

Centellaasiatica* aqueous extract preparation and its antifungal activity against *Candida albicans

- **Ngoubinah pretty TM**

Saveetha dental college and hospitals, Saveetha Institute of medical and Technical Sciences, Saveetha university, Chennai - 600077. Email id: 151901053.sdc@saveetha.com

- **Dr. Rajeshkumar**

Department of Pharmacology Saveetha dental college and hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha university, Chennai - 600077. Email id: rajeshkumars.sdc@saveetha.com

- **Dr. Gheena.S***

Professor, Department of Oral Pathology Saveetha dental college and hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha university, Chennai - 600077. Email id: gheena@saveetha.com

- **Dr. Abirami Arthanari**

Department of Forensic Odontology Saveetha Dental College and Hospital, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077 Email id- abiramia.sdc@saveetha.com

Abstract:

Introduction:

Centellaasiatica belong to a family Apiaceae is a common perennial herbaceous creeper flourishing abundantly in moist areas and distributing widely in tropical and subtropical countries, various chemicals constituents are reported in *Centellaasiatica* like asiaticoside, madecassoside, madecassic acid, asiatic acid.

Materials and method:

Three grams of dry powder of *centellaasiatica* powder were weighed and taken, which was commercially available in powder form and therefore it was easy to purchase. 200ml of distilled water was added. Then the mixture was boiled and centrifuged at 8000 rpm for 10 minutes. The extract was then placed in the well cultured agar plates (rose bengal agar) against *Candida albicans* and incubated for 24 hours at 37°C.

Result:

In the nanoparticles the result shows 25µl of concentration with 9mm of zone of inhibition, 50µl of concentration with 9mm of zone of inhibition, 100µl of concentration with 10mm of zone of inhibition, and zone of inhibition for antibiotic was 11mm

Conclusion:

In this study the aim was to find antifungal activity in *centellaasiatica* in *C.albicans* and we found that *Centellaasiatica* mediated in aqueous extraction showed us wider zones of inhibition of good antifungal efficiency.

Keywords: *Centellaasiatica*, Natural, antioxidant, antifungal, extract, innovative technique, green synthesis.

INTRODUCTION:

Centellaasiatica (CA) belong to a family umbelliferae is a common perennial herbaceous creeper flourishing abundantly in moist areas and distributing widely in tropical and subtropical countries, it is widely distributed throughout tropical and subtropical regions of the world, centella are used in food and beverages due to their beneficial functional properties. various chemicals constituents are reported in *centellaasiatica* like asiaticoside, madecassoside, madecassic acid, asiatic acid, glucose, rhamnose, terpenoids, sitosterol, stigmasterol, fatty oil consist of glycerides of palmitic acid, stearic acid, linoleic acid, linolenic acid vitamins like ascorbic acid it also contain calcium, iron and phosphate. (1), Saponins also known as triterpenoids are the main active constituents of *Centellaasiatica*. These include asiaticosides, which have a trisaccharide moiety connected to the aglycone asiatic acid, madecassoside, and madasiatic acid. (2), the liquefied medium of agar nutrient can also be inoculated with the suspensions of bacteria, and the inoculated medium should be poured immediately into petri dishes to occupy a depth (3). The Antioxidant activity of *Centellaasiatica* is comparable to the activity of rosemary and sage and also has very good potential to be explored as a source of natural antioxidants. *Centellaasiatica* leaves exhibited higher antioxidant activities using boiled aqueous extraction. It is also said that total flavonoid content and total phenolic content also respond better in boiled aqueous extraction (4)

The methanolic extract of *Centellaasiatica* had a higher oxygen radical absorbance potential than the aqueous methanolic and ethyl acetate extracts of the same plant, indicating that *Centellaasiatica* has a protective effect on the antioxidant

tissue protection system against adriamycin-induced cardiomyopathy in rats. Centella in combination with arsenic protects animals from oxidative stress caused by arsenic (5). Diarrhea is a major public health problem in developing countries. Multiple drug resistance among enteropathogens in various geographic regions presents a major threat in the control of diarrhea. Broad spectrum activity of *Centella asiatica* against a wide range of enteric pathogens was observed. They used a viable cell count method to study whether the observed inhibition was bactericidal or bacteriostatic in action. In the case of *Vibrio cholerae*, *Shigella* species and *Staphylococcus aureus*, the alcoholic extract of the plant showed bactericidal action within 2 hours.(6). Ethanolic and petroleum ether extracts of *Centella asiatica* plant show significantly higher rate of antifungal activity against various fungal strains like *Aspergillus niger*, *Aspergillus flavus* and *Candida albicans* when compared to water extracts. Hexane, carbon tetrachloride, chloroform and aqueous soluble fractions of methanolic extract showed antimicrobial activity against various yeast and mold strains like *Aspergillus niger*, *Saccharomyces cerevisiae* and *Candida albicans*, similarly the aim of this study is to find the antifungal activity of *Centella asiatica*(7)

The inhibitory effect on spore germination of the above fungus strains was increased proportionately with the increase in the concentration of methanolic extracts of the leaves of *C. asiatica* (8), the leaf extract of *C. asiatica* growing in China was shown to display neuroprotection through enhancing phosphorylation of cyclic AMP response element binding protein in neuroblastoma cells in $A\beta$ proteins found within the amyloid plaques occurring in the brains of AD patients.(9), When a medicinal plant was found, the methods of applying for therapeutic treatment are herbal teas or preparation of pharmaceutical powder pills, tinctures, capsules, fluid extract, standard enrich, or crude extract, a plant that contains active natural compound that is itself responsible for drug can be isolated and purified by extraction process, such as ergotamine, digoxin, and quinine(10), *Centella asiatica* is one of the most important spices used daily by people all over the world. Our team has extensive knowledge and research experience that has translate into high quality publications (11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30), The aim of this study is to find antifungal activities of aqueous extract of *Centella asiatica*.

Materials and methods:

Three grams of dry cpowder of *centella asiatica* powder were weighed and taken, which was commercially available in powder form and therefore it was easy to purchase. 200 ml of distilled water was added. Then the mixture was boiled and centrifuged at 8000 rpm for 10 minutes.

The extract was then placed in the well cultured agar plates (rosebengal gram) against *Candida albicans* and incubated for 24 hours at 37°C. The zones of inhibition were calculated by disk diffusion method. The procedure was done under the guidance of lab technicians.

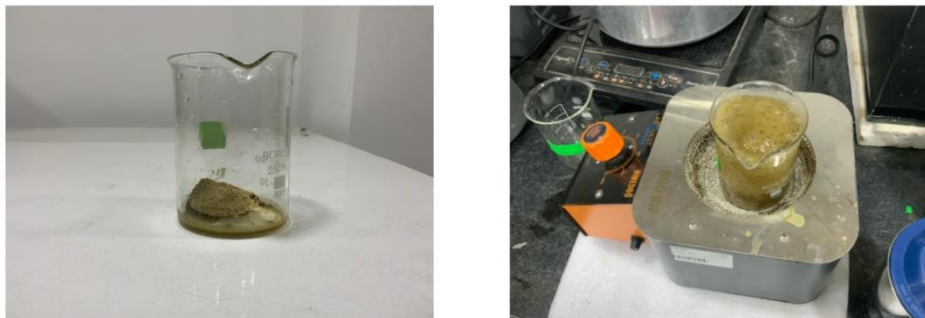


Figure 1: Representation of about 200ml of distilled water added to the dry form of *centella asiatica*, and the solution was boiled at 50°C for 20 minutes.

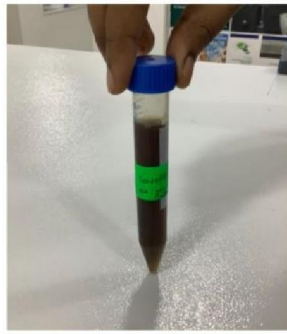


Figure 2: Representing the obtained extract

Result:

Table 1: Antifungal activity of aqueous solution of centellaasiatica, in Candida Albicans with different concentration (μ l) and zone of inhibition (mm)

s.no	Zone of inhibition	Concentration in mm
1	25 μ l	9mm
2	50 μ l	9mm
3	100 μ l	10mm
4	Antibiotic	1mm



Figure 3: Antifungal activity of aqueous solution of *Centellaasiatica* against *Candida Albicans* showing zone of inhibition analysed by well diffusion method.

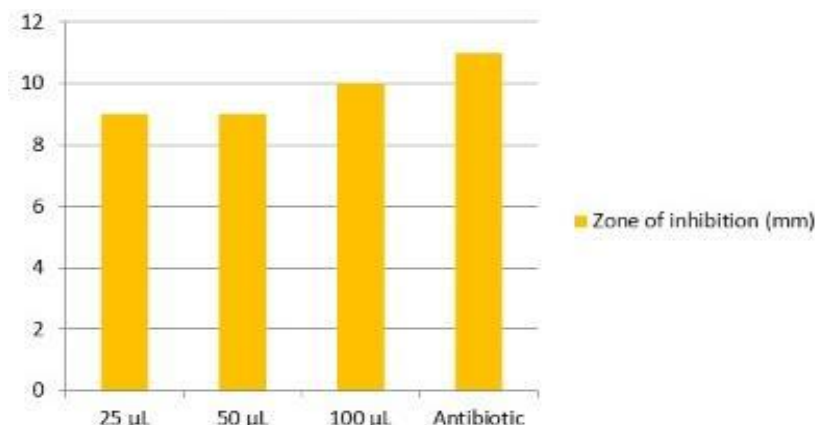


Figure 4: The bar graph depicts the antifungal activity of *Centella asiatica* against *Candida albicans*, Yellow colour represents the zone of inhibition, and X axis represents the concentration in µl and the y axis represents the zone of inhibition in mm.

Discussion:

According to this study the mediated aqueous extract of *Centella asiatica* has good antifungal activity with the zone of inhibition of 10mm at the highest concentration (100 µl). It showed a zone of inhibition against *Candida albicans*. In a related study on rats, *C. asiatica* extract was reported to have a protective effect against mitochondrial damage occurred in potential difference by means of improving oxidative stress parameters(31), in the similar study anticonvulsant effect of the hydroalcoholic extract of *C. asiatica* against PTZ- and strychnine-induced opisthotonus convulsions at 100 mg/kg. Moreover, the extract was observed to reduce lipid peroxidation and spontaneous locomotor activity, whilst it potentiated pentobarbital-induced sleeping duration and diazepam-induced hyperactivity.(32),

In a similar study Cinnamon and clove mediated selenium nanoparticles were studied and their wider zones of inhibition observed were suggestive of good antifungal efficiency.(33), *Centella asiatica* is a valuable plant traditionally utilized to treat a wide range of diseases and proved to have immense medicinal and therapeutic benefits. Phytochemicals such as asiatic acid, Madecassic acid, Madasiatic acid, Betulinic acid and Thankunic acid isolated from this plant are utilized in various commercial products such as skin care, anti-aging, slimming teas etc.(34),

Conclusion:

From the present study it was concluded that the extracts of *Centella asiatica* plants were found to be potent antifungal agents against *Candida albicans*. Further study should be undertaken to elucidate the exact mechanism of action by which extracts exert their antifungal effect by identifying the biological active ingredients which can be used in drug development programs to identify newer therapeutic agents.

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CONFLICT OF INTEREST- All the authors declare no conflict of interest in the study.

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