

Caralluma fimbriata - Pharmacological review

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ABSTRACT

Caralluma fimbriata (CF) has been used as an appetite suppressant herb for millennia. It also has antioxidant, antidiabetic, and nootropic actions. It is proved that it is a natural antiobesogenic agent and is widely consumed in India. Its actions like anti-atherosclerotic and analgesic is of high medicinal value. The objective of this article is to highlight various uses of CF along with its use in medical problems.

Keywords: *Caralluma fimbriata*, appetite suppressant, adiposity

Introduction

Caralluma is an edible plant used by tribes in India, to suppress hunger and enhance endurance.^[1,2] *Caralluma* is an erect branched herb, 20–30 cm tall. Stems are leafless, 4-angled, fleshy, green, and tapering to a point. Leaves are minute, present only on young branches, soon falling off, and leaving a tooth-like projection on the angles. Flowers are borne at the end of branches, singly or 2–3 together on short stalks. Flowers are like wheels, 2 cm across. Petals are narrow, purple with yellow marking, and margins frilly with hairs. Fruits are 10–12 cm long, cylindrical with one of the pairs often suppressed. It has been eaten in rural India for centuries, raw, as a vegetable with spices, or preserved in chutneys and pickles, and is often found as a roadside shrub or boundary marker. It has been used as a portable food and thirst quencher for hunting. It is also used for its purported ability to suppress hunger and appetite and enhance stamina.^[3] Tribesmen on a day's hunt will often only pack some *Caralluma* to sustain themselves, and hence, it is commonly considered a "famine food" in India.^[4] *Caralluma* (family Asclepiadaceae) is a genus containing 50 variable species of succulent plants.^[7] It is a widespread dwarf stem succulent that occurs throughout western Africa, southwest Asia, and the Indian subcontinent.^[5] It is more common in peninsular India.^[6]

It is a new arrival in the family of succulent plants that are becoming increasingly popular for their appetite suppressant^[8] and weight loss properties^[9] as well as their ability to lower blood sugar.^[10] Studies have also revealed the nootropic,^[11] nociceptive,^[12] and antioxidant actions^[13] of *Caralluma fimbriata* (CF).

Appetite suppressant

Caralluma is used as an appetite suppressor and can be used as supplement for reducing weight. *Caralluma* contains pregnane glycosides, a class of naturally occurring compounds thought to inhibit the formation of fat. Show that supplementation with CF can lead to a clinically meaningful reduction in central adiposity, a key component of metabolic syndrome associated with other risk factors such as elevated blood pressure and cardiovascular disease. Although very little is known about the safety of using *Caralluma* on long term.^[18]

Antidiabetic action

Through a study on effect of methanol extract of CF (MCF) on streptozotocin (STZ) 50 mg/kg b.w. induced diabetic rats proved that the MCF significantly controlled the diabetic condition including oxidative stress in liver and kidney. This finding has a significant role in maintaining the health of individual in the modern lifestyle and food habits, where diabetes is a constant companion of workforce.^[10]

Action against high-fat diet-induced insulin resistance

In a study done to investigate the beneficial effects of hydroalcoholic extract of CF (CFE) on high-fat diet feeding on insulin resistance and oxidative stress in Wistar rats. The study concluded that intake of CFE

Access this article online

Website: www.japer.in

E-ISSN: 2249-3379

How to cite this article: Asmi S, Lakshmi T, Parameswari R. *Caralluma fimbriata* - Pharmacological review. J Adv Pharm Edu Res 2017;7(3):175-177.

Source of Support: Nil, **Conflict of Interest:** None declared.

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may be beneficial for the suppression of high-fat diet-induced insulin resistance and oxidative stress.^[14]

Antibesogenic action

One human intervention (n=62 at baseline, 50 completions) on *Caralluma* ingestion in overweight persons noted that 1 g (made from aerial parts of the plant, 40/60 aqueous/ethanolic extract; 12:1 concentrated extract equivalent to 12 g dried plant) was able to induce 2.5% weight loss in 60 days, whereas placebo-induced 1.2% weight loss when both groups were subjected to “standard weight loss through caloric restriction.” Only waist circumference decreased in a statistically significant manner, while weight and body fat trended toward significance with p=0.15 and 0.07, respectively. Antiobesogenic action of CF was proved by a study in which the diet-induced obesity (DIO) rat model was used to investigate CFE’s anorexigenic effects. Rats were randomly divided into three groups: (i) Untreated control (C), (ii) control for cafeteria diet (CA), and (iii) cafeteria diet-fed + CFE treated. Rats in the test group received cafeteria diet and CFE from day 1 onward. CFE was administered by gavage at three doses (25, 50, and 100 mg/kg BW per day) for 90 days. The antiobesogenic effects of CFE were evaluated by monitoring changes in feed intake, body weight, serum lipid and hormonal (leptin) profiles, fat pads, and liver weight.^[15]

Nootropic action

Ramaswamy Rajendran, Digambar Balkrishna Ambikar, Rakesh Arun Khandare, Vrushali Dattatraya Sannapuri, Niraj Sudhakar Vyawahare, and Paul Clayton investigated the effects of a standardized CFE wall on learning and memory in mice using various behavioral models. It was proved that CFE exerts both nootropic and anxiolytic activity.

Antinociceptive action

A study used petroleum ether, chloroform, and aqueous methanolic extracts of dried leaf of CF at the doses of 100 and 200 mg/kg and was evaluated for the analgesic activity using the hot plate and acetic acid-induced abdominal constrictions in mice. CF leaf extracts showed significant analgesic properties in all the models studied.

Antioxidant action

The levels of total phenolics and flavonoids of the extracts were determined in a study done on antioxidant capacity and amino acid analysis of CF. The study revealed that methanol and water extracts had good total phenolic and flavonoid contents showed potent antioxidant and free radical scavenging activities. The antioxidant activity was correlated well with the amount of total phenolics present in the extracts. The extracts and its components may be used as an additive in food preparations and nutraceuticals.

Effect on long-term hypoperfusion

A research done on effect of Slimaluma (SL), an enriched phytochemical composition of CF in long-term hypoperfusion injury in rats has investigated the effect of SL, a branded product

and an enriched phytochemical composition developed from CF a traditionally claimed neuroprotective agent, against long-term hypoperfusion-induced damage using two different paradigms for the behavioral studies in the rats. 36 male Wistar rats were used for two different models (open field test, Morris water maze), each having three groups (sham-operated control, vehicle-treated control, SL - 500 mg/kg p.o.) The permanent BCCAO was carried out with the 3.0 silk suture followed by the survival surgery. The research concluded that SL treatment showed significant attenuation showing improvement in the spatial memory impairment. The altered spatial discrimination and induction of anxiety are common outcomes of permanent BCCAO which was significantly attenuated by SL treatment.

Conclusion

Nature has provided a complete storehouse of remedies to cure all ailments of workforce. This is where, nature provides us drugs in the form of herbs, plants and algae to cure the incurable diseases without any toxic effect. There is evidence that the principles present in the widely consumed Indian food plant CF extracts suppress appetite and provide antiobesogenic and metabolic benefits. *Caralluma* has antioxidant and antidiabetic action apart from the role of appetite suppressant. It has been proved that it also has analgesic property which adds on to its medicinal value. All these qualities suggest the importance of CF in different aspects.

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