glycosides, tannins, alkaloids and polyphenolic compounds.

2.7 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 antigenic activity.

2.8 Cardiotonic Activity – Preliminary Pharmacological and Anticestodal Screening of *Cucurbita maxima*. Preliminary pharmacological screening with crude extract of *Cucurbita maxima* seeds revealed that it produces positive ionotropic effect on frog heart and a slight transient rise in the mean arterial blood pressure in dog which was not dose dependent. Study of electrocardiogram in dog revealed elevation of ‘QRS’ complex and decrease in heart rate. The extract have beta adrenergic stimulant activity so *Cucurbita maxima* shows cardiotonic activity.

Conclusion
The pumpkin seeds contained 39.25% crude protein, 27.83% crude oil, 4.59% ash, and 16.84% crude fiber; 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. The seeds are used against benign prostatic hyperplasia (BPH), sometimes in conjunction with other herbs, especially *Saw Palmetto* (*Serenoa repens*) seed extract. To treat prostate cancer. To prevent stomach cancer. Against cadmium toxicity. As a mild laxative To treat pulmonary ailments. Pumpkin seed oil has been used in combination with kava (*Piper methysticum* Forst.) to treat irritable bladder.

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