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## CHLORIS BARBATA: A COMPREHENSIVE REVIEW OF ITS THERAPEUTIC ACTIONS AND POTENTIAL BENEFITS

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### ABSTRACT

This review mainly focusses on the *Chloris barbata*. It is the member of the Chloridoideae subfamily, it is mostly found in coastal locations and are fond of dry circumstances, this plant is quite effective in treating rheumatism and the studies that have been done on the leaf of this plant gives an insight that its extract is containing aldehydes, nitriles, tannins, phenols, amino acids, alcohol, amines, glycosides, phytosterols, flavonoid, steroids, saponins. Its leaves have anthelmintic, anti-diabetic, antihyperlipidemic, antiurolithiatic, and antibacterial properties along with that its plant juice is utilised for treating skin conditions.

**Keywords:** *Chloris barbata*, anthelmintic, anti-diabetic, antihyperlipidemic, antiurolithiatic, antibacterial

### INTRODUCTION:

#### Identity:

**Scientific name:** *Chloris barbata* Sw,  
Common name: purple top Chloris,

**Another scientific name:** *Chloris barbata*  
var. *divaricata* Kuntze, *Chloris inflata* Link,  
*Chloris longifolia* Steud, *Chloris*  
*paraguayensis* Steud,

**International common names:** (English)  
Airport grass, feather finger grass, giant  
finger grass, peacock plumegrass, plush

grass, purple top, purple top chloris, purple  
top Rhodes grass, **Local common names:**  
India: chevvarakupul (Tamil)kattuk kotumai  
(Tamil) kodai pullu (Tamil) kotai-p-pul  
(Tamil) kuruthu pillu (Tamil) mayil kondai  
pul (Tamil). Indonesia: rumput jejarongan  
suket cakar ayam. Malaysia: kilen. Sri  
Lanka : kondai pul, mayuru tana. Thailand:  
yaa rangnok. USA: mau'u lei (Hawaii),  
swollen windmill-grass. *Chloris barbata* is

a member of the Chloridoideae subfamily. There are 55 species in the genus *Chloris*, which are found mostly in Africa and Australia and in tropical to mild temperate, mostly dry settings [1]. *Andropogon barbata*, an illegitimate name that originated as a later homonym of *A. barbatus*, served as the model for the name *Chloris barbata*. However, the genus *Chloris* does not have an improper epithet "barbata," thus Swartz was quite correct to name his plant *C. barbata*. Because of this, *C. barbata* is recognised as a novel name that first appeared in 1797 and ought to be reported without referencing Linnaeus. [2, 3]. *C. barbata* predates *Chloris inflata*, a synonym that is frequently used to refer to this species. The weedy grass *Chloris barbata* is highly varied. It can outcompete natural vegetation in these situations because it is a particularly aggressive invader of bare regions and damaged places. This species spreads to surrounding disturbed woods, streams and riverbanks, native grasslands, and coastal habitats such coastal forests from agriculture, pastures, gardens, disturbed areas, and roadsides. In agricultural terrain, it thrives as a significant weed as well [4]. It's still unclear where *C. barbata* originated. Although some scholars believe that this species is indigenous to southern Asia and Africa's tropical and subtropical areas [5]. Some scholars only acknowledge that it is currently widely

dispersed over all continents' tropical and subtropical zones [6, 7, 8]. It is very difficult to determine the history of *C. barbata's* introduction because its original distribution range is still unknown. This species has been classified as both native and introduced in many of the locations where it is found in the world. *Chloris barbata* propagates vegetatively by stolons that root at nodes in addition to seeds. Seeds are carried by the wind and the water, lodged on animals, and contaminate hay [9]. Hawaii's sugarcane (*Saccharum officinarum*), tree crops papayas, (*Carica papaya*), macadamia nuts, (*Macadamia ternifolia*), coffee (*Coffea arabica*), and lawns are all frequent places for *Chloris barbata* to grow happens in peanuts (*Arachis hypogaea*) in India [10] and tobacco (*Nicotiana tabacum*) in the Philippines [11]. It is rare in northern Marshall Islands coconut (*Cocos nucifera*) farms [12]. Additionally, in India, Indonesia, the Philippines, Sri Lanka, Thailand, and Vietnam, this species is a weed of upland rice (*Oryza sativa*) [13]. It can be found in lowland rice in Indonesia and in rice seedling nurseries in Thailand [14].

#### Taxonomic tree:

Domain	Eukaryote
Kingdom	Plantae
Phylum	Spermatophyta
Subphylum	Angiospermae
Class	Monocotyledon
Order	Cyperales
Family	Poaceae
Genus	Chloris
Species	<i>Chloris barbata</i>



Figure 1: Image *Chloris barbata*

**Description:** It grows annual plants. Culms 15–95 cm long, rooted at the lowest nodes, upright or reclining. Sheaths are smooth; ligules measure 0.3–0.5 mm and become lacerate; blades are typically glabrous but can grow up to 15 cm long and 0.3–0.6 mm broad, with basal hairs. Panicles digitate, with 7–15 clearly distinguishable branches; branches are 3–8 cm long, somewhat upright, and have 14 spikelets on average per centimetre. One bisexual and three sterile florets per spikelet. The lower lemmas are 2–2.7 mm, ovate to elliptic, with calluses and the distal portion of the margins being pilose, hairs to 1 mm, keels glabrous or pilose, apices awned, and awns 4–7.7 mm. The upper and lower glumes are 2.3–2.7 mm and 1.2–2.1 mm, respectively; the second and third florets are 0.9–1.3 mm long, 0.4–0.9 mm wide, slightly to strongly widened distally, inflated, usually glabrous, truncate, awned, and awns 5–7 mm. 1.1–1.4 mm in caryopses [16].

**Comparing This Species/Condition to Others:**

Many features, including three blooms, a three-awned spikelet that is usually purple, virtually whole lemmas with subequal awns, and the inflated truncate lemmas of the imperfect florets, identifies *Chloris barbata*. The lengthy, bearded callus and stiff white hairs in the submarginal fringe on the top half of the lemma are characteristics of the lowest (fertile) floret [15]. Feather fingergrass, sometimes known as feather top Rhodes grass, is identical to *C. virgata*, but has only two distinct awns instead of three, and white to yellowish-brown spikes [16]. A useful fodder grass called *C. gayana* (Rhodes grass) resembles it on the surface, but its spikes are yellow-brown rather than purple, and its awns are far shorter than its lemmas—by less than 1.5 times [17]. *C. pilosa*, another weedy plant, too has very small awns. The awns of *C. prieurii* [*Enteropogon prieurii*] are long, but each spikelet has four to six of them. The small, blunt leaves of the annual *C. pycnothrix* are quite striking.

**Habitat:**

*Chloris barbata* is a common plant found in coastal locations that grows well in dry circumstances. In Mexico, South America, the Caribbean, Papua New Guinea, and Sri Lanka, it is a common weed. It is a widespread species in the dry coastline zone of the Hawaiian Islands [18]. It may be found on levees in lowland ricefields, railroad embankments, roadsides,

wastelands, sugarcane, pastures, dryland field crops and abandoned cultivated sites. It grows in lowland rice fields, lawns, beside roadsides, by railway tracks and in other disturbed places in South East Asia. It is prevalent in coastal regions, desert pans, the edges of mangrove swamps and salt meadows, and it is generally saline tolerant [19].

**Environmental Science and Biology:**

**Genetics:** For *C. barbata*, the reported chromosomal numbers range from  $2n = 20$  to  $2n = 40$  to  $2n = 50$  [6].

**Reproductive biology:** *Chloris barbata* spreads vegetatively by stolons that root at nodes or by seeds [20].

**Longevity:** It is stated that *Chloris barbata* is either an annual or perennial.

**Environmental sciences:**

**Environmental conditions:** Because *Chloris barbata* is widely distributed geographically, it may grow in a variety of environmental situations. It grows in tropical and subtropical locations with mean annual temperatures ranging from 16 to more than 26 degrees Celsius and extreme temperatures of 5 to 45 degrees Celsius, from near sea level up to heights of 2000 metres. In its native range, the amount of rainfall is between 500 and 1500 mm annually. It can live in regions with a six-month dry season and can withstand drought conditions. It does not tolerate shadows well [9, 20].

**Natural enemy:** *Sogatella furcifera* [21, 22] *Sogatodes pusanus*, [*Tagosodes pusanus*] [23] the white-backed planthoppers, are among the many rice insect pests and illnesses that are carried by *Chloris barbata*, *Leptocorisa oratorius*, a rice bug [24]. The *Mythimna separata*, or rice caterpillar [25], the rice-feeding tiger moth (*Cretonotos gangis*) [25] the cereal thrip *Haplothrips ganglbaueri* [26], the rice whitefly *Aleurocybotus indicus* [*Vasdaividius indicus*] [27] and sheath blight *Rhizoctonia solani* [*Thanatephorus cucumeris*] [28]. Additionally, the rice leaf-folder *Cnaphalocrocis medinalis* oviposits on *Chloris barbata* [25]. The grass seed-feeding thrip, *Chirothrips mexicanus* [*Arorathrips mexicanus*], which infests the cultivated crop pearl millet, *Pennisetum typhoides* [*Pennisetum glaucum*], mostly uses it as an alternate host [29].

**Uses:**

Approximately 8000 species, or half of all higher blooming plant species in India, are classified as medicinal plants [30]. Today's pharmacopoeia still includes at least 25% of medications that are derived from plants, and many more are synthetic equivalents made from plant-derived prototype chemicals [30]. Plants have given Western medicine an extensive selection of medications and remedies for a wide range of illnesses [30]. Throughout history, plants have been utilised to make rudimentary

remedies for people and animals in the form of decoctions, syrups, powders, infusions, and ointments. Both modernised and developing nations continue to utilise herbal medicine in primary healthcare [32]. The need for medical plants is rising in both developed and developing nations because more people are realising the benefits of natural goods, which are easy to get at reasonable rates, non-addictive, and have no negative side effects [30]. The World Health Organisation (WHO) estimates that around 80% of people in countries that are developing get their main treatment from herbal medicine [33, 34]. The majority of ethnobotanical research on traditional medicine focuses on the expertise of traditional healers, and concentrates on home medicine, especially the expertise of women [35]. The growing interest in traditional ethnomedical practices might result in the identification of new medicinal substances [30]. In Hawaii, hat leis are made from *C. barbata*'s fluffy, purple spikes [36]. When *Chloris barbata* is young, cattle graze it; however, it quickly loses its taste and becomes a nuisance [20]. In India, the leaves are used to make a paste that is used topically to cure skin conditions, while the juice is used to treat fever, diarrhoea, and diabetes [37]. The herb is quite effective in treating rheumatism. The findings of the studies on the leaf extracts verified the existence of aldehydes, nitriles, tannins,

phenols, amino acids, alcohols, amines, glycosides, phytosterols, flavonoids, steroids, saponins. *Chloris Barbata* (CB) leaves have anthelmintic, anti-inflammatory, and antidiabetic qualities. The plant juice is utilised to treat skin conditions because of its exceptional pharmacological qualities [38].

#### ***Chloris barbata* pharmacological studies: *Chloris barbata* as anthelmintic plant (*In-Vitro*):**

One of the most serious animal diseases in the world, Helminthes contaminations, also referred to as helminthiasis, are thought to cause more horror, significant financial hardship, and social unrest among humans and other animals than any one group of parasites, upsetting a significant portion of the global population. Worldwide, Helminthiasis causes severe creation calamities in cattle and touching. Anthelmintics are medications that can work locally to eradicate worms from the gastrointestinal tract or very broadly to destroy adult Helminthes or improvement frameworks that target organs and tissues. The Roundworms (Nemathelminthes) example: Whipworm, Pinworm, Strongyloidsstercorails, Trichinellaspirails, Wuchereriabancrofit, and the Flatworms (Platyhelminthes) example: Cestode, beef tapeworm (*Taeniasaginata*), pork tapeworm (*Taeniasolium*), fish tapeworm (*Diphyllobothriumlatum*). The anthelmintic

study was conducted ethanolic leaf concentrate of *Cloris barbata* in vitro anthelmintic activity against *Pheretima posthuma*, an Indian earthworm. Following the trial of three fixations (25 mg/ml, 50 mg/ml, and 75 mg/ml), the findings were expressed in terms of the amount of time for paralysis and the worm death. Albendazole was used as a standard drug in this experiment. Comparing the ethanolic leaf concentrate of *C. barbata* to the standard group (Albendazole), the ethanolic leaf concentrate of *C. barbata* showed increasingly large movement at higher fixations [39]

#### ***Chloris barbata* as Antidiabetic and antihyperlipidemic plant (In-Vivo):**

Diabetes mellitus is a long-term metabolic disease characterised by abnormalities in the metabolism of fat, protein, and carbohydrates as well as an absolute or relative deficiency of insulin and/or insulin resistance. One of the top five metabolic disorders worldwide and a metabolic disease that is becoming more and more widespread is diabetes mellitus. By 2025, 300 million individuals are expected to be affected by the illness [40]. Despite the availability of insulin and many oral hypoglycaemic medicines for the treatment of diabetes mellitus, there is an increasing interest in herbal therapies because of the negative effects of these pharmaceutical agents [41]. The traditional plant is a crucial component

in the creation of novel therapeutic formulations, as evidenced by the recent history of drug discovery, which has an unbreakable connection to the plant world [42]. Thus, knowledge of traditional medicine is invaluable in determining which specific plant species portion may be the target as well as recommending the best extraction method. Therefore, it is crucial to research anti-diabetic medications derived from plants that are utilised in traditional medicine. In Indian traditional medicine, the leaf of the Poaceae family plant *Chloris barbata* (SW.) is used to cure diabetes mellitus. In this work, normal, glucose-loaded hyperglycaemic, streptozotocin (STZ)-induced diabetic rats are used to test the methanolic extract *Chloris barbata* (SW.) (MECB) leaves' in vivo anti-diabetic and anti-hyperlipidemic properties. Rats were given an oral dosage of MECB, and the acute toxicity was examined to identify the appropriate dose for evaluating the anti-diabetic effect. At a dosage of 2000 mg/kg, oral administration of MECB did not show any toxicity or death. Rats with STZ (40 mg/kg, i.p.)-induced diabetes were given MECB (100, 200, and 400 mg/kg) for a duration of 28 days. In treated diabetic rats, the three dosages of MECB resulted in a considerable rise in liver glycogen and plasma insulin levels and a significant drop in blood glucose. Furthermore, in treated diabetic rats, MECB had anti-

hyperlipidemic action as demonstrated by a considerable rise in HDL-C levels and a significant decrease in blood levels of TC, TG, LDL-C, and VLDL-C. Additionally, MECB brought the levels of total protein, liver glycogen, and modified plasma enzymes including SGOT, SGPT, and ALP back to almost normal. MECB's effects were similar to those of the common medication glibenclamide. The findings of this investigation demonstrated the anti-diabetic and anti-hyperlipidaemic properties of MECB [43].

#### ***Chloris barbata* as antiurolithiatic plant (In- Vitro):**

Since the beginning of time, plants have provided food, raw materials for medicine, and a host of other necessities for life itself, including human existence [44]. Many of the medicinal substances used in modern conventional medicine are derived from plants. Humans are turning to nature for safe solutions since abuse of synthetic medications increases the risk of severe pharmacological responses. People's interest in herbs and herbal medications has grown as a result of their clinically demonstrated benefits [45]. Kidney stone disease is a complex condition that arises from the interplay of genetic, biochemical, and epidemiological risk factors [46]. Urolithiasis is regarded as the third most prevalent urinary tract ailment. It speaks of the urinary tract's solid, non-metallic

minerals. It is a complex procedure resulting from an imbalance in the kidney's promoters and inhibitors. Kidney stones are the result of a number of phytochemical processes, which start with crystal nucleation, aggregation, and conclude with retention in the urinary system. Of the several kinds of kidney stones, calcium oxalate stones are the most prevalent, accounting for as much as 80% of the stones that are examined [47]. Pure calcium oxalate (50%) or calcium phosphate (5%) or a combination of both (45%) can be found in calcium-containing stones. Magnesium phosphate (15–20%), uric acid (10%), and cystine (1%) are the next most common forms [48]. Data from clinical trials conducted in vivo and in vitro suggested that phototherapeutic drugs could be helpful as an alternate treatment for urolithiasis. Because they encourage the healing mechanism in a natural way, medicinal plants and the products made from them are more beneficial [44]. Based on conventional knowledge, pharmacological and phytochemical prospecting of medicinal plants can result in the creation of novel drugs and pharmacologically significant items for human health care [49]. Compared to synthetic pharmaceuticals that are expensive and frequently have negative effects, green treatments were more trustworthy and safer [50]. On the chosen plant *Chloris barbata*, in vitro urolithiasis has been carried out

using the standard drug Neeri. The proportion of kidney stone dissolution was determined using an in vitro antiurolithiatic model. *Chloris barbata* ethanolic leaf extracts had the highest solubility rate compared to Neeri, a conventional medication. Primary evidence supporting *Chloris barbata*'s status as a plant with antiurolithiatic properties has been provided by this study [51].

#### ***Chloris Barbata* as antibacterial plant:**

The economic implications of antimicrobial drug resistance affect physicians, patients, healthcare administrators, pharmaceutical businesses, and the general public [52]. In order to fight resistance, novel antimicrobial medication development has been employed. Nonetheless, the majority of the world's traditional medical systems have used plant-derived medications, and since these chemicals have well-established antibacterial qualities, interest in using plants as sources of antimicrobial agents is growing [53]. The antibacterial activity of *Chloris barbata* was started as a result of several skin infections, including bacteria and fungus, developing an increasing resistance to medications. In dermatology, plant extracts and chemicals are becoming more and more interesting as antiseptics and antibacterial agents [54]. Comparing the methanolic and aqueous extracts of *Chloris barbata* to the standard ciprofloxacin, all tested strains of microorganisms showed

moderate antibacterial activity at 250µg/ml concentration. Tannins and flavonoids may be the cause of the observed action. To characterise the active principles, more research is now being conducted. The investigation's findings suggest that medicinal plant extracts have a great deal of promise for the creation of cutting-edge antimicrobial medicines and the cure of a number of illnesses brought on by microbes. The study's findings lend some scientific validation to the traditional use of the Indian medicinal herbs that were assessed for treating fever. This study confirms that more investigation is required to identify the plant's bioactive components that have pharmacological activity against human infections that cause illness [55].

#### **CONCLUSION**

In India there are approximately 8000 species of medicinal plant, now a days pharmacopoeia includes approx. 25% of medications that includes plant derived compounds and synthetic counterparts made from plant derived prototype chemicals plants have given western medicine an extensive selection of medications and remedies for a wide range of illnesses this review focusses on the pharmacological activity of *Chloris barbata* that has been showed promising effects in animal studies for various diseases The study's findings lend some scientific validation to the traditional use of the Indian medicinal herbs

that were assessed for treating fever. This study confirms that more investigation is required to identify the plant's bioactive components that have pharmacological activity against human infections that cause illness.

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