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EXTRACTION, PHTOCHEMICAL SCREENING AND IN VITRO ANTIOXIDANT ACTIVITY OF CYMBOPOGON CITRATUS

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Abstract

Human beings rely heavily on medicinal plants to maintain their health. The pharmacological assessment of numerous plants utilized in Indian traditional medicine is becoming increasingly popular. The plant Cymbopogon citratus, commonly known as West Indian lemon grass or simply lemon grass,is a tropical plant native to Maritime Southeast Asia and introduced to many tropical regions Cymbopogon citratus is part of the grass family, Poaceae. In folk medicine, it has been used as antibacterial, antifungal, anti-inflammatory, anticancer, analgesic, antiseptic and antinociceptive and antioxidant agents Due to its capacity to function as an antibiotic and antiseptic, it can be used to treat ringworm and athlete's foot disease. Lemongrass has a strong antimicrobial effect against methicillin-resistant Staphylococcus aureus (MRSA). It can help with colitis, indigestion, and gastro-enteritis. It aids in the relief of headache, bodily discomfort, nervous weariness, and other stress-related symptoms It has been used to treat gastrointestinal disorders. In cases of fever, a decoction of lemongrass leaves is used as a diaphoretic lemongrass revitalizes the body and improves overall wellness. This study deals with Extraction, Phytochemical screening and in vitro antioxidant activity of Cymbopogon citratus. The leaves plant was collected and subjected to extraction in hydroalcoholic solvent. The phytochemical screening & antioxidant activity was also assessed. The results showed that the percentage yields were found to be (7.21% w/w of crude drug) of Hydroalcoholic extract Cymbopogon citratus leaves. Results of Phytochemical test showed the presence of Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenols and Alkaloid were found to absent in extract Cymbopogon citratus. The results of phytochemical revels that the all polar and Methanolic and aqueous soluble compound was found to be present in Cymbopogon citratus extract. Antioxidant activity of the samples was calculated through DPPH assay. % inhibition was calculated as an indicative of antioxidant potency. The percentage inhibition for ascorbic acid was found to be 14.23% while for Hydroalcoholic extract Cymbopogon citratus leaves the IC50 value was found to be 88.72%. Results point towards fact that Cymbopogon citratus exhibit potent antioxidant activity.

Keywords: *Cymbopogon citratus, Antioxidant activity, Herbal medicines, IC50*

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INTRODUCTION:

Nature has given a large source of medicinal agents from plants for the past thousands of years, an impressive number of modern drugs have been isolated from natural sources. Many of these isolations were based on the uses of the agents in traditional medicine. The plant-based, traditional medicine systems continue to play an essential role in health care, The natural products derived from medicinal plants have proven to be an abundant source of biologically active compounds, many of which have been the basis for the development of new lead chemicals for pharmaceuticals. With respect to diseases caused by microorganisms, the increasing resistance in many common pathogens to currently used therapeutic agents, such as antibiotics and antiviral agents, has led to renewed interest in the discovery of novel anti-infective compounds. As there are approximately 500 000 plant species occurring worldwide, of which only 1% has been phytochemically investigated, there is great potential for discovering novel bioactive compounds. Many plant-derived medicines used in traditional medicinal systems have been recorded in pharmacopeias as agents used to treat infections and a number of these have been recently investigated for their efficacy against various diseases (Palombo,2011 & Bent,2008).

The plant *Cymbopogon citratus*, commonly known as West Indian lemon grass or simply lemon grass,is a tropical plant native to Maritime Southeast Asia and introduced to many tropical regions Cymbopogon citratus is part of the grass family, Poaceae. It is a medicinal andfragrant perennial tall grass with rhizomes and fibrous roots that are densely tufted. It is a member of the Poaceae family, which is known for producing a lot of oil. On short subterranean stems, dense clusters of green, slightly leathery leaves emerge In folk medicine, it has been used as antibacterial, antifungal, anti-inflammatory, anticancer, analgesic, antiseptic and antinociceptive and antioxidant agents Due to its capacity to function as an antibiotic and antiseptic, it can be used to treat ringworm and athlete's foot disease. Lemongrass has a strong antimicrobial effect against methicillin-resistant Staphylococcus aureus (MRSA). It can help with colitis, indigestion, and gastro-enteritis. It aids in the relief of headache, bodily discomfort, nervous weariness, and other stress-related symptoms It has been used to treat gastrointestinal disorders. In cases of fever, a decoction of lemongrass leaves is used as a diaphoretic lemongrass revitalizes the body and improves overall wellness. Lemon grass tea is frequently used to treat illness, fever, and pneumonia. (Joseph,1960).

Recently, interests in medicinal plants have been cantered on investigation of the pharmacology and phytochemical screening of secondary metabolites to explore their therapeutic potency and boost the production of novel herbal drugs. Essential oils and other bioactive compounds have been isolated, characterised and analysed in C. citratus for their pharmacological activities. Also, their applications have been reported in food, pharmaceutical, cosmetics, beverages, soap and detergent industries (Chopra *et al*., 1958; Nambiar and Matela, 2012).

MATERIAL AND METHOD:

Collection of Plant:

The roots of *Cymbopogon citratus* were collected from Akshat Nursery, Bhopal in the period of March 2022, considering the seasonal conditions for obtaining maximum phytoconstituents.

Extraction:

Collected plant drugs namely *Cymbopogon citratus* roots were cleaned properly and washed with distilled water to remove any kind of dust particles. Cleaned and dried plant drugs were converted into moderately coarse powder in hand grinder. Powdered plant drugs were weighed (50 gm) and packed in (1 liter) air tight glass Bottle. The plant drugs were subjected to extraction by Methanol+water (20:80) as solvent for about 24 hrs. The liquid extracts were collected in a tarred conical flask. The solvent removed from the extract by evaporation method using hot plate. The extracts obtained with each solvent were weighed to a constant weight and percentage w/w basis was calculated (Khandelwal, 2005; Kokate, 1994).

Preliminary Phytochemical Screening:

Preliminary phytochemical screening means to investigate the plant material in terms of its active constituents. In order to detect the various constituents present in the Hydroalcoholic extract of roots of *Cymbopogon citratus*, were subjected to the phytochemical tests as per standard methods.

Estimation of total flavonoids content:

The aluminum chloride colorimetric method was modified from the procedure reported by Woisky and Salatin. Quercetin was used to make the calibration curve. Ten milligrams of quercetin was dissolved in 80% ethanol and then diluted to 10 to 50 µg/mL. The diluted standard solutions (0.5 mL) were separately mixed with 1.5 mL of 95% ethanol, 0.1 mL of 10% aluminum chloride, 0.1 mL of 1M potassium acetate and 2.8 mL of distilled water. After incubation at

room temperature for 30 min, the absorbance of the reaction mixture was measured at 415 nm with a Shimadzu spectrophotometer. The amount of 10% aluminum chloride was substituted by the same amount of distilled water in blank. Similarly, 0.5 mL of Hydroalcoholic extracts and Flavonoid standard solutions (100 ppm) were reacted with aluminum chloride for determination of Flavonoid content as described.

Antioxidant Activity:

DPPH free radical scavenging assay DPPH scavenging activity was measured by modified method (Parkhe and Jain, 2018). DPPH scavenging activity was measured by the spectrophotometer. Stock solution (6 mg in 100ml methanol) was prepared such that 1.5 ml of it in 1.5 ml of methanol gave an initial absorbance. Decrease in the absorbance in presence of sample extract at different concentration (10- 100 µg/ml) was noted after 15 minutes. 1.5 ml of DPPH solution was taken and volume made till 3 ml with methanol, absorbance was taken immediately at 517 nm for control reading. 1.5 ml of DPPH and 1.5 ml of the test sample of different concentration were put in a series of volumetric flasks and final volume was adjusted to 3 ml with methanol. Three test samples were taken and each processed similarly Finally the mean was taken. Absorbance at zero time was taken for each concentration. Final decrease in absorbance was noted of DPPH with the sample at different concentration after 15 minutes at 517 nm. The percentage inhibition of free radical DPPH was also calculated (Parkhe and Jain, 2018).

RESULTS AND DISCUSSION:

The yields were found to be (7.21% w/w of crude drug) of Hydroalcoholic extract *Cymbopogon citratus* leaves. Results of Phytochemical test showed the presence of Carbohydrates, Flavonoids, Proteins & Amino acids, Diterpenes and Saponins. Phenols and Alkaloid were found to absent in extract *Cymbopogon citratus*. The results of phytochemical revels that the all polar and Methanolic and aqueous soluble compound was found to be present in *Cymbopogon citratus* extract. Antioxidant activity of the samples was calculated through DPPH assay. % inhibition was calculated as an indicative of antioxidant potency. The percentage inhibition for ascorbic acid was found to be 14.23% while for Hydroalcoholic extract *Cymbopogon citratus* leaves the IC50 value was found to be 88.72%.

Table 1: Extractive values obtained from *Cymbopogon citratus*

S. No.	Solvent	% Yield
1.	Methanol+water (20:80)	7.21%

Table 2: Preliminary phytochemical screening of *Cymbopogon citratus*

S.N.	Phytoconstituents	Test Name	Hydroalcoholic Extract
1	Alkaloids	Wagner's Test	**+(ve)**
2	Carbohydrates	Fehling's Test	**+(ve)**
3	Flavonoids	Lead acetate	**+(ve)**
		Alkaline reagent test	**+(ve)**
4	Proteins & Amino acids	Precipitation test	**+(ve)**
5	Phenols	Ferric chloride test	**-(ve)**
6	Diterpenes	Copper acetate test	**+(ve)**
7	Saponins	Foam test	**+(ve)**

Table 3: % Inhibition of Hydroalcoholic extract of *Cymbopogon citratus*

S. No.	Concentration (µg/ml)	% Inhibition	
		Ascorbic acid	Hydroalcoholic extract
1	10	41.93	21.76
2	20	56.45	27.63
3	40	61.29	34.89
4	60	72.58	39.55
5	80	75.8	42.98
6	100	80.64	56.81
IC 50		**14.23**	**88.72**

CONCLUSION:

The results of the phytochemical test indicated the presence of Diterpenes, proteins and amino acids, flavonoids, and carbohydrates. *Cymbopogon citratus* extract was discovered to be devoid of Phenols and phenolic compounds. The Phenols and flavonoids are present in higher amount in the extract .This plant was also subjected to in vitro antioxidant activity, which demonstrated the existence of antioxidants needed to combat free radicals. In order to treat many diseases and ailments, this plant portion can be used.

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