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Popular Article

Chenopodium album Linn (Bathua): Review of Health Benefits

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Abstract

The plant bathua, or Chenopodium album, is a rich source of a wide range of nutrients, including minerals, vitamins, bioactive carbohydrates, flavonoids and phenolics, and anticancer, antidiabetic, anti-inflammatory, and antioxidant activities. The plant's anthelmintic properties are partly attributed to ascaridole, a significant phytoconstituent found in the aerial sections of the plant. Despite widespread historical usage and substantial health advantages, its reputation has not grown, and consumption has sharply declined in recent years. The plant is now referred to as Non-conventional Edible plant (NCEP) gradually. Beyond its obvious nutritional advantages, C. album is a vegetable with significant functional potential that is underutilized. Traditionally, the plant has been utilized as an anthelmintic against round and hookworms, as well as bloodpurifier, diuretic, sedative, hepatoprotective and antiscorbutic laxative.

Keywords: Chenopodium, Album, Anthelmentic, Flavonoids, Polyphenolics etc.

Introduction

Since thousands of years ago, knowledge about the potential medical benefits of plants has been growing. Nonetheless, it can be said that plant sources have been used to cure anomalous physical disorders since the dawn of humankind. Additionally, it has been demonstrated that trips that were acknowledged as cultural markers of Indigenous cultures yielded significant knowledge on the use of plants for medicinal purposes (**Agrawal *et, al.*, 2014**). C. album is a polymorphous annual plant that grows up to 3.5 metres tall and 3600 metres above sea level. It has a strong scent and is light green in colour. The Greek words "khen" (goose) and "pous" (foot) are the origin of the name "Chenopodium," which describes the goosefoot form of the majority of the genus's members. The kingdom, phylum, subphylum, class, order, and family of the plant are represented by the taxonomic traits, which are Plantae, Spermatophyta, Angiospermae, Dicotyledonae, Caryophyllales, and

Amaranthaceae. The petiole supports the simple, alternating, oval to obovate or lanceolate leaves, which are 1.5–8 cm in length and 3 cm in breadth. (**Yadav, *et, al.*, 2017**).

*Within the family Chenopodiaceae, Chenopodium album is often referred to as "Bathua" and is widely distributed throughout India's tropical and subtropical areas. The plant is often found in the following states: Gujarat, Maharashtra, Haryana, Karnataka, Sikkim, Rajasthan, Jammu and Kashmir, Uttar Pradesh, Madhya Pradesh, Himachal Pradesh, and West Bengal. The leaves can be consumed in combination or as a decoction that acts as an anthelminthic and purgative. Additionally, it has been proposed as a treatment for splenic enlargement and hepatic issues. The leaves are ground into a very fine powder and used as anthelminitics. It is also used for conditions involving the stomach, the eyes, the throat, blood, heart, and spleen, as well as nausea and vomiting. The purpose of this study was to evaluate Chenopodium album's overall impact. Numerous health-promoting and disease-modifying effects on the immunological, circulatory, digestive, and cardiovascular systems have been reported for C. album. Additionally, it has been discovered that they are potent antioxidants with the ability to stop or slow down the pace at which a free radical chain reaction occurs in autoxidisable materials (**Tarnawski et al. 2018).** Both potassium and vitamin C are abundant in the leaves. It has also been shown to be effective in treating burns, spleen enlargement, intestinal ulcers, and hepatic problems.* (**Sarma *et al.* 2019).**

Traditional uses

The herb was also traditionally used as an antiscorbutic, an anthelmintic against round and hookworms, and a remedy for stomach discomfort, eye disease, throat irritations, and cardiovascular problems. Diffuse shoots with bubbles are used in clogging. Finely ground Chenopodium album Linn. powder. The leaves were trimmed to reduce partner annoyance, and the juice from the leaves was used to cure consumers. Aeronautical debris infused with alcohol was rubbed on the body area affected by joint pain and inflammation. (**Choudhary *et al.*, 2021).**

Medicinal properties of *C. album*

The herb is used as a narcotic, purgative, and diuretic in India, where it is also infused to

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cure stiffness. Many therapeutic qualities, including anthelmintic, antiphlogistic, antirheumatic, antidiarrheal, antioxidant, antibacterial, contraceptive, laxative, and odontalgic effects, are associated with Chenopodium album. Chenopodium album is used to treat a variety of conditions, including rheumatism, skin issues, insect bites, sunstroke, and urinary tract issues. Additionally, leaves have been used to cure burns, and it is known to have calming and cooling qualities. Numerous illnesses, including kidney stones, edoema, anaemia, heart disease, jaundice, and many more, are treated with it. The juices of C. album, also known as Bathua leaves, are used as a traditional treatment for intestinal parasites. It is also beneficial to the heart and raises haemoglobin levels. It is considered as a heart tonic and its leaves are good for liver, spleen and gall bladder. *C. album* is used to treat muscular spasms and pain **(Chakraborty, 2021).**

Antibacterial

The antibacterial activity of C. album was assessed by testing its aqueous and methanolic extracts against pathogenic bacteria, including Salmonella typhimurium, Escherichia coli, Proteus vulgaris, Staphylococcus aureus, and Pseudomonas aueruginosa. Using the paper disc diffusion method, the investigations found that the aqueous and methanolic extract of the C. album leaves was efficient against the tested pathogens. (**Saini, *et, al,*. 2019).**

Hepatoprotective activity

Preventing changes in the liver's antiradical defence systems or shielding it from the damaging effects of potentially consumed hepatotoxins. The aerial portions of Chenopodium album, both in aqueous and alcoholic extracts, exhibited hepatoprotective properties. Furthermore, it has been suggested that the methanolic extract of C. album shields the liver against ethanol-induced liver damage. (Karwani and Sisodia, 2015).

Anthelmintic properties

When tested on the Indian earthworm eisenia foetide, the aerial sections of the bathua exhibited strong anthelmintic action. Studies have shown that C. album exhibits anthelmintic action against cyathostomins, a significant worm that infects the gastrointestinal tract of horses. Examined C. album's potential as an anthelmintic against cyathostomins, a significant gastrointestinal worm that infects horses. Plant extracts were made by vacuum evaporating, macerating with methanol, drying, and grinding. **(Adak, *et. al.*, 2022).**

Antioxidant activity

Scavenging free radicals and/or preventing the creation of reactive oxygen species are two aspects of the antioxidation process **(Lone *et al.*, 2017).** C. album has great antioxidant activity since it contains a significant quantity of polyphenols. Using the DPPH (2,2-

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diphenyl-1-picryl-hydrazyl-hydrate) test, riboflavin photooxidation technique, hydroxyl-scavenging activity-deoxyribose assay, and lipid peroxidation method, the antioxidant activity of the aqueous and alcoholic extract of C. album was evaluated. **(Lichota, 2018**).

Anticancer activity

Researchers from all around the world have been closely examining the plant C. album, which is routinely ingested, for its ability to fight cancer. Using Swiss albino mice, Rana *et al.* examined the C. album leaves' potential for in vivo anticancer action against Ehlrich ascites carcinoma (EHC) cells. Results showed that at 200 mg/kg and 400 mg/kg of C. album extract, respectively, there was a statistically significant suppression of cell growth of 30.60% and 41.80%, respectively. The anticancer impact was shown to be mediated by the activation of apoptosis, a decrease in tumour weight, an increase in mean survival time, and suppression of cell proliferation. It is known that lectins derived from plants can cause cancer cells to undergo autophagy and apoptosis. (**Rana *et, al*., 2020).**

Other activities

One of the main endocrine diseases, type 2 diabetes, is characterized by decreased insulin production and/or decreased insulin action at the cellular level. Some plants, including C. album, are well-known for having strong antidiabetic properties and are utilized ethnobotanically in many regions of the world. Mushtaq and associates' study results also support the plant's analgesic and anti-inflammatory properties. C. album produced the greatest (64%) edoema inhibition. **(Mustaq *et, al.*, 2017).**

Conclusion

Bathua (chenopodium album) leaves contain significant level of calcium, iron and amino acids, all of which are necessary for healthy growth and development. Although C. album has been a significant dish since antiquity, its weedy appearance in crops has significantly decreased consumption over time. Apart from higher concentrations of essential nutrients including proteins, carbs, fibres, vitamins and minerals the plant also contain vital phytochemicals such phytic acid, p-cymene, alpha terpinene ascaridole, carvacrol, and cryptomeridiol. The plant's phenolic acids are thought to have sensory and health promoting properties such as antibacterial, anti-adipogenic, antioxidant and anti-inflammatory properties. Alkaloids, on the other hand, are responsible for the plant's spasmolytic and anaesthetic properties. C. album has therapeutic qualities and is a rich source of useful nutrients. It may be added to a variety of extruded food items to improve its nutritional value, health and appeal to consumers. The biological significance of this plant is further supported by its antibacterial and antioxidant properties. Raising public awareness and using this plant more frequently could

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help prevent chronic degenerative diseases like cancer and cardiovascular disorders, which would ultimately benefit rural communities greatly, in addition to deficiency diseases and disorders related to ageing and muscular degeneration.

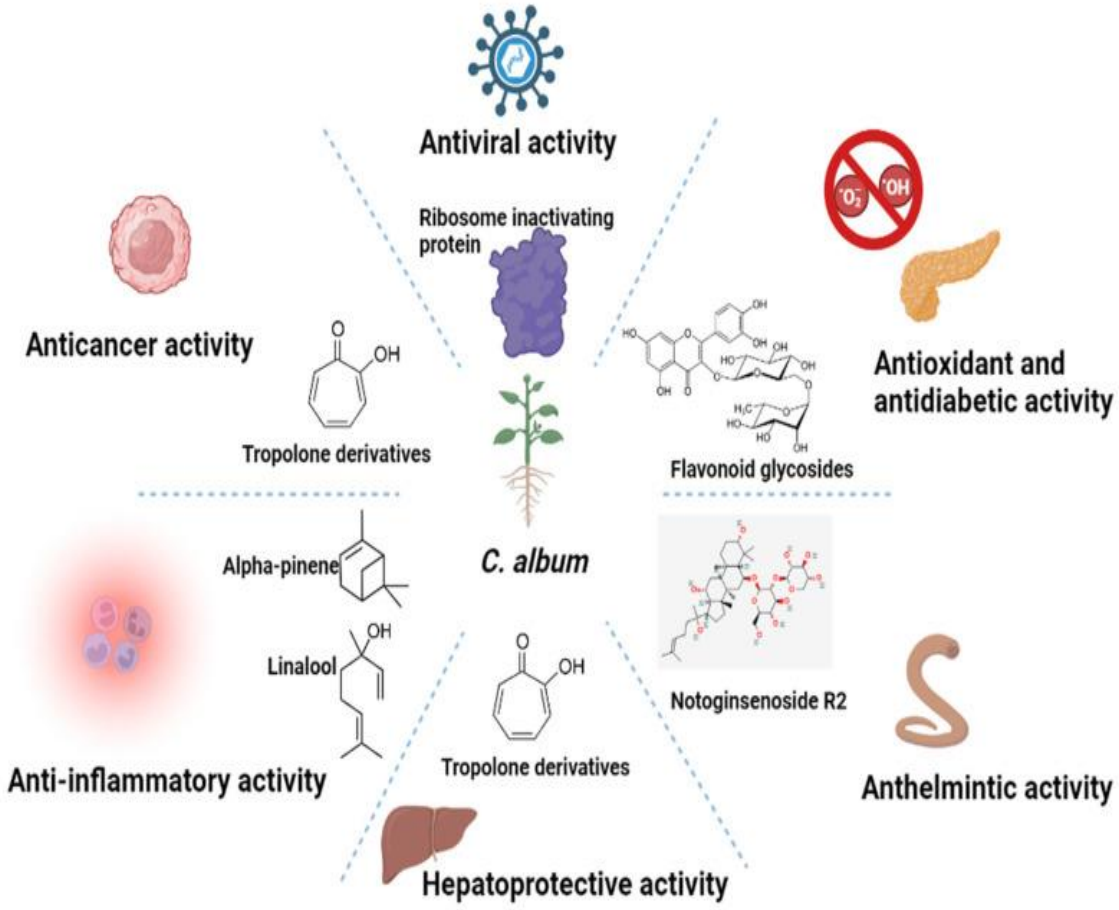

Figure representing important chemical components and corresponding biological activities of *C. album*.

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