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Immunity Booster Activity of Lamb's Quarters: Nutritive Value and Economic Importance

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Abstract

Lamb's quarters (Chenopodium album) is annual weeds found in worldwide. Leaves are immunity booster contains important nutritive value as energy, carbohydrate, fiber, protein, fat, vitamins A, B1, B2, B3, B5, B6, B9, C, minerals Ca, Fe, Mg, P, K, Na and Zn. Lamb's quarters also contain trypsin inhibitor activity, phenols and tannins, saponin, phytic acid, phytate phosphorus, alkaloids, flavonoids, oxalates, oils, proteins, trace elements and many other bioactive contents. Lamb's quarters exerted was anti-inflammatory, analgesic, gastro protective, hepatoprotective, anticancer, antioxidant, antimicrobial, anthelmintic, insecticidal and many other activities. The present manuscript was highlighting the nutritive value and its economic importance of Lamb's quarters.

Keywords: Immunity booster, Lamb's quarters, Leaves, Nutrient contains, Importance

Introduction

Lamb's quarters (Chenopodium album), also called pigweed, annual weedy plant of the amaranth family (Amaranthaceae). These are one of the most common weeds grows in sunny or partially sunny areas including gardens, backyards, roadsides, fallow fields and human habitation. It is usually blooms from July to November months. It is widely distribution in Asia, Europe, and North America. It can grow up to three metres but is usually a smaller plant. Young green leaves and seeds are eatable with vital nutritive value. Its leaves are eaten both raw and cooked. It's no wonder humans have both foraged and cultivated this free-ranging food for hundreds of generations. Lamb's quarters leaves are very common in Indian cuisine especially in North Indian dishes and are used much like other greens. The present manuscript has been critically discussed various aspects of Lamb's quarters role in immunity booster activity and their economic importance.

Identifying Lamb's Quarters

It has alternate, triangle- to diamond-shaped leaves that are coarsely toothed or shallowly lobed. The leaves bear a whitish-gray powdery coating, which is especially evident on the emerging young leaves.

Cultivation

The Lamb's quarters species are cultivated as a grain or vegetable crop as well as animal feed in Asia and Africa, whereas in Europe and North America, it is commonly regarded as a weed in places such as potato fields [1] while in Australia it is naturalised in all states and regarded as an environmental weed in New South Wales, Victoria, Western Australia and the Northern Territory.

Potential Impact on Conventional Crops

Lamb's quarters species are one of the more robust and competitive weeds, capable of producing crop losses of up to 13% in corn, 25% in soybeans, and 48% in sugar beets at an average plant distribution. It may be controlled by dark tillage, rotary hoeing, or flaming when the plants are small. Crop rotation of small grains will suppress an infestation. It is easily controlled with a number of pre-emergence herbicides [2].

Chemical Components

Chemical analysis of 100g Lamb's quarters leaves

showed that they contained trypsin inhibitor activity (0.11-0.17 TIU/mg), total phenols (224.99-304.98 mgGAE), simple phenols (72.50-101.007mgGAE) and tannins (152.49-203.91 mgGAE), saponin (0.043-0.867g), phytic acid (238.3-268.33mg), phytate phosphorus (67.16-75.62mg, alkaloids (1-27-1.53mg), flavonoids (220.0-406.67mg) and oxalates (394.19-477.08mg) [3,4]. The leaves of Lamb's quarters gave 0.64% oil v/w. The oils of the leaves of Lamb's quarters contained (%): tricyclene: trace, α-thujene: trace, α-pinene: 7.0, camphene: trace, sabinene: trace, β-pinene: 6.2, myrecene: trace, p-cymene: 40.9, limonene: 4.2, benzyl alcohol: trace,1,8-cineole: trace, cis-ocimene: trace, γ-terpinene: trace, linalool: trace, pinane-2-ol: 9.9 , allo ocimene: trace, citronellal: trace, borneol: trace, terpinen-4-ol: trace,α-terpineol:6.2, citronellol: trace, ascaridole:15.5, neral: trace, linalyl acetate: 2.0, geranial: trace, borneol acetate: trace, thymol: trace, carvacrol: trace, ethyl cinnamate: 3.7, acetyl eugenol: trace, elemicin: trace and benzyl benzoate: trace [5].

Nutritive Food Value of Green Leaves

Lamb's quarters use as food is very low in saturate fat and cholesterol. Its leaves are high in fiber, protein and are loaded with both Vitamins A and C. The plant is also high in manganese, calcium, copper and has a bit of iron, and is high in both omega-3 and omega-6 fatty acids and very less amount of oxalic acid. After washing and cooking of seeds and leaves eliminates most oxalic acid, quinoa and saponin. 100gm leaves contains energy -180 KJ (43kcal); Carbohydrates – 7.3g, Dietary fiber -4.0g, Fat- 0.8g, Protein – 4.2g; Vitamins (Quantity %DV): Vitamin A- 73.0% (580µg), Thiamine (B1) -14% (0.16mg), Riboflavin (B2) -37% (0.44mg), Niacin (B3) – 8% (1.2mg), Pantothenic acid (B5) – 2% (0.092mg), Vitamin (B6) – 21.0% (0.274mg), Folate (B9) – 8.0% (30µg), Vitamin C – 96.0% (80mg); Minerals (Quantity % DV): Calcium -31.0% (309mg), Iron - 9.0% (1.2g), Magnesium -10.0% (34mg), Manganese -37.0% (0.782 mg), Phosphorus – 10.0% (72mg), Potassium – 10.0% (452 mg), Sodium -3.0% (43mg) and Zinc – 5.0% (0.44mg) [6]. Currently, Lamb's quarters is eaten in Japan, South Africa, Europe, India, and the Americas.

Traditional Medicinal Activity

In India, the plant is used as a laxative, diuretic, sedative and the infusion of the plant is used for the treatment of rheumatism [7]. It was also used as an antidiarrhoeal, antiphlogistic, antirheumatic, contraceptive, odontalgic, cardiotonic, antiscorbutic, blood purifier, digestive, carminative, aphrodisiac, for the treatment of dyspepsia, flatulence, strangury, seminal weakness, pharyngopathy, splenopathy, hemorrhoids, ophthalamopathy, cardiac disorder, hepatic disorder, spleen enlargement, biliousness, intestinal ulcers, and general debility [8-11]. The plant was also used traditionally as, anthelmintic against round and hookworms, antiscorbutic [12], for treatment of abdominal pain, eye disease, throat troubles and cardiovascular disorders [13]. Boiled tender shoot is used in constipation [14]. Decoction of aerial parts mixed with alcohol was rubbed on the body part affected by arthritis and rheumatism [15].

Animal Feed

Lamb's quarters leave use as feed for animal and the leaves and seeds feed for chickens and other poultry.

Antioxidant Activity

The total oxidative status (TOS) and total antioxidative status (TAS) levels were determined to evaluate the antioxidant activity of Lamb's quarters ethanolic leaf extract (CAE). Results indicated that there was a good correlation between dose of CAE and TAS levels [16]. The antioxidant activity (expressed as percent inhibition relative to control, using β-carotene bleaching method) of aqueous and ethanolic extracts of Lamb's quarters were 64.5 and 60.5% respectively [17]. The extracts also caused DPPH radical scavenging activities which were comparable to those of ascorbic acid. This was also the same for BHT scavenging activity [3]. The protective effect of CAE was evaluated on both yeast and human mononuclear leukocytes' genomic DNA upon oxidative shock. Chenopodium album ethanolic leaf extract (CAE) protected the DNA of both yeast and mononuclear leukocytes against the damaging effect of hydrogen peroxide [16].

Anticancer Activity

Methanolic extract of Lamb's quarters leaves exhibited maximum antibreast cancer activity having IC50 value 27.31 mg/ml against MCF-7 cell line. Significant percent inhibition (94.06%) was recorded for MeOH extract of Lamb's quarters leaves at 48 h of exposure and concentration 100 mg/ml ($p < 0.05$) against MCF-7 breast cancer cell line [18].

Antimicrobial Activity

The extracts of the leaves caused varied inhibition of some bacterial strains [3]. The antibacterial activity of Lamb's quarters ethanolic leaf extract (CAE) was studied against gram positive and gram-negative microorganisms. Antibacterial activity was recorded against Bacillus subtilis with 13mm of inhibition zone [16]. The in vitro antimicrobial activities of the flowers and leaves methanolic and ethanolic

extracts of Lamb's quarters was studied against 4 bacterial strains such as Escherichia coli, Pseudomonas aeruginosa, Bacillus cereus and Staphylococcus aureus [17]. However, in other studies, the antibacterial activity of Lamb's quarters was investigated against five human pathogenic bacteria like Escherichia coli, Salmonella typhimurium, Staphylococcus aureus, Proteus vulgaris and Pseudomonas aueruginosa. The leaf extracts of Lamb's quarters (aqueous and methanol) exhibited significant antibacterial activity against all the tested bacteria. The strongest activity was recorded against Pseudomonas aeruginosa with (28.30 mm) zone of inhibition, while, the lowest antibacterial activity was observed against Salmonella typhimurium with (14.00 mm) zone of inhibition [19].

Antifungal Activity

Antifungal activity of methanol and n-hexane leaf, stem, root and inflorescence extracts of Lamb's quarters (1, 2, 3 and 4% w/v) was investigated against Macrophomina phaseolina, a soil-borne fungal plant pathogen that has a broad host range and wide geographical distribution. The n-hexane extracts of Lamb's quarters reduced fungal biomass by 60-94% [20].

Insecticidal Activity

Insecticidal effect was exerted by the petroleum ether, carbon tetrachloride and methanol extract of Lamb's quarters against malaria vector, Anopheles stephensi Liston. It influenced the early life cycle of Anopheles stephensi by reducing the percentage of hatching, larval, pupal and adult emergence and also lengthening the larval and pupal periods. The growth index was also reduced significantly [21].

Pest Control

Lamb's quarters grown for food are an esoteric veggie that doesn't make much of an environmental impact to other plants; it attracts leaf miners which might otherwise have attacked the crop to be protected. It is a host plant for the beet leafhopper, an insect which transmits curly top virus to beet crops.

Sustainability of Lamb's Quarters

Generally, Lamb's quarters grown for food are an esoteric veggie that doesn't make much of an environmental impact. But it is considered an invasive weed in industrial agricultural operations, made more difficult to eradicate because it prefers nitrogen rich soils.

Construction

The leaves juice of this plant is a potent ingredient for a mixture of wall plaster, according to the Samaraṅgaṇa Sutradhara, which is a Sanskrit treatise dealing with Silpasastra (Hindu science of art and construction) [22].

Conclusion

Lamb's quarters grown for food as green vegetable and are an esoteric veggie that doesn't make much of an environmental impact could be utilized in several medical applications because of its effectiveness and safety.

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