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Pharmacological and Phytochemical Potential of Chenopodium Album Linn. (Chenopodiaceae)

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Abstract – The present review comprises phytoconstituents and pharmacological aspects of Chenopodium album Linn. (CHENOPODIACEAE). Major class of phytoconstituents mcludes phenols, alkaloids, flavonoids, glycosides and saponins. This plant has been traditionally used as laxative, blood-purifier, antiscorbutic and anthelmintic. There, Chenopodium album holds a great potential for biological evaluation.

Keywords – Chenopodium Album Linn., Antiscorbutic, Laxative, Blood-Purifier, Anthelmintic.

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INTRODUCTION

Scientific reports from the world around indicated that *Chenopodium album* Linn. forms a prime disease preventive berb which is found growing as weed in crop fields during post monsoon period. The entire plant parts are covered with varying amount of a waxy substance-giving the plant a ligh-green appearance. Flowers are wind-pollinated having lax paniculate mealy spikes in leaf-axil (Sarma *et al.*, 2008).

In folklore medicine *Chenopodium album* reported to have wide application as a laxative anthelmintic against roundworms and antiscorbutic. According to Ayurvedic system of medicine, the plants is used to treat vata and kapha. The plant also having the potential of improving appetite, abdominal pain, piles and blood related disease. The decoction of its aerial parts mixed with alcohol is rubbed on the inflated body parts to cure arthritis and rheumatism (Watt, JM *et al.,* 1962; Kirtikar and Basu, 1976). The tender shoots are eaten raw in salad. They are also cooked as vegetable or pot herbs. The leaves are rich in potassium and vitamin-C (Prajapati *et al.,* 2003; Pal *et al.* 2011).

PHYTOCHEMICAL ASPECTS

Chenopodium album contains different groups of secondary metabolites of which most important are alkaloids and coumarins (Rizk, AM, 1986_a), lipids; essential oils (Rustenbekova, GB, *et al.* 1974), I. *et al.* 1979), sterols and steroidal oestrogen-like substances (Bathory, M. *et al.,* 1982).

- **Phenols:** *Chenopodium album* is reported to contain phenols on basis of spectroscopic data as such –
  - Cinnamic acid,
  - 4-hydroxy-cinnamic acid,
  - Ferulic acid,
  - Methyl ferulate,
  - Synapic acid,
  - Methyl 3-(4-hydroxy-3-methoxypheny) propaneate,
  - 4-(1-hydroxymethyl)-2-methoxyphenol,
  - 4-hydroxy-3-methoxybenzoic acid,
  - 4-vinyphenol,
  - 4-methylbenzaldehyde
  - N-[2-(1H-indol-3-methyl)] acetamide,
  - Pynoresinol,
  - Syringaresind,
  - Lariciresinol,
  - 5,5-dimethoxy-lariciresinol,
  - Threoguaicylglycenol-β-0-4-syringaresinol ethen
- **Alkaloids:** It includes – Chenoalbicin, a novel cinnamic acid amide alkaloid

- **Glycosides:** *Chenopodium albumi seeds* were reported to contain olenolic acid as glycon and glucose and glucuronic acid as monosaccharide which has sperm-immobilizing effect.

- **Saponins:** The root of *Chenopodium album* contains following three kinds of saponins –

– Calenduloside – E

– Chikusetsusaponin – IV a

– 3-0-[39-0-(20-0-Glycolyl)-glyoxyl]

- **Flavonoids:** Eight flavonoids were isolated from *Chenopodium album* namely –

– 3-0-glucopyranoside,

– Qyercetub 3,7-di-o-β-D-glucopyranoside,

– 3-0-glucosylglucuronide,

– 3-0-$\propto$-L-rhamnopyranosyl-(1-6)-β-D-glucopyranoside,

– 3-0-β-D-glucopyranoside,

– Kaempferol-3-0-(4-β-D-xylopyranosyl)-$\propto$-L-rhamnopyranoside-7-o-$\propto$-L-rhamnopyranoside,

– 3-0-(4-β-D-apiofuranosyl)-$\propto$-L-rhamnopyranoside-7-o-$\propto$-L-rhamnopyranoside,

– 3,7_di-$\propto$-L-rhamnopyranoside,

PHARMACOLOGICAL ASPECT

- **Sperm-immobilizing and contraceptive action:**

Aqueous decoction of *Chenopodium album* seeds was reported to be sperm-immobilizing and contraceptive agent by spermicidal action. Contraceptive efficacy was evaluated by intrauterine and vaginal use of *Chenopodium album* decoction in rats, followed by their mating and evaluated pregnancy outcomes. Later, it was reported that the sperm death mediated by *Chenopodium album* is due to oxidative damage of cellular macromolecules by *in situ* generation of reactive oxygen species (Shrabanti, K. *et al.* 2008).

- **Anthelmintic action:**

Anthelmintic potential of *Chenopodium album* was evaluated by using mature *Haemonchus contortus* and their eggs in adult motility assay and egg hatch test.

DISCUSSIONS

Chenopodium album has been traditionally used in various disorders like laxative, anthelmintic against roundworms, improving appetite, abdominal pains, throat troubles, piles and diseases of blood. A close scrutiny of the available literature reveals that only limited pharmacological study have been carried out while this plant contains a number of important chemical constituents like saponins, flavonoids and phenolic compounds which may be responsible for various kinds of activities. This plant can also be exploited for the isolation of bioactive compounds of reported activities. Thus, it can be concluded that this plant may be explored as an important functional food by keeping in view the traditional uses and clinical applications.

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