



ANTIFUNGAL ACTIVITY OF DIFFERENT HOMOEOPATHIC DRUGS AGAINST *ASPERGILLUS NIGER* IN VITRO

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Abstract: Aspergillosis is a fungal infection which manifests both acute and chronic phases. In the acute phase it affects about 1-4 million and in the chronic phase 3 million people around the world. Aspergillosis is caused by *Aspergillus niger* mainly in immunocompromised persons. Homoeopathy is one of the most effective systems of medicine used worldwide. Even though there are plenty of clinical studies, the homoeopathic system is lacking in pre-clinical studies. Here the antifungal activity of *Aspergillus niger* was studied in-vitro by using *Allium cepa*, *Carbo vegetalis* and *Phosphorus* 200 potencies in SDA medium and the zone of inhibition produced by these three drugs was studied in-vitro. The medicine *Carbo vegetalis* 200 showed more antifungal activity with a zone of inhibition of 7mm, *Phosphorus* 4mm and *Allium cepa* 2mm. The control *Saccharum lactis* shows only 1mm inhibition. It shows that homoeopathic medicines possess a fungicidal activity and hence it can be effectively used in fungal infections.

Index Terms - Antifungal activity, *Aspergillus niger*, *Carbo vegetalis*, *Phosphorus*, *Allium cepa*, Zone of Inhibition.

I. INTRODUCTION

Aspergillosis is an infection caused by *Aspergillus*, a type of fungus that lives indoors and outdoors. In today's world, people breathe *Aspergillus* spores every day. People with weakened immune systems are at a higher risk of developing aspergillosis.^[1] *Aspergillus niger* is a microscopic filamentous fungus. The main source is soil. The ability of *Aspergillus niger* to produce various types such as low molecular weight organic acids and has a great use not only in food, medicine but also in mineral biotechnology.^[2] Homoeopathic remedies are widely used all over the world for different disease conditions. Approximately 70% are derived from the plant; however, their preclinical evaluation is still a major concern.^[3] Homoeopathy is a holistic way of healing based on the principle "like cures like". There is a wide spread increase in the use of homoeopathy and it can serve as a good alternative option with greater cost effectiveness and lesser side effects. The homoeopathic medical substances are extremely diluted so there is no doubt regarding their safety, yet there has not been verification of the mode of action of homoeopathy in terms of a modern evidence-based system. In this study, homoeopathic medicines *Allium cepa*, *Phosphorus*, *Carbo vegetalis* are used for the study. Through the present study, the antifungal effect of these medicines in 200C potencies has been assessed and evaluated.

II. NEED OF THE STUDY

- To determine the growth inhibitory capability of homoeopathic medicine against *Aspergillus niger*.
- To know the antifungal activity of selected homoeopathic medicine against the pathogen.

III Pathogenicity

3.1 Plant pathogen

Aspergillus niger can cause black mold infections in certain legumes, fruits, and leading to the fungus being a common food contaminant. This filamentous ascomycete has a tolerance to changes in pH, humidity, and heat, thriving in a temperature range from 15 to 53 °C (59 to 127°F). These characteristics make infections of *A. niger* a common cause of post-harvest decay in fruits and vegetables, which can lead to significant economic loss in the food industry.

3.2 Human pathogen

Aspergillus niger spores are commonly inhaled by humans from their surrounding environment. Aspergillosis infection commonly occurs in people with low immune systems. Types of aspergillosis include allergic broncho pulmonary aspergillosis (ABPA), allergic aspergillus sinusitis, azole-resistant aspergillus fumigatus, cutaneous (skin) aspergillosis, and chronic pulmonary aspergillosis. Aspergillosis is particularly frequent among horticultural workers who often inhale [peat](#) dust, which can be rich in *Aspergillus niger* spores. *A. niger* is rarely reported to cause pneumonia compared to other *Aspergillus* species, such as *Aspergillus flavus*, *Aspergillus fumigatus*, and *Aspergillus terreus*.^[4]

3.3 Disease Presentation

- Fever and chills
- A cough that brings up blood (hemoptysis)
- Shortness of breath
- Chest or joint pain
- Headaches or eye symptoms
- Skin lesions^[5]

3.4 Growth

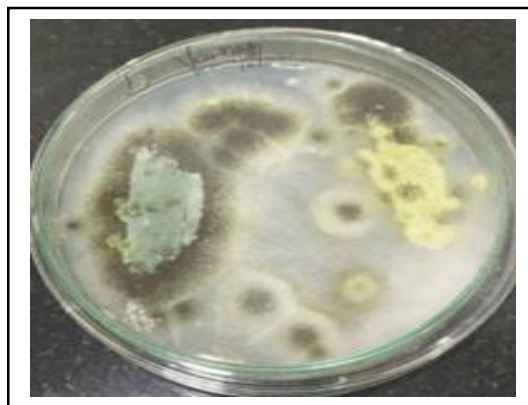
A. niger is a mesophilic fungus. Its optimal growth temperature is 20-40°C, with good growth at 37 °C.^[6]

IV MATERIALS AND METHODS

- Study setting: Sarada Krishna homoeopathic medical college & research centre.
- Types of Study: An experimental study
- Media for fungal culture: Sabouraud Dextrose Agar (SDA)
- Homoeopathic medicine: In this study, Homoeopathic Medicine ALLIUM CEPA, PHOSPHORUS, CARBOVEGETALIS dilution was brought from Wilmar Schwabe, an approved standard homoeopathic manufacturing unit.
- Negative control: *Saccharum lactis*
- Kirby-Bauer Method:

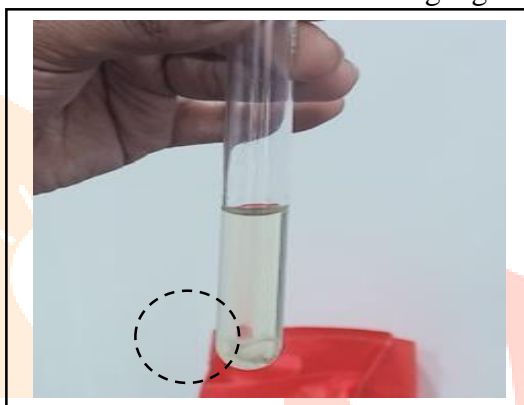
The antifungal activity was performed following Kirby-Bauer Method. The Sabouraud Dextrose Agar (SDA) plate was prepared and solidified. After solidification of the plates the *Aspergillus niger* inoculum was uniformly swabbed over the solidified SDA plate. The plate was undisturbed for 5 mins, after 5 mins the plate was taken and the sterile disc 6mm placed on the appropriate position using sterile forceps. After a few minutes the different homoeopathic medicines were loaded in the sterile condition. 10ml of the medicine was loaded in each sterile disc. The plate was undisturbed for 24 hours. After 24 hrs the result will be observed by measuring the zone of inhibition in millimeter.

- Fungal growth



Fungal culture

Fungal growth



- Method of collection of data (including sampling procedures if any):

Conducting the study / obtaining data by disc diffusion method or Kirby-Bauer testing method on culture medium. The drugs for conducting the study are Allium CEPA, PHOSPHORUS, CARBOVEGETALIS. The potency used are 200. These are divided into 4 groups.

Group I – allium cepa 200

Group II – saccharum lactis

Group III – carbovegetalis 200C

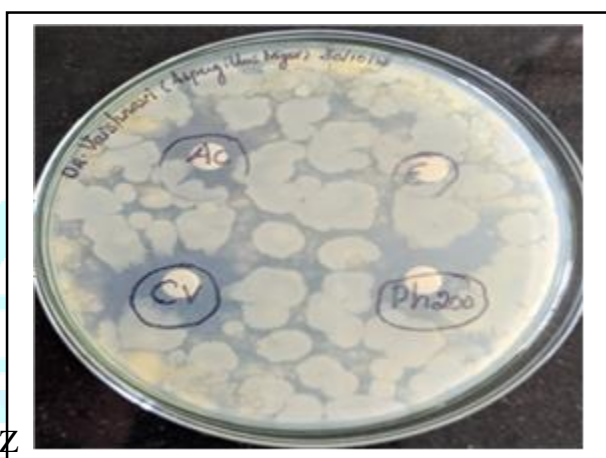
Group IV – Phosphorus 200C

IV. RESULTS AND DISCUSSION

Each group culture medium is streaked with *Aspergillus niger*. The sample of medicine is mixed separately with 1 drop of sample with 1 ml of distilled water and then it is impregnated in round filter paper disc. Plain discs medicated with 200C potencies of Allium cepa, Carbovegetalis, Phosphorus along with alcohol and Saccharum lactis control are to be placed and then assessed by the zone of inhibition (ZOI) around the disc.



6mm disc were placed and Medicated on SDA plate



AC-Alliumcepa
E- Ethanol
CV-Carbovegetalis
Ph 200- Phosporus

FUNGALSTAIN	MEDICINE	INHIBITION ZONE
Control	SaccharumLactis	1 MM
Aspergillus Niger	AlliumCepa	2 MM
	Phosphorus	4 MM
	Carbovegetalis	6MM

4.1 Result

Alliumcepa, Phosphorus, Carbovegetalis of 200potencies shown antifungal activity for *Aspergillusniger* and effectiveness of homoeopathic medicine is seen by observing the zone of inhibition around the disc which ranges from 2mm , 4mm, 6mm for different potencies. The Carbo vegetalis 200 has the ZOI of 6 mm. This antifungal study results support the concept of the Evidence-Based Medicine, it represents that Homoeopathic medicine has specific inhibitory action against *Aspergillus niger*.The homoeopathic medicine CARBO VEGETALIS showed the best antifungal with growth inhibitory action of 6 mm of inhibition zone and effective in treating various diseases such as Aspergillosis, allergic

broncho pulmonary aspergillosis (ABPA), aspergilloma, chronic pulmonary aspergillosis and invasive aspergillosis. Different medicine of the same potency produce different responses on the micro-organism growth, suggesting that a further kinetic study may be appropriate

4.2 Discussion

It is shown that the homoeopathic medicine CARBOVEGETALIS200 has specific inhibitory activity and Fungicidal activity. Many modern medicines have resistant in *Aspergillus* and it may sometimes have created many side effects, where as homoeopathic medicines have no side effect as far as known and it has inhibitory activity against the fungus. It has a cost-effective and preventive and safe mode of the treatment in this reason the homoeopathic medicine was the effective choice of treatment. The results of the experiment prove that the homoeopathic ultra-diluted medicines are effective *in-vitro* antifungal study as evidence based medicine, It's not placebo therapy.

ACKNOWLEDGMENT

We are pleased to express my sincere gratitude and appreciation to the management and staff of Sarada krishna homoeopathic medical college and hospital for their invaluable support and cooperation during the course of my research. We extended our heartfelt thanks to the management for providing the necessary infrastructure and resources required to carry out this study. We would also like to acknowledge the staff members who provided their valuable input and guidance throughout the research process. Their assistance and encouragement have been instrumental in the successful completion of our study.

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