

A Review on the Phytochemistry and Pharmacology of *Cymbopogon citratus* (Lemongrass)

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Abstract: *Cymbopogon citratus* Stapf. (Lemon grass) has become a cynosure of modern medicinal system due to presence of wide range of biologically active chemicals and therapeutic functions associated with them. Lemon grass is reported to exhibit immunomodulatory, anti-inflammatory, antiviral, anticarcinogenic antihyperglycaemic, antioxidant, antimalarial, antimutagenic, antimicrobial and antiglycation properties. This review aims to summarize the information concerning the chemicals present in lemon grass and various kinds of pharmacological properties attached with them.

Keywords: Lemon grass, Cymbopogon, Citral, Bioactive compounds, Pharmacognosics.

I. INTRODUCTION

Cymbopogon citratus Stapf is popularly known as citronella grass or lemongrass. This species belongs to the Gramineae family, which comprises approximately 500 genus and 8,000 herb Species. Lemon grass is a tufted perennial grass growing to a height of 1 meter with numerous stiff leafy stems arising from short rhizomatous roots. It has an economic lifespan for about 5 years. The leaf-blade is linear, tapered at both ends and can grow to a length of 50 cm and width of 1.5 cm. The leaf-sheath is tubular in shape and acts as a pseudostem. Leaves are long, glaucous, green, linear tapering upwards and along the margins. This plant produces flowers at matured stages of growth. Conversely, flowering has never been observed under cultivation due to rapid harvesting time. The most substantial and safest drugs since sundry are medicinal plants and they play remarkable role in public and Primary health care. Medicinal herbs are therapeutic agents indispensable in the primary health care system in main-Taining exceptional well-being and health condition. The pharmacological activities of *C. citratus* have outstanding record in the folk and Ayurvedic medicine. It has also been known to restrain platelet composition. The pharmacological activities of *C. citratus* have outstanding record in the folk and Ayurvedic medicine [19,20]. Scientific investigations have reported the antifungal, antibacterial, antiprotozoal, anti-inflammatory, anti-carcinogenic, antioxidant, Anti-rheumatic and cardio-protective activities of *C. citratus*[3]. It has also been known to restrain platelet composition, Cure diabetes, gastrointestinal infections, anxiety or depression, malaria and pneumonia Industrially, they serve as additive, flavor, insecticides and preservative in beverages, baked foods and cuisines Inapprase.



Fig. Lemmongrass

Table. Taxonomy of Lemmongrass

Kingdom	Plantae
Species	C. Citratus
Family	Poaceae
Order	Poales
Genus	Cymbopogon Spreng
Class	Liliopsida
Division	Mangoliophyta

- **Phytochemistry and Pharmacology:** The use of medicinal plants is part of a competitive market, which includes pharmaceuticals, food, cosmetics, and perfumery markets^[8]. The chemical composition of the essential oil of cure diabetes, gastrointestinal infections, anxiety or depression, malaria and pneumonia.^[23]
- **Phytochemistry of Lemon Grass:** Citral, geranial and neral form nearly 75 % of the aldehydes present in the oil extracted from lemongrass. These chemicals provide aroma to the plant and helps its usage in aromatherapy. Citral α , citral β , nerol, geraniol, citronellal, terpinolene, geranyl acetate, myrcene and terpinol methylheptenone are some of the chemicals that have been extracted from lemongrass parts by various researchers. Two triterpenoids, cymbopogone and cymbopogonol and flavones identified as luteolin and its 6-C-glucoside have also been isolated from leaves of C. Citratus from leaves of C. Citratus.

Table 2: Major chemical constituent of lemongrass oil

Name	Area%	Atributes	Therapeutic benefits
Geranial	41.4	Strong lemmon aroma	Antimicrobial and insecticidal
Neral	33.9	Sweeter, Fresher and comparatively less lemon odour	Antimicrobial and insecticidal
Geraniol	6.3	Mild rose-like fragrance	Antioxidant, Neuroprotective, Antidepressant and Anti-inflammatory
Geranyl acetate	4.7	Lovely floral or fruity rose fragrance	Deodorizer, refreshing, antinociceptive, antioxidant and analgesics
Beta caryophylline	2.8	Distinctive gentle aroma	Anxiolytic and anti-depressant

Chemical Pharmacological Action:

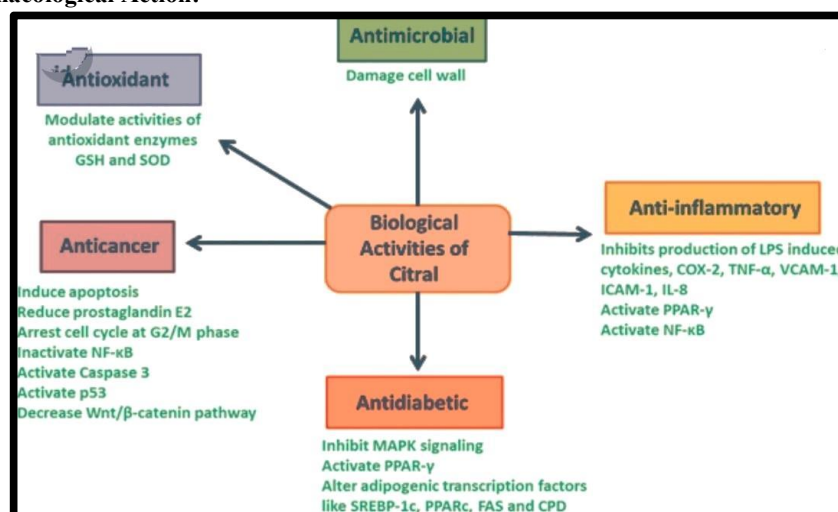


Fig. Biological activity of citral

Neurological Effects

After ingestion, systemic handling, and cerebral reuptake, The active constituents of *C. citratus* affect behavior, pain Sensitivity, neurotransmitter signaling, and hormone release. While some studies have shown that extracts of *C. citratus* leaves exhibit sedative, anxiolytic, and hypnotic effects On the central nervous system, these effects are not consistently demonstrated across all studies . As reported by No-Guiera . *C. citratus* was used by 201 out of 479 women that Visited health centers in Sao Paolo, Brazil, for its neuro-pharmacological effects. In Parana, Brazil, *C. citratus* Stands out as a preferentially used sedative in a number of Ethnobotanical studies ^[11,18]. As an illustrative example, Although Peigen has observed hypnotic and anxiolytic effects among participants after ingestion of the decoctions Prepared from *C. citratus* leaf extracts, such effects are absent In the study conducted by Leite et al . Additionally, Seth And colleagues have observed that *C. citratus* essential oil Produces marked depression of the central nervous system in Mice, while a separate study shows that *C. citratus* essential Oil is three times as potent in prolonging sleep in mice as Sodium thiopental, a common anesthetic . In a similar study by Blanco et al ^[12], the essential oil of *C. citratus* extract is effective in increasing the sleeping time, as well as the Percentage of entries and time spent in open arms of the elevated plus maze, and the time spent in the light compartment Of the light/dark.

1. **Antimicrobial activity:** The ethanolic extracts of the leaves of Lemon grass showed potential antibacterial property against Anti-microbial activity^[31]The ethanolic extracts of the leaves of Lemon grass showed potential antibacterial property against *Staphylococcus aureus*. Flavonoids and Tannins found in the extract are responsible for the activity aureus. Flavonoids and Tannins found in the Extract are responsible for the activity.^[3]
2. **Anti-Inflammatory activity:** Anti-Inflammatory Activity Of *Cymbopogon citratus* leaf infusion in lip polysaccharide-Stimulated dendritic cells was studied and used for the treatment of Inflammatory diseases, in particular of the gastrointestinal tract.^[2]
3. **Anti-hepatotoxic activity:** The aqueous leaf extracts of *Symbiont citrates* showed anti-hepatotoxic action against Cisplatin induced hepatic toxicity in rats. The extracts have The potential to be used for the management of hepatopathies and As a therapeutic adjuvant in cisplatin toxicity.
4. **Anti-HIV activity:** Citronella oil isolated from *C. citratus* leaf was report to effectively cure mouth thrush caused by *Candida albicans* in HIV/AIDS patients within 1–5 days.
5. **Insecticidal activity:** Essential oils from *C. citratus* have been applied in the control of pathogens and insects .It has been reported to be Effective against *Aedes aegypti*, *Pharmacoccus solenopsis*], *Musca domestica* and *Dermatophagoides* sp .
6. **Antinociceptive activity:** In folk medicine, lemon grass has been significantly important in reducing pains and anxiety in living organisms .In ancient time, the plant was used as analgesic or pain reliever for surgical operations and could help reduce behavioural And physiological responses of the body to excessive pains.
7. **Dermatotoxicity activity:** *Cymbopogon citratus* has been incorporated in herbal soap to treat rashes, itchy and swollen skin ^[11].Herbal soap produced from *C. citratus* leaf, tea tree oil and orange peel was investigated for their dermatotoxicity potency using clinical Samples. Significant activity of 60% ($p < 0.05$) was observed after 40 days of treatment with the soap .
8. **Anti-obesity and antihypertensive activities:** Lemon grass has been incorporated in hypolipidemic and hypoglycemic drugs. In folk and Ayurvedic medicine, it has been used to regulate glucose, lipid and fat level in the blood serum which could prevent obesity and hypertension, usually Taken as tea ^[15]. The plant has been used to maintain blood glucose through secretion of insulin (hyperinsulinemia). It Reduces blood pressure which could lead to hypertension ^[8]. Citral isolated from *C. citratus* has function as endothelium-Independent vaso-relaxation through the blockage of Ca^{2+} influx and prostacyclins (PGI₂) channel.

II. CONCLUSION

This bibliographic review, it is clear that the species *Cym citratus* can be considered an active potential for efficient cosmetic formulations, acne control lotions, Antibacterial soaps, repellent lotions, anti-aging creams, Dermal fungal creams, among others. Scientific support Exists, evaluations that have been carried out in vitro on some pathogens, identification of an effective concentrat in their growth, may allow defining effective formulations.

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