



Lotus Seed- A Review

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Abstract

Nelumbo nucifera commonly known as lotus and kamala in Hindi belong to the family of *Nymphaeaceae*, it is widely seen in Australia and Asian countries it was used as a dainty and ornamental flower and also it has been used for its medicinal value from the ancient period for its strong antipyretic, cooling, astringent, and demulcent properties. It also loaded with various alkaloids groups namely nuciferine, neferine, lotusine, isoliensinine, quercitin, isoquercitrin, and flavinoids. The lotus seeds are edible it has been used as food as well as medicine in traditional practices like Ayurveda and folk medicine. This is also filled with many biologically active compounds.

Keywords: Lotus Seeds; Anti Diabetic; Antioxidants

Introduction

Lotus is an aquatic plant, belonging to the monogeneric family Nelumbonaceae, the lotus seeds have been used as a functional food for over 2,000 years in Asia [1] these are majorly used as food ingredients in many Asian countries especially in China. The largest producer and consumer of this lotus seed amongst the world are China where they produce about 45,000 tons of dry seeds in an area of 0.5–0.7 million hectares of land per year [1].

The Lotus seed has three parts, namely seed epicarp, embryo, and cotyledons [1]. the ripening of this lotus seed (Makana) is derived into a milk-ripe stage (70% maturity), dough stage (80% maturity), full ripe stage (90% maturity), and withered ripe stage (100% maturity) [3]. This can be consumed in a form of raw, roasted, or ground and boiled into a syrup or paste after peeled and cored. It plays a vital role in nutrition, health, and cosmetics in several forms like honey, tea, jam, juice, oil, loaf, and cake [2].

The Ministry of Health of the People's Republic of China has approved the lotus seed to use as "both food and medicine" [1]. In the

last decades when people have more conscious about health issues and functional foods the consumer of the lotus seeds has been increased [1].

Health benefits

The lotus seed plays a vital role in traditional medicine practices; it is also used as a dry powder in bread dough to add on the functional properties of bread. As a functional food, this lotus seed is used in the treatment of inflammation, cancer, diuretics, and skin diseases and as a poison antidote [4]. Including insomnia, palpitations, poor digestion, chronic diarrhea, enteritis, and cancer [5].

Nutritionally it has a solid content of carbohydrate, protein, vitamins and other essential nutrients especially it has an abundant amount of phytochemicals which act as a functional food [3].

Pharmacological effect

The genus *nelumbo* is endowed with several medicinally important activities anti-diabetic, Antipyretic, anti-inflammatory, anti-cancerous, antimicrobial, antiviral and anti-obesity properties [6].

Photochemical properties

The seeds have hepatoprotective activity and act as a free radical scavenging, anti-fertility activity and also suppress cell cycle progression, cytokine genes expression and cell proliferation in human. The phytoconstituents present in the seed namely dauricine, lotusine, nuciferine, pronuciferine, liensinine, isoliensinine, roemerine, nelumbine and neferine. This dauricine, neferine saponins, phenolics and carbohydrates isolated from *Nelumbo nucifera* block the Na⁺, K⁺ and Ca²⁺ transmembrane currents in cardiac cells [7].

Anti-Arrhythmic properties

The study was done by Chopra, R.N., *et al.* has proved the Neferine present in the lotus seed has shown to have anti-arrhythmic action and also significantly inhibits rabbit platelet aggregation an inhibitory effect of isoliensinine on bleomycin-induced pulmonary fibrosis in mice [8]. The anti-oxidant activity of procyanidins present in this lotus seed helps to prevent cell damage.

Anti-inflammatory properties

Lotus has phytochemical agents majorly Kaempferol and Isoliensinine act as an anti-inflammatory agent, this proved in a study where it reduces the cytokines and reactive oxygen species in rats [9] and reduces the bleomycin-induced pulmonary fibrosis in mice [10].

Anti -Diabetic properties

The ethanol rhizome extract reduced the blood sugar level in a normal rat, glucose-fed hyperglycemic and streptozotocin-induced diabetic rats. This seed is also rich in polysaccharides namely resistant starch flavonoids, superoxide dismutase (SOD) and other functional components [11].

The resistant starch has a low glycemic index value which helps in slow digestion. This RS will get fermented partly in the colon by coliform bacteria this results in a decrease in the blood sugar level [3]. this will result in controlling diabetes.

Anti estrogenic properties

The anti-estrogenic nature of the lotus seed helps in reducing the wet weight of the ovary and uterus, which helps in the prolonged estrous cycle and diestrus phase observed in a rat study since this extract is suggested for its anti-fertility effect [12].

Conclusion

Even though this lotus seed is rich in many functional properties the knowledge about its benefits is deficient among the common public. Since its widely available in the Indian market the usage of this lotus seed need to be implemented in the community to prevent and overcome many chronic diseases.

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