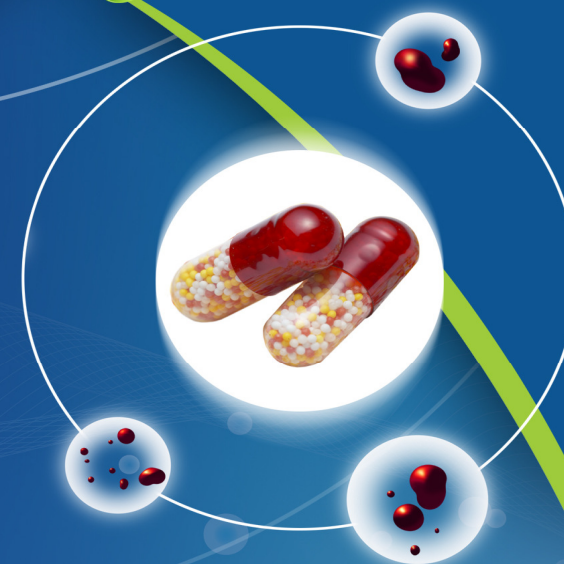




**BI
MONTHLY**

Asian Journal of Pharmaceutical Research And Development

(An International Peer Reviewed
Journal of Pharmaceutical
Research and Development)



Volume - 01

Issue - 01

JAN-FEB 2013

**website: www.ajprd.com
editor@ajprd.com**



Review Article

PHARMACOLOGICAL ACTIVITY OF *CUCUMIS SATIVUS* L. – A COMPLETE OVERVIEW**Jony Mallik*, Priyanka Das, Sourav Das**Department of Pharmacy, Southern University Bangladesh, Chittagong, **Bangladesh****Received: 21-01-13****Revised and Accepted: 30 January 2013****ABSTRACT**

Cucumber (*Cucumis sativus* L.) belongs to the family cucurbitaceae. There are 30 *Cucumis* species found in Asia and Africa. Cucumber is a native to the tropics and is one of the oldest cultivated vegetable crops. It is known in the history for over 3,000 years (Yawalkar, 1985). *Cucumis sativus* (CS) is growing widely throughout the Bangladesh (Forests of Gazipur, Sherpur, Chittagong, Chittagong Hill Tracts, Cox's Bazar, Tangail and planted elsewhere), Indian subcontinent, Sri Lanka. Apparently cucumbers have originated in the foothills of the Himalayan mountains, just north of the Bay of Bengal, the area which is now primarily occupied by Bangladesh. While there does not seem to be any wild cucumbers present in the area today, scientists have identified a small bitter fruit of the squash family, which is thought to have brought forth the cucumber. Recent investigations led to the assumption that cucumbers may have started off on the African continent, however fossils, which could substantiate such claims have not yet been found. Fact is that cucumbers have already been widely cultivated in the past, which is evident from written records in many different cultures. Records show that cucumbers were already grown as far East as China as early as 2,000 years before the Christian Era. The present article attempts to provide comprehensive information on pharmacological properties of *Cucumis sativus* for further research. All the information were collect from the published research paper on *Cucumis sativus* as for the sake of future research on it.

Key Words: Pharmacology, *Cucumis sativus*, Traditional system of medicine, Cucurbitaceae.

INTRODUCTION

A plant which has active constituents of medicinal properties and is used to treat disease/illness in different systems of medicine or traditionally used for the treatment of disease/illness is considered as medicinal plant. Plants have been used as medicines from the ancient time.

Medicinal plants are widely and successfully used on every continent. In Asia, the practice of herbal medicine is extremely well established and documented. As a result, most of the medicinal plants that have international recognition come from this region. Plants, plant parts and plant products served as the materials for the preparation of medicine and these medicinal plants and plant parts constitute an important natural wealth of a country. They play a significant role in primary health care service to rural people.

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Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions, and to defend against attack from predators such as insects, fungi and herbivorous mammals. Many of these phytochemicals have beneficial effects on long-term health when consumed by humans, and can be used to effectively treat human diseases. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total. Chemical compounds in plants mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines, but also gives them the same potential to cause harmful side effects. The use of plants as medicines predates written human history. Ethnobotany (the study of traditional human uses of plants) is recognized as an effective way to discover future medicines. In 2001, researchers identified 122 compounds used in modern medicine which were derived from "ethnomedical" plant sources; 80% of these have had an ethnomedical use identical or related to the current use of the active elements of the plant. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine, and opium. The use of herbs to treat disease is almost universal among non-industrialized societies, and is often more affordable than purchasing expensive modern pharmaceuticals. The World Health

Organization (WHO) estimates that 80 percent of the populations of some Asian and African countries presently use herbal medicine for some aspect of primary health care. Studies in the United States and Europe have shown that their use is less common in clinical settings, but has become increasingly more in recent years as scientific evidence about the effectiveness of herbal medicine has become more widely available.

PLANT DESCRIPTION

Cucumbers (*Cucumis sativus*) are botanically categorized as berries, which are available in many different sizes shapes and colors. They range from thick, stubby little fruits (10 - 12 cm long) to Dutch greenhouse varieties (of up to 50 cm long). The most popular variety is the long smooth salad cucumber which has a smooth, dark-green skin. Its little brother, the "gherkin" is actually a cucumber that has been harvested when little and pickled in brine. The true gherkin is a different species (*Cucumis anguria*), which is primarily grown in the West Indies. Cucumber may not contain a lot of food value, but they make up this lack of nutrients with a wide variety of healthy substances. They were already used in ancient times to dissolve stones caused by uric acid. Their cleansing effect on the intestines, kidneys, lung and skins was also known. People suffering from stomach or liver diseases also benefit from the consumption of cucumbers. They have been known to cure some headaches, bleeding, dizziness, and pale skin. Cucumber juice contains a substance, which promotes blood circulation of the skin. It is for this reason that it is widely used in cosmetics.



Figure 1: Fruits of *Cucumis sativus*



Figure 2: Flowering tops of *Cucumis sativus*

TRADITIONAL USES

Fruits are laxative, astringent, anthelmintic and antipyretic; useful in hepatitis, bronchitis, asthma, dyspepsia, piles, diarrhoea, coughs hoarseness of voice, eye diseases and scorpionsting; used as a hair tonic. Decoction of the green fruit is used for cough. Pulp of the fruit is useful in dysenteric-diarrhoea, dropsy, piles and leprosy. Half ripe fruit is used as purgative. Kernel of the fruit is narcotic. Fruits are used in menstrual disorder in Khagrachari. Seed oil is used in rheumatism. Gum of the bark is demulcent and purgative. The triterpenoid present in the fruits possess significant antimicrobial activity. Kernel oil has purgative

action and its prolonged use was well tolerated in mice. [1]

PHARMACOLOGICAL ACTIVITIES

Anti bacterial activity

Ankita Sood et al was conducted the antimicrobial activity of CS against 4 human microbial pathogens. Antimicrobial assay was performed by Agar well diffusion method.. Specific concentration of seed extract was showed highest zone of inhibition against *S. aureus*. These pathogens were highly sensitive to the methanol extract also except *E. coli* (enteropathogen) and *P. aeruginosa*. Finally they concluded that CS seeds possess potential broad

spectrum antimicrobial activity. [2-3]

Antifungal activity

Ankita Sood *et al* was conducted the antifungal activity of CS against two potent fungus. Finally they concluded that CS seeds possesses potential antifungal activity. [2-3]

Jony Mallik *et al* was performed an study on the antifungal activity of the ethanolic extracts of *Cucumis sativus*. The antifungal potentials of the ethanol extract of cucumis sativus Linn. (30µg/disc) were assessed against six fungus. The results (diameter of zone of inhibition) were compared with the activity of the standard drug, Griseofulvin (30µg/disc). At 80µg/disc, the ethanol extracts of *Cucumis sativus* Linn. [4]

Cytotoxic activity

Jony Mallik *et al* were performed an study on the cytotoxic activity of the ethanolic extracts of *Cucumis sativus*. In brine shrimp lethality bioassay, the Ethanol extract showed lethality against the brine shrimp nauplii. It showed different mortality rate at different concentrations. From the plot of percent mortality versus log concentration on the graph paper, LC50 (µg/ml) and LC90 (µg/ml) of the ethanol extract of *Cucumis sativus* Linn. were deduced respectively. [4]

Antacid & Carminative activity

Swapnil Sharma *et al* was investigate with the aqueous extract fruit pulp of *C. sativa* significantly neutralized acid and showed resistance against change in pH and also illustrate good carminative potential. The extract of *C. sativa*, has shown to possess significant carminative and antacid property. [5]

Activity against ulcerative colitis

Patil *et al* was describes after an authentic investigation with the aqueous extract of *Cucumis sativus* Linn. fruit in ulcerative colitis in laboratory animals. In this investigation, the aqueous extract of *C. sativus* L. selected for screening against experimentally induced bowel

disease. The extract of *C. sativa*, has shown to possess significant property against ulcerative colitis. [6]

Hepatoprotective activity

H. Heidari *et al* was studied the effect of *Cucumis sativus* against cumene hydroperoxide induced-oxidative stress. Results showed that aqueous extract of *Cucumis sativus* acts as a hepatoprotective and antioxidant agent against CHP-induced hepatotoxicity suggesting that antioxidants and radical scavenging components of *Cucumis sativus* fruit extract can easily cross the cell membrane and cope with the intracellular ROS formation. [7]

Hypoglycemic and Hypolipidemic activity

R. Sharmin *et al* was studied Hypoglycemic and Hypolipidemic Effects of Cucumber in Alloxan Induced Diabetic Rats. It was concluded that the ethanol extracts of Cucurbitaceae family fruits, cucumber, white pumpkin and ridge gourd has significant antihyperglycemic effects in AIDRs.

They also have the capacity to reduce the elevated lipid profiles in AIDRs. Ridge gourd has also significant effects to restore the depressed hepatic glycogen levels in AIDRs. Therefore, we believe that these fruits extracts can be useful, at least as an adjunct, in the therapy of diabetes, a condition in which hyperglycemia and hyperlipidemia coexist quite often. However, further study is necessary for the screening of chemical compounds and the structure elucidation of the respective antidiabetic leads as well as their exact mechanism. [8]

Wound healing activity

Patil *et al* were studied on pharmacological evaluation of wound healing potential of *Cucumis sativus*. He stated that aqueous extracts of *Cucumis sativus* have proper efficacy on wound healing. Herbal paste preparation showed significant ($P<0.05$) improvement on maturation, wound contraction and epithelialization. [9]

CONCLUSION

The extensive survey of literature revealed that *Cucumis sativus*, is an important medicinal plant with diverse pharmacological spectrum. *Cucumis sativus* is widely used in Ayurveda, Siddha, Chinese medicine etc. The vast study done on the plant proved that the plant has many important phytoconstituents like Glycosides, flavones, terpenoids, phytosterol, saponins and anolignan B, Tannins, ellargic acid, glucose, fructose. These compounds were found to be responsible for many of the pharmacological

activities such as antibacterial, antifungal, antidiabetic, Cytotoxic, Antacid & Carminative activity, Hepatoprotective activity, Wound healing activities. Further the plant is used in the treatment of gastric ulcer, constipation, general debility, piles. Hence, this plant provides a significant role in the prevention and treatment of a disease. Further evaluation needs to be carried out in order to explore the concealed areas and their practical clinical applications, which can be used for the welfare of the mankind.

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