EFFECT OF HERBAL TEA LEMONGRASS (CYMBOPOGNON CITRATUS STAPF) ON HYPERLIPIDEMIC PATIENTS, AND ITS PHARMACOLOGICAL PROPERTIES

INTRODUCTION

Herbal tea looks like tea and is made in the same manner as tea, it is actually not thought of as tea at all. The reason for this is that they are not original from the Camellia Sinensis bush, which is the source of all teas.[1] Herbal teas are more properly referred to as “tisanes,” which are combinations of multiple herbs. Combinations of dried leaves, seeds, grasses, nuts, barks, fruits, flowers, or other botanical components are used to create tisanes, which have the flavour of herbal teas and offer their advantages.[2] Lemongrass, popularly known as citronella grass is a member of the Poaceae family and belongs to the genus Cymbopogon. There are about 140 species in the genus Cymbopogon, which is widely distributed across semi-arid and tropical regions of the Asian, American, and African continents. Australia and Europe are home to only a few species of lemon grass. Also known as ‘Squinant’ in English, lemongrass is known by various other colloquial names throughout the world. The members of the Cymbopogon genus produce volatile oils and so are also known as aromatic grasses.[3,4]

Numerous bioactive substances in lemon grass give it therapeutic benefit. For its uses in ethno-pharmacology, there is a lot of evidence. 4 Over two-thirds of people in poor countries believe that herbal medicine is an essential component of the healthcare sector, according to the WHO.[5] Lemon grass is a monocotyledoneous perennial grass that can reach heights of 6 feet and widths of 4 feet. It develops in clumps. It has three-foot-long, thin, bright green leaves that range in width from 1.3 to 2.5 cm. Simple leaves have complete edges. On spikes, flowers sprout. It has a long inflorescence that is between 30 and 60 cm long. Cymbopogon is the name given to this fragrant grass by the flower arrangement. Southeast Asia is home to many Cymbopogon citratus.[6,7]
Taxonomic classification\textsuperscript{[8]}

Kingdom: Plantae  
Division: Magnoliophyta  
Class: Liliopsida  
Order: Poales  
Family: Poaceae  
Genus: Cymbopogon  
Species: citratus

Chemical composition

Lemongrass (\textit{Cymbopogon citratus}) is well known because it contains more citral than other plants. Essential oils were impacted by early or late lemongrass harvesting, along with the citral's contents in some way. Temperature, lighting intensity, soil moisture, fertiliser, and maturity all had an impact on the essential oils and citral components. The plant transitions from the vegetative to the reproductive stage as it ages. Overall, there is a strong correlation between the production of plant biomass and the yield of essential oils when harvested at a particular time.

Different processes, such as solvent, rapid solvent dense CO2 and the Soxhlet, solidphase matrix, and supercritical fluid extraction techniques, are typically used to get lemongrass essential oils.\textsuperscript{[9]} Due to the intricacy of the essential oil components, modern techniques like high performance liquid chromatography in conjunction with gas chromatography (HPLC-GC) are the recommended analysis method. A sample can be placed into a GC for further, greater separation using HPLC, which is more effective for a broad class separation of a sample.\textsuperscript{[10]}

Hyperlipidemic is defined as unusually high amounts of fats or low-density lipoprotein in the blood caused by improper lipid burning or activity, and it can be triggered by nutritional complications, adiposity, genetic disorders such as familial hyperlipidemia (FH), or even further diseases like Hyperglycemia. Hyperlipidemic patients are roughly twofold as expected to suffer cardiovascular disease (CVD).\textsuperscript{[11]} Hyperlipidemia is a common condition and a situation of the body in which triglyceride levels go beyond 200mg/dl, LDL levels go beyond 160mg/dl, total cholesterol points go beyond 200mg/dl, and HDL points fall below 40mg/dl.\textsuperscript{[12]} It has a crucial role in the onset and progression of atherosclerosis as well as coronary heart disease (CHD). Atherosclerosis is a widespread illness mutually in advanced and unindustrialized nations, and it is now acknowledged as an inflammatory disorder that leads to the progress of ischemic heart disease, cerebrovascular disease, and peripheral vascular disease.\textsuperscript{[13]}

The majority of individuals are afflicted with diseases like Hyperlipidemic. To treat such diseases, conventional allopathic medications are used, but they have a number of side effects.\textsuperscript{[14]} Thus, Herbal remedies and Natural plant medicines are used to treat various diseases with minimal side effects. Naturopathy is a complex healthcare field of study in that it focuses on the root cause of suffering and disease. Medicinal herbs are more advantageous than pharmaceutical medications.\textsuperscript{[15]}

### Table 1: Nutritional Content of Lemon grass\textsuperscript{[12]}

<table>
<thead>
<tr>
<th>NO.</th>
<th>Nutritional component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carbohydrate</td>
<td>55.00%</td>
</tr>
<tr>
<td>2</td>
<td>Crude fat</td>
<td>5.10 %</td>
</tr>
<tr>
<td>3</td>
<td>Crude protein</td>
<td>4.56 %</td>
</tr>
<tr>
<td>4</td>
<td>Crude fiber</td>
<td>9.28 %</td>
</tr>
<tr>
<td>5</td>
<td>Energy</td>
<td>360.55 al/100g</td>
</tr>
</tbody>
</table>

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Pharmacological properties of Lemongrass

Antioxidant and Antibacterial properties

Lemongrass has many antioxidants properties, including iso-orientin, chlorogenic acid, and swertiapponin, which aid in scavenging free radicals that could lead to illness.[17] A basic activity in human cells, tissues, and systems is oxidation, which produces reactive oxygen species (ROSs) like free radicals, superoxide anion, and hydrogen peroxide (H2O2).[18] Medical conditions, including atherosclerosis, rheumatoid arthritis, and muscular atrophy. Others include cancer, some neurological conditions, cataracts, and ageing. To provide a defense mechanism against the detrimental effects of the oxidation process brought on by free radicals, antioxidants must be present in the body.[19]

Lemongrass extracts have antibacterial characteristics and are effective against Streptococcus mutans, which causes tooth decay.[20] In recent years, numerous sources have shed light on the anti-bacterial action of plant extracts, with encouraging results. This property has also been studied in the volatile oil component of the lemon grass aqueous extract.[20] The oil was found to have significant amounts of -citral (neral) and -citral (geranial) bioactive chemicals. These elements prevent the growth of both Gram positive and Gram negative bacteria, demonstrating their antibacterial action. However, the third component, myrcene, has no antibacterial properties on its own but does so when coupled with other substances.[21]

Anti-inflammatory properties

Citral and geranial chemicals, which serve to stop the release of some inflammation-causing signals in our bodies, are said to be present in lemongrass.[22] One of the most important health problems in the world is tissue inflammation. Its increased prevalence has been linked to the more affluent lifestyles brought on by technological innovation. As a result, inflammation is more often to blame for human death. Importantly, it has been connected to other health issues such diabetes, rheumatoid arthritis, cancer, and cardiovascular disease.[23] Animal tissue inflammation is typically brought on by physical stress or by the presence of chemical inducers (like lipo-polysaccharide) in the tissue itself. Mechanistically, inflammation will happen if macrophages are exposed to lipo-polysaccharide (LPS), which causes the release of pro-inflammatory mediators such nitric oxide (NO) and prostaglandin E2 (PGE2). Reactive oxygen species (ROS), cytokines, such as tumors necrosis factor (TNF), interleukins, and up-regulation of nuclear factor kappa-B are additional inductive elements.[24]

Anticancer Properties

Lemongrass contains bioactive citral, which either induces apoptosis or strengthens the immune system to combat cancer.

Anti-obesity and antihypertensive activity of lemongrass tea

Since lemon grass aqueous extract contains essential oil and other extractants, it has been suggested that the presence of anti-hypertensive substances such flavonoids and alkaloids.[25,26] Similar to this, lemon grass extracts were successful in lowering blood cholesterol levels. Endozepine octa deca-neuropeptide (ODN), which is an inhibitor of food intake in small animals, is an endogenous ligand of central-type benzodiazepine receptors, according to researchers.[27]

Anti-fungi properties of lemon tea

According to research, the impact of the essential oils derived from lemon grass decoction against both pathogenic and edible fungus is significant. Inhibiting the formation of fungus cells that are linked to the release of mycotoxins during the storage of grains and other food goods, lemon grass oil stood out among other essential oils as having promising potential.[28,29] Lemon tea's essential oil fraction has been shown to have anti-fungal activities against filamentous fungi of several classes, demonstrating the tea's broad range of activity against both pathogenic and non-pathogenic fungi.[30]

Antiseptic

Tea tree extract is used in the preparation of hand sanitizer and cleansers since it is effective against infection causing bacteria and viruses including E. coli, S. pneumoniae and H. influenzae.[31]

Anxiolytic properties of lemongrass tea

Researchers have looked into the anxiolytic characteristics of lemongrass tea in order to clarify its effectiveness in treating anxiety-related illnesses noted adverse effects associated with the anxiolytic characteristics of the decoctions prepared from lemon tea.[32,33] However, recent research findings showed that when lemon grass decoctions and infusions (lemon grass tea) are offered to animals, they have the potential to have anxiolytic effects.[34] Positive results from the light/dark box test made this obvious. In this test, a biphasic dosage response, (U-shaped) curve resembling those extensively.[35]

Health Benefits of lemongrass tea

Herbal teas are frequently drunk for their medicinal and energetic qualities since they can promote calm. Having the capacity to support digestion or herbal teas can aid in offering the body cleaning effects and boosting the immune system. It is crucial to keep in mind that various herbs may have various therapeutic characteristics, allowing us to create our own herbal infusions in accordance with how we want the cup of tea to help us.

One of the healthiest herbal teas to consume is green tea. It has a number of benefits, including preventing some malignancies, battling dental decay and gum disease, assisting with weight loss, and more. Green tea is sometimes offered in “matcha” form, which is simply green tea leaves that have been finely powdered. The
ingestion of green "matcha" tea, which is actually whole tea leaves ground into a fine powder, has a variety of positive side effects on the body.[8,12]

<table>
<thead>
<tr>
<th>Skin treatment:</th>
<th>Lemongrass essential oil is reportedly utilised as a medicinal agent for the treatment of inflammatory skin diseases, according to research.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Repellent:</td>
<td>Lemongrass extract is used in the preparation of insect repellents due to the presence of compounds citral and geraniol.</td>
</tr>
<tr>
<td>Controls dandruff:</td>
<td>Due to its antibacterial properties, lemongrass oil is used in hair tonics to alleviate dandruff, as well as anti-inflammatory qualities. Additionally, it prevents the development of the fungus M. furfur, which is linked to dandruff.</td>
</tr>
<tr>
<td>Prevents anemia:</td>
<td>Lemongrass is a rich source of iron and other minerals, it encourages erythropoiesis to ward off anemia's symptoms.</td>
</tr>
<tr>
<td>Treats oral issues:</td>
<td>Lemongrass extracts aid in preventing gum disease and cavities.</td>
</tr>
<tr>
<td>Wound treatment:</td>
<td>The antibacterial activity of tea tree extract makes it an effective wound healer.</td>
</tr>
<tr>
<td>Antiseptic:</td>
<td>Tea tree extract is used in the manufacturing of hand sanitizers and cleansers because it is efficient against infection-causing bacteria and viruses such as E. coli and S. aureus. H. influenzae and H. pneumoniae.</td>
</tr>
</tbody>
</table>

### Side effects of lemongrass tea

- Lemongrass is typically regarded safe to use in cooking, but if ingested in excess, it might cause negative effects like fatigue, dry mouth, dizziness, and elevated heart rate.
- Additionally, because it begins menstruation early, avoid using it while pregnant.
- A lack of appetite, frequent urination, and allergic rashes and itching.
- Melaleuca alternifolia, the botanical name for the tea tree, is a native of Queensland and New South Wales in Australia.
- Tea tree oil has been used as a conventional medicine by Aborigines and Australians for treating common cold and cough.
- Terpinen-4-ol, an antibacterial substance that increases the activity of white blood cells against foreign infections, is a component of tea tree extract.

### CONCLUSION

Lemon grass (Cymbopogon citratus), is a member of poaceae family. It is a medicinal plant with compounds capable of controlling pathogens and increasing herbal resistance to pathogenic diseases. Lemongrass is widely used in the herbal teas and other non-alcoholic beverages in baked food, and also in the confections. The cholesterol-lowering ability of herbal teas may be linked to variations in intestine cholesterol uptake, as well as cholesterol transformation to bile acids and impaired absorption. The extract’s hypocholesterolaemic properties were evidenced, which could lead to its use in enthmecine for the treatment of heart disease. Some lipid-lowering drugs also lower HDL levels in the body along with total cholesterol, triglycerides, and LDL, but lemongrass and basil tea have a unique ability to increase HDL levels in the body and decrease total cholesterol, triglycerides, and LDL. HDL is good cholesterol that aids in the regulation of blood cholesterol. These herbal teas are an arsenal for fighting hyperlipidemia and preventing cardiovascular disease.

### REFERENCES

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