

REVIEW STUDY ON PHARMACOLOGICAL POTENTIAL PF CHENOPODIUM ALBUM (BATHUA): CHENOPODIACEAE

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Article Received on
07 Nov. 2016,

Revised on 27 Nov. 2016,
Accepted on 17 Dec. 2016

DOI: 10.20959/wjpps20171-8404

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ABSTRACT

Chenopodium album which belongs to family Chenopodiaceae, is an annual herb, commonly known as wild or dog mustard. The whole plant and its parts (leaves, seeds and roots) are widely used in traditional systems of medicine. *Chenopodium album* has several pharmacological functions including anticancer, anti-ulcer, anti-inflammatory, anti-diarrhoeal, etc. The present review is therefore, an effort to give a detailed survey of the literature on its taxonomy status, botanical details, traditionally uses, pharmacological activity

of *Chenopodium album*.

KEYWORDS: Ayurveda, Siddha, traditional systems, drug, anti-ulcer.

INTRODUCTION

India is a rich source of plant and animal wealth, which is due to its varied geographical and agro-climatic regions. Besides it's varied biodiversity, it has a diverse cultural heritage. Though at present Indian health care system consists of both traditional and modern systems of medicines, traditional systems of medicine like Ayurveda, Siddha and Unani and unorganized systems like folk medicine have been flourishing well. Ayurveda and Siddha are of Indian origin and accounted for about 60% health care system in general and 75% of rural Indian population. These two systems of medicine use plants, minerals, metals and animals as source of drugs, in which plants being the major source. It is estimated that roughly 1500 plant species in Ayurveda and 1200 plant species in Siddha have been used for drug preparation.^{[1][2]}

Chenopodium album Linn. (Bathua) belongs to the family Chenopodiaceae, is an important medicinal plant in Ayurveda. The medicinal property of this plant is mainly present in leaves

and seeds. Leaves are rich in essential oil mineral matters, particularly in potash salts, a considerable amount of albuminoids, and other compounds are nitrogen. The plant is recommended by Hindu physicians for correction of hepatic disorders and splenic enlargement.^[3] *C. album* is a rich source of nutrients, antioxidants and important dietary elements.^{[4], [5]} As therapeutic agents, it is used as laxative, antihelmintic against round and hook worms and blood purifier. Its use for the treatments of intestinal ulcers and burns has also been documented.^[6]

CLASSIFICATIONn

Kingdom : Plantae
 Sub kingdom : Tracheobiont
 Super division : Spermatophyta
 Division : Magnoliophyta
 Class : Magnoliopsida
 Sub class : Caryophyllidae
 Order : Caryophyllales
 Family : Chenopodiaceae
 Genus : *Chenopodium* L.
 Species : *Chenopodium album*



Fig 1: Whole Plant of *Chenopodium album*

BOTANICAL DESCRIPTION

Chenopodium album commonly named as “Bathua” or “Goosefoot”. It is herbaceous, 0.3-3.5 m high, erect or ascending, mealy or green or reddish, inodorous. Stems rarely slender, angled, often striped green, red or purple. Leaves are very variable in size and shape, reaching in cultivated plants sometimes 15 cm long, oblong, rhombic, deltoid or lanceolated obtuse or acute entire, toothed or irregularly lobulated; petioles long, slender. Flowers are in

clusters forming complex or lax paniculate often mealy spikes, which in cultivated forms become thyrsoid. Sepals 1.5-2 mm long, oblong lanceolated, keeled, closing over the thinly membranous utricle. Stigmas-2. Seed are 1.5 mm diameter, orbicular, compressed, with an acute margin, smooth, shining, embryo completely annular. The young plant of not more than 20 cm is much esteemed as a pother.^[7]

TRADITIONAL USES

Many species of *Chenopodium* are being used traditionally in indigenous systems of medicine for the treatment of numerous ailments. *C. album* improves the appetite, acts as anthelmintic, laxative, diuretic and tonic. It is also useful in biliousness, vata and kapha, abdominal pain and eye diseases. It is used in the form of pot herb in piles. The finely powdered leaves are used as a dusting powder about the external genitalia in children.^[8]

PHARMACOLOGICAL STUDY

Anticancer Activity

Ethanol and aqueous extract of the leaves of *C. album* showed positive results with successful control of cell's growth. The cells were seeded with both the extracts and then allowed to grow for 24 hrs, the cell growth was inhibited and apoptotic bodies were formed within 24 hrs.^[9]

Anti-ulcer activity

Alcoholic extract of *C. album* Linn. (Chenopodiaceae) was investigated in rats to evaluate the antiulcer activity by using three models, i.e., pyloric ligation, ethanol and cold restraint stress induced ulcers by V. Nigam and P. M. Paarakh. The parameters taken to assess anti-ulcer activity were volume of gastric secretion, pH, free acidity, total acidity and ulcer index. The results indicate that the alcoholic extract significantly decreases the above parameters.^[10]

Anti-inflammatory activity

It has been established that anti-inflammatory activities of essential oils are attributable to the presence of substituent such as; limonene, linalool, linalyl acetate and α -pinene. The result revealed that the antiinflammatory action of the oil is concentration dependent. Hence, the percentage reduction in the ear edema increases with increase in concentration of the oil. Furthermore, the oil caused significant reduction ($p < 0.05$) in the ear edema except at 0.625 mg concentration.^[11]

Hepatoprotective activity

Chenopodium album is having reported hepatoprotective activity. Acetone and methanol extracts were tested, the (200 mg/kg) of the plant *C. album* possess more effective hepatoprotective activity against paracetamol intoxication in rats because of its flavonoid bearing capacity.^[12]

Antidiarrhoeal Activity

Parrakh *et al.* (2012) find out the antidiarrhoeal activity of *C. album*. Author have used the two models for antidiarrhoeal activity i.e. castor oil induced diarrhoeal and entero pooling assay by using dose of 200 and 400 mg/kg of *C. album*.^[13]

Spasmolytic and Analgesic activity

The plant was extracted in ethanol and fractionated in ethyl acetate, chloroform, n-butanol and water. The crude extract and its fractions were tested in vitro on intestinal smooth muscles of rabbit. The crude extract exhibited a dose-dependent increase in relaxation of smooth muscles. Overall, the activity produced by nbutanol fraction was found to be highly significant. Analgesic effect of the crude extract was carried out by tail flick method in mice.^[14]

CONCLUSION

Chenopodium album belonging to family Chenopodiaceae, is an important medicinal plant used by indigenous communities in India. Different parts of this plant such as leaf, seed and root are known to have medicinal properties. In the last more than three decades, several studies have been carried out on this medicinal plant to facilitate evidence in favor of its traditional uses. The authors wanted to discuss future research opportunities through the present review in the form of its comprehensive information on the traditional uses, ethnopharmacology and pharmacological research.

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