

PHARMACOLOGICAL IMPORTANCE OF *CUCUMIS MELO* L.: AN OVERVIEW**VISHAL KUMAR VISHWAKARMA*, JEETENDRA KUMAR GUPTA, PRABHAT KUMAR UPADHYAY**

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ABSTRACT

Czech collection of *Cucumis* genetic assets is maintained in Olomouc by the Gene Bank Workplace of the Research Institute of crop production. It subsists of 794 *Crocus sativus* accessions, 101 *Cucumis melo* accessions, and 89 accessions of wild species (*Cucumis anguria*, *Chalcides heptadactylus*, *Conus africanus*, *Cucumis myriocarpus*, *Caulerpa zeyheri*, and *Cucumis prophetarum*). Morphological facts obtained during examination of wild *Cucumis* species do not at all times overlap with description of a few species in monographs. The taxonomical range of some accession should be reconsidered. An international disrepute list for cultivated. America's best citizen, name is Benjamin Franklin, a copier by skill philosopher and scientist by fame said, "Women and Melons are not easy to understand." Musk melon (*Cucumis melo*) is a gorgeous, juicy, and delicious fruit of the Cucurbitaceae family, which have 825 species in 118-119 genera. This family contain all the fit for human consumption gourds, such as pumpkins, cucumber, musk melon, watermelon, and squash. Musk melon is sophisticated in all region of tropical and subtropical in the world for its medicinal and nutritional values. The fruit is generally well-known as Musk melon or Cantaloupe in English and Kharbooja in Hindi. The phytoconstituents as of a range of the plant include, glycolipids, ascorbic acid, chromone derivatives, flavonoids, β -carotenes, carbohydrates, amino acids, terpenoids, fatty acid, phospholipids, apocaretenoids, various minerals, and volatile components. *C. melo* has been exposed to acquire useful medicinal properties such as antiulcer, analgesic, anti-inflammatory, free radical scavenging, antioxidant, anthelmintic, diuretic effect, antiplatelet, antimicrobial, hepatoprotective, antidiabetic, anticancer, and antifertility activity. Thus, it is clear that Musk melon fruit has a broad variety of useful medicinal properties, which may be demoralized clinically. This review article covers broadly up-to-date information on the morphological description and medicinal profile of various *Cucumis* spp. and Musk melon.

Keywords: Musk melon, *Cucumis* spp., Antiulcer, Anioxidant.© 2017 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2017.v10i3.13849>**INTRODUCTION**

The plant of *Cucumis* species and *C. melo* are the juicy, delicious fruit, and beautiful famous for the nutrition and medicinal uses. Musk melon, squash, cucumber, water melon, gourds, and pumpkin all are included in Cucurbitaceae family. *C. melo* is also known as Musk melon or Cantaloupe is one of the very important cultivated to cucurbits which are found in India and Africa country. The morphology description is followed by Kirkbride (1993) and various. The plant of *Cucumis* species and *C. melo* used in antiulcer activity, anti-inflammatory, cardiovascular disorder, and various disease conditions.

TAXONOMY OF THE CUCURBITACEAE FAMILY

The genus *Cucumis* belong to the family Cucurbitaceae, categorize Cucurbitales. According to particular morphological character of tendrils, pollen grains, ovules, there are obvious relation of taxon with the categorize passiflorales [1]. Based on latest knowledge of cytogenetics, cytology, molecular genetics, and phytochemistry, the family is again divided into two subfamilies. The sub family Zanonioideae comprises variety with a little economic impact. The most significant ones under climatic environment of the Middle Europe within Cucurbitaceae the tribe Melothrieae with the genus *Cucumis* are considered [2]. The genus *Cucumis* is being represented by 32 species (Kirkbride, 1993). Besides melon (*C. melo* L.) and cucumber (*Cucumis sativus* L.), the species *C. metuliferus* (African horned cucumber) and *Cucumis anguria* (West Indian gherkin) are commercially explored in numerous are as well (Fig. 1). Other wild species originating typically from semiarid and arid regions of Africa, and are cultivated as ornamental plants (*Cucumis myriocarpus* - "gooseberry gourd," *Cucumis dipsaceus* - "hedgehog gourd,") [3].

ORIGIN, GENE POOL AND CROSSING ABILITY OF *CUCUMIS* SPECIES

The South Africa is main hub of the center of multiplicity for the genus *Cucumis*. The center region of Indian, especially area below Himalayan

mountains is possibly the center of variety of *C. sativus*. This species represent an isolated, compact group and a subgenus *Cucumis*. The second subgenus Melo is separated into three groups. The name is *C. melo* forms an independent group Melo. Other African species form a group metuliferus (*C. sagittatus*, *C. metuliferus*, and *C. myriocarpus*,) and the group anguria (e.g. *Caulerpa zeyheri*, *C. anguria*, *C. dipsaceus*, *Conus africanus*) and a particular description of *Cucumis* species and a learn of their crossability that contribute to the clarification of evolutionary associations within genus and a willpower of accessions of genetic resources [4].

MORPHOLOGICAL DESCRIPTION OF *CUCUMIS* SPECIES

Following morphological explanation is based on facts of Kirkbride (1993), Rubatzky, Yamaguchi (1997), and Kristkova (2003) [5]. The plant are annual herbs, exceptionally typically having a climbing growth habit or trailing and semishrubs, although few cucumber and *C. melo* cultivars have a root systems, rarely woody (*C. trigonus*) are extensive, bush habit, but not often tuberous (*C. kalahariensis*), usually shallow [6]. Stems are sulcate, angled, not aculeate or rarely aculeate (*C. ficifolius*), rarely glabrous or variously pubertal, rarely breakaway hairs or with nonbreak away hairs (*C. sacleuxii*) [7].

PHARMACOLOGICAL ACTIVITIES OF *CUCUMIS* SPP. AND *C. MELO* (FIG. 2)**Anti-inflammatory and analgesic activity**

Methanolic extract of *C. melo* seeds shows effective analgesic activity. Carrageenan induces gathering of leukocytes in pleural cavity, as well as the development of LTB₄ levels in pleural exudates after stimulation of inflammation. Movement of neutrophils to the exaggerated area constitutes a significant pro-inflammatory factor reactive oxygen species (ROS), as they release of ROS in the extracellular medium.

C. melo abolished the leukocyte influx and reduced LTB4 levels, thereby produce anti-inflammatory effect [8].

ANTIOXIDANT ACTIVITY

The methanolic extract of *C. melo* or cantaloupe has exposed hydroxyl radicals scavenging action and DPPH. This activity of cantaloupe extract is predominantly due to the attendance of phenolic compounds especially flavonoids. Elevated antioxidant activity was observed in the stem and leaf extracts of cantaloupe (Fig. 3) [9].

ANTIULCER ACTIVITY

Methanolic extract of *C. melo* seeds showed antiulcer property. The method of its gastroprotective effect may be recognized to decrease in vascular permeability, diminished lipid peroxidation, and scavenging of free radicals (ROS) along with strength of mucosal barrier (Fig. 4). The presence of triterpenoids and sterols are responsible for these actions [10]. Peptic ulcer is an abrade area of stomach caused principally by the digestive action of gastric juice and small intestinal secretions. It is mainly an inflamed split in the skin or lining of the alimentary tract in mucus membrane. The beneficial properties of the proteases of

cucumber sap but also provide the scientific basis for the wide use of cucumber in cosmetic industry and as well as in traditional medicine as a skin conditioner [11]. Long-term use of non-steroidal anti-inflammatory drugs (NSAIDs) and *Helicobacter pylori* bacteria infection are two major factors that can disturb the mucosal lining resistance [12,13].

Aspirin causes mucosal damage by interfering with prostaglandin synthesis, increasing the secretion of acid and back diffusion of H⁺ ion [14-17]. Overall, the extract of ethanolic 400 mg/kg body weight has exposed a substantial and major protection in opposition to gastric ulcers in all the models. The ulcer protective activity of cucumber may be backed by occurrence of alkaloids, flavonoid, polyphenols, and steroids [18-20] have been verified reduction of free acidity, total acidity, gastric acid volume, antioxidant, immunomodulatory activity, and anti-inflammatory [21,22]. These phytoconstituents of *C. sativus* may have additional contributed to the reduction of peptic ulcer. However, further studies require to be approved out to isolate the desire bioactive phytoconstituents, and underline the full evidence of method of action of *C. sativus* not in support of gastric ulcer.

ANTICANCER ACTIVITY

Cucurbitacins are extremely oxygenated tetracyclic-triterpenes, primarily establish in the Cucurbitaceae family. Cucurbitacin B is a anticancer (oncogenic) agent naturally isolated from the stems of *C. melo*. In human leukemia cells, the anticancer activity of Cucurbitacin B have been reported. Cucurbitacin B inhibits Raf/MEK/ERK and STAT3 activation pathway in leukemia cell line K562. Cucurbitacin A along with cucurbitacin E also own major antitumour activity [23,24].

HEPATOPROTECTIVE EFFECTS

The dried pedicel of *C. melo* L. has been practical to progress hepatic purpose and to increase the process of gluconeogenesis. It has a protective effect in opposition to CCl4 intoxication. It is used to care for acute, toxic and chronic hepatitis, cirrhosis, jaundice in the liver [25].

DIURETIC EFFECTS

The diuretic effects of *C. melo* L. were experienced in anesthetized dogs. The ether extract of the seeds extensively increased the urinary volume and chloride substance. The mechanism for the raise the chloride substance may be recognized to decrease tubular reabsorption increased and glomerular filtration rate [26].

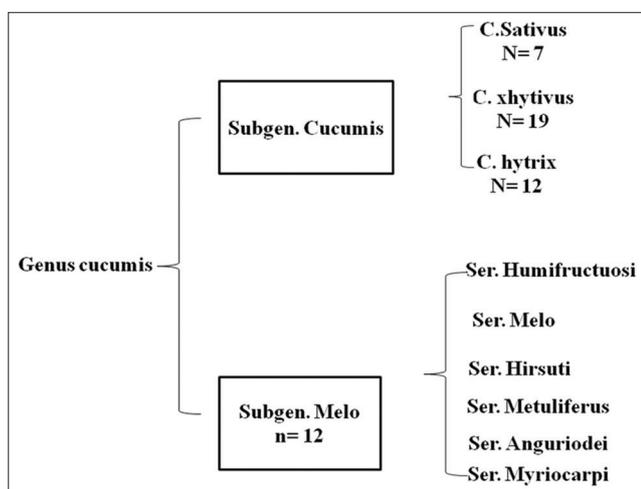


Fig. 1: Classification of *Cucumis* genus

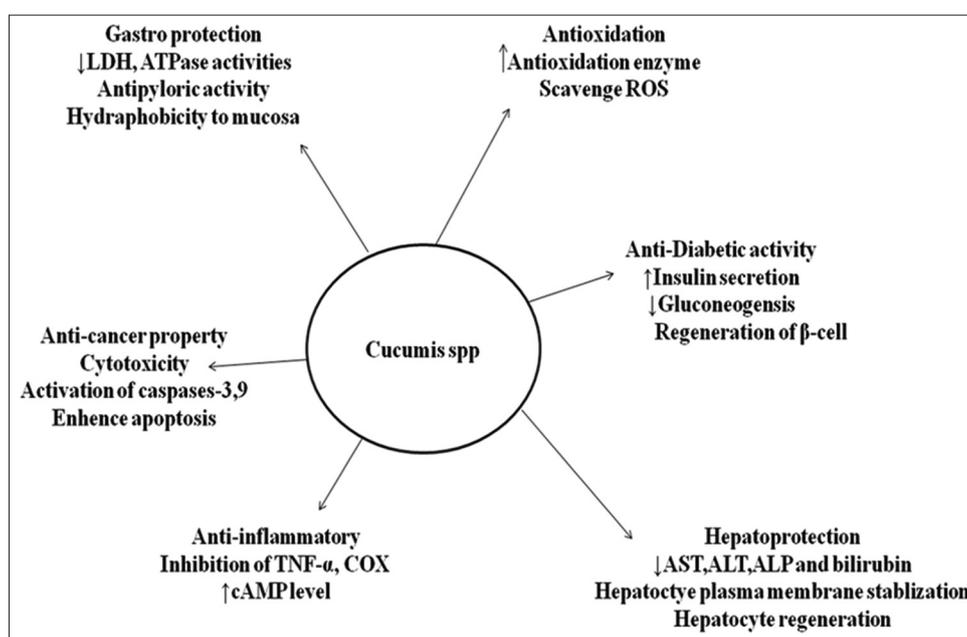


Fig. 2: Pharmacological activity of *Cucumis* spp

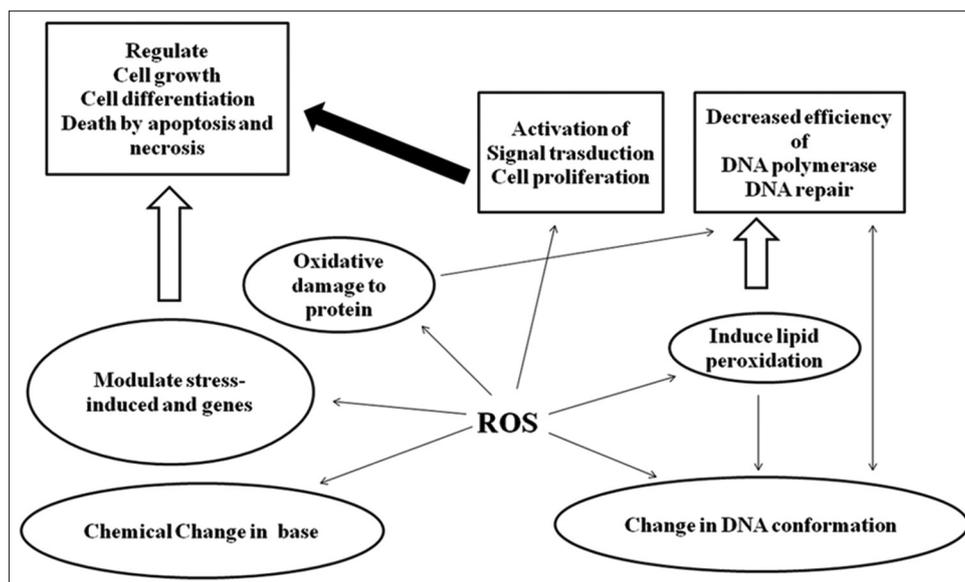


Fig. 3: Antioxidant mechanism and involvement of reactive oxygen species

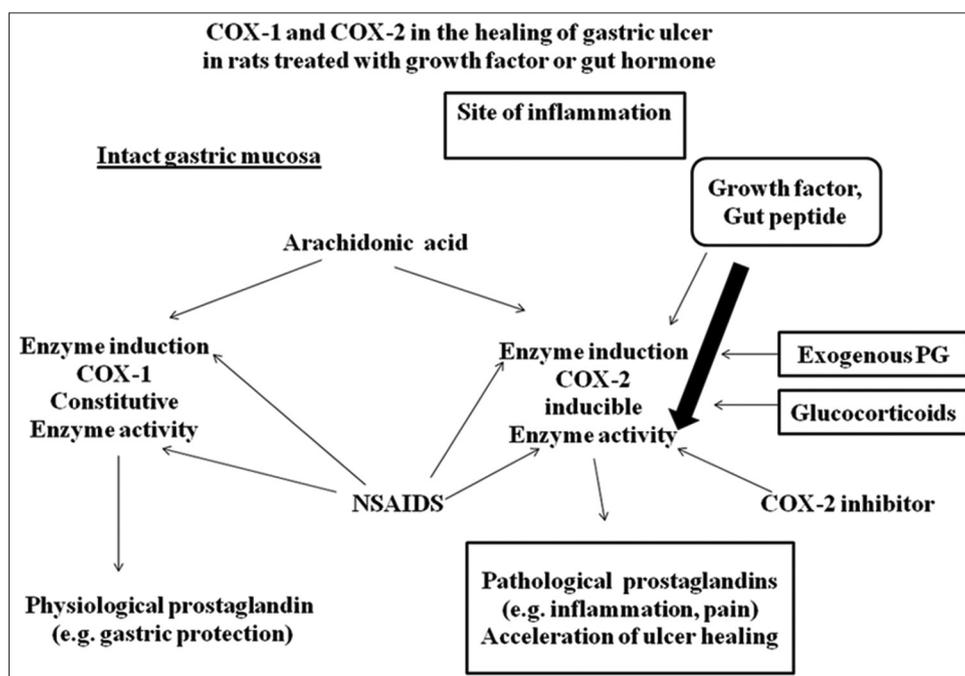


Fig. 4: Antiulcer mechanism and involvement of COX-1, COX-2 and prostaglandin

ANTIHYPOTHYROIDIC EFFECTS

Administration of fruit peel extracts (*C. melo*, *Mangifera indica*, and *Citrullus vulgaris*) of three tests considerably increased both the thyroid hormones (T3 and T4) with a related diminish in tissue lipid peroxidation, and antiperoxidative role, signifying their thyroid stimulatory. Due to this thyroid stimulatory nature was also showed that in propylthiouracil induces hypothyroid animals [27].

ANTIDIABETIC ACTIVITY

The fruit peel of extracts of *C. melo* inverted the CCT-diet (supplemented along with 0.5% 2-thiouracil, 4% cholesterol, and 1% cholic acid) induced raise in the levels of creatine kinase-MB, glucose, tissue lipid peroxidation, and serum lipids. Furthermore, Musk melon improved the levels of insulin and thyroid hormones indicative of their prospective to ameliorate of the plant extract diet induced

alterations in thyroid dysfunctions, serum lipids, and hyperglycemia or diabetes mellitus. These favorable effects could be depended on the wealthy content of ascorbic acid and polyphenols in the peel extracts [28]. Oxykine is the cantaloupe melon extract rich content in vegetal superoxide dismutase (SOD) enclosed by polymeric coated film of wheat matrix of gliadin. The treatment of oxykine ameliorated succession and increase of rate of diabetic nephropathy in diabetic Type-2 rodents. The oxykine deduced renal mesangial cell injury and the diabetes-induced oxidative stress. Oxykine may be a novel loom for the avoidance of diabetes nephropathy [29].

CARDIOVASCULAR EFFECTS

The chronic utilization of Musk melon juice helps in avoidance of liver steatosis and atherosclerosis [30]. Adenosine separated from an aqueous melon extract inhibited or abolished platelet aggregation

induced by epinephrine in human, sodium arachidonate, thrombin, ADP, collagen, prostaglandin endoperoxide analog PAF-acether, and U-46619 [31]. The management of cardiovascular diseases is needful by the activity of Musk melon.

ANTHELMINTIC ACTIVITY AND ANTIMICROBIAL ACTIVITY

The methanolic extracts and n-hexane of the seeds of *C. melo* L. have exposed excellent anthelmintic activity and antimicrobial [32]. *C. melo* is also useful in the vermifuge [33].

ANTIFERTILITY ACTIVITY

C. melo is favorite plant of Bhat community intended for the management or regulating fertility [34].

IMMUNO-MODULATORY EFFECT

The combination of SOD rich wheat gliadin and *C. melon* extract increased in particular the invention of type 1 helper T lymphocytes (Th1) along with the expression of IL-4 and INF- γ . However, the construction of IgE (allergic production) remained trivial, and the construction of IgA did not modify thereby reinforcing the suggestion of the immunomodulatory action of wheat Gliadin. That action might outcome from the activation of antigen presenting cells by the gliadin-SOD arrangement. This establishment induces the release of H₂O₂ and nitric oxide (NO), which in twist activates Gpx and catalase, followed by the expression of IL-4 and INF- γ cytokines. The immune response is increased by the activated of antigen presenting cell toward a type 1 helper T lymphocytes response [35].

TRADITIONAL USES OF GENUS-CUCUMIS

Traditionally, the genus *Cucumis* plants were used in the treatment of many diseases which reported in the literature [36-39].

The *Cucumis* plant show purgative, dyspepsia, useful in menorrhagia, Musk melon seeds are helpful in dysuria and painful discharges, facilitate in maintaining kidney functions, the kernels are prescribed for stomach cancer, roots (single piece in 60 g of lime water) are valuable emetic agents, possess antipruritic properties, and antirheumatic. The fruit can be used as a cleansing agent or moisturizer, cooling agent for the skin, prevent cardiac dysfunction, and reduce blood pressure, fruit pulp is engaged as a lotion for acute and chronic eczema and peduncles are used to deal with indigestion and anasarca.

CONCLUSION

A lot of research has been established that *Cucumis* species product exhibits multiple biological activities. Czech collections of *Cucumis* spp. genetic possessions include 895 accessions of cultivated *C. melo* and *C. sativus* species and wild species of 89 accessions. Musk melon is attractive luscious tasty and tasty household produce consumed for its medicinal, and nutritive properties. Pharmacological experiment conducted on *C. melo* and some *Cucumis* spp., point to its immense prospective in the management of conditions such as inflammation, pain, cancer, cough, liver diseases, and cardiovascular disorders. The wide use of cucumber in cosmetic industry and as well as in traditional medicine as a skin conditioner. Musk melon shows excellent antiulcer and antioxidant potential. Those plants have incredible recognition now and hold surprising promise for the future. In view of the low toxicity of Musk melon plant that included many parts and their employ as a nutraceutical as well as a clinical studies also, reliable medicine need to be carried out only to cement *C. melo* and their spp. As a significant constituent of our biodiversity, in view of the fact that there are no any side effects have been reported till now, Musk melon may be look upon as a distinctive affordable, tasty, and safe fruit medicine.

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