



# STUDY OF EFFICACY OF SOME SPICES AGAINST AEROMYCOFLORA ISOLATED FROM VEGETABLE MARKETS OF JABALPUR

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## Abstract:

Air is a natural habitat of numerous fungi, mostly existing there in the form of spores, their clusters, or – on contrast – spore and mycelium fragments. Spores of some fungal genera are very frequent in air samples, often out numbering pollen grains, on which most of research have focused for many years. Spices are an important part of the human diet. In addition to increase the flavor; herbs and spices are also known for their preservative and medicinal value. In the present study the water decoction of 8 spices (Turmeric, Asafoetida, Black Cardamom, Ginger, Garlic, Bay leaf, Star Anise and Nutmeg) are used against the isolated fungal genera from the park. From present study we can conclude that the decoctions of spices especially that of Turmeric can be a good antifungal followed by decoction of Asafoetida, Garlic, and Ginger. They can be even used as preservatives and may be used as alternative to chemical additives that alter the quality of food and also affect the health of consumers.

**Keywords:** water decoction, spices, aeromycoflora, chemical additive.

## Introduction:

Vegetable markets are one of many such environments that produce airborne fungi. Spoiled vegetables and dumped waste plant materials and debris play significant role in the growth and dispersal of various types of airborne fungi and its spores. Fungi are cosmopolitans and are ubiquitous in nature and it has the ability to grow on all substances available in the environment. The fungal spores remain suspended for longer time in the air, their presence depend on the various factors like humidity, temperature, sunlight, seasonal climatic variations. (Kumar and Shende 2022). Airborne molds have been found to be responsible for biodegradation of vegetables and fruits in market area. Many of the microbial forms of the aeromicrobioata are hazardous to plants animals and human beings.

The spices have unique aroma and flavor which are derived from compounds known as phytochemicals or secondary metabolites (Avato et.al. 2002). the phytochemicals are antimicrobial substances in the spices which are capable of attracting benefits of repel harmful organisms, also serve as photo protectants and responds to environmental changes. Spices are recognized to prevent the microbial deterioration of food. Antimicrobial

activity of spices depends on several factors, i.e. kind of spice, composition and concentration of spice and its occurrence level, substrate composition and processing conditions and storage (Shelef 1983; Farag et al. 1989). Several scientific reports describe the inhibitory effect of spices on a variety of microorganisms, although considerable variation of resistance of different microorganisms to a given spice and of the same microorganisms to different spices has been observed (Akgul and Kivanc 1988).

## Methodology

### Sample Collection:

A total no. of 5 samples were collected from different Vegetable markets of Jabalpur (Madhya Pradesh) by using gradient petri plate method. Sterilized Petri plates containing Sabouraud's Dextrose Agar (SDA) media were exposed for 2 minutes at 5 feet height in the sampling site. The exposed Petri plates were brought into lab and incubated at 28° C for 3-5 days. Fungal isolates were observed and identified on the basis of morphological characteristics, microscopic slide and available published literature.

The Percentage contribution of fungal flora was calculated by the following formula-

$$\text{Percentage contribution} = \frac{\text{Total number of colonies of individual species in all the plates}}{\text{Total number of colonies in all species}} \times 100$$

### Collection of spices

All the sample of spices viz. turmeric, garlic, ginger, star anise, holy basil, asafoetida, nutmeg, bay leaf were purchased from the local market.

### Preparation of Aqueous Decoction

Aqueous decoction of turmeric, garlic, ginger, star anise, holy basil, asafoetida, nutmeg, bay leaf were prepared by boiling 10gm in 100ml sterile distilled water over low flame for 15 minutes. The flasks were then plugged and removed from heat and allowed to cool. After cooling the contents of flasks were filtered.

### Agar well diffusion method

Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants or microbial extracts. The agar plate surface is inoculated by spreading a volume of the microbial inoculum over the entire agar surface. Wells were punched on the plates sized approximately 2mm thick. The punched wells were then filled with decoctions and kept for observation for 3-5 days at 35°C for 3-5 days.

### Measurement of the zone of inhibition

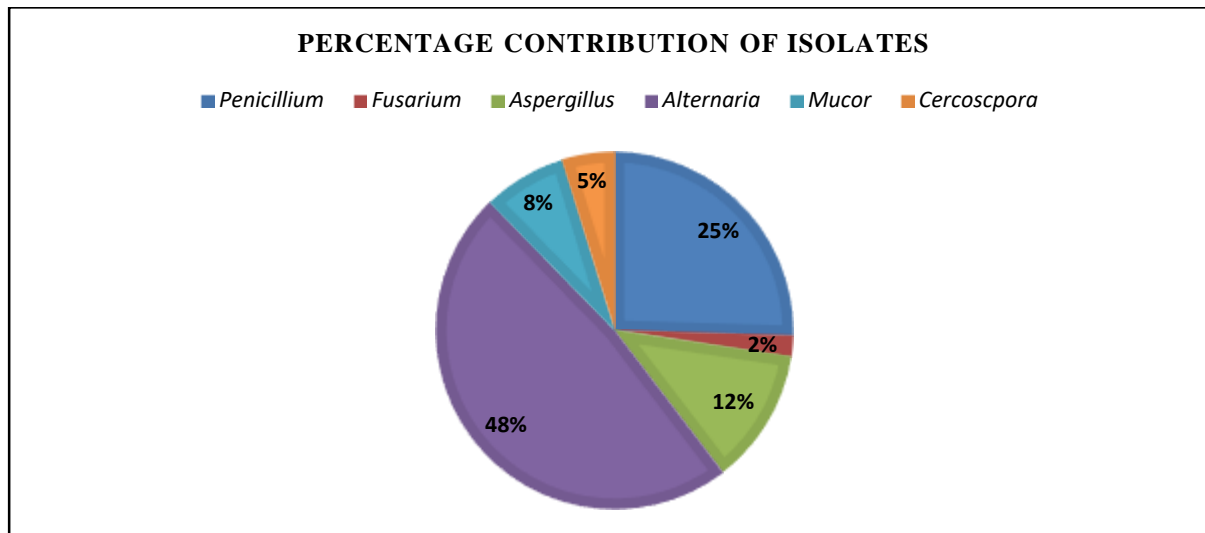
The measurements were made with the of ruler on the under-surface of the plate without opening the lid. The scale was used and putting the well center as a center point diameter was measured.

## Result and Discussion:

A total of 106 Fungal isolates were identified in the present investigation these fungi were isolated from different vegetable markets around Jabalpur (Madhya Pradesh) and it was observed that the growth of these reduced as the temperature raised in the month of March – April and the number of colonies reduced gradually. On Identification Fungal Isolates were found to be *Penicillium*, *Aspergillus*, *Alternaria*, *Mucor*, *Fusarium* and *Cercospora*. The maximum percentage was found of *Fusarium sp.*(48.11%) and the lowest occurrence is of *Aspergillus sp.* (1.88%).

Table No. 1 Percentage Contribution of Isolated Species

Isolated Genera	Total No. of isolated species	Percentage Contribution (%)
<i>Aspergillus sp.</i>	2	1.88
<i>Cercospora sp.</i>	5	4.71
<i>Mucor sp.</i>	8	7.54
<i>Alternaria sp.</i>	13	12.26
<i>Penicillium sp.</i>	27	25.4
<i>Fusarium sp.</i>	51	48.11



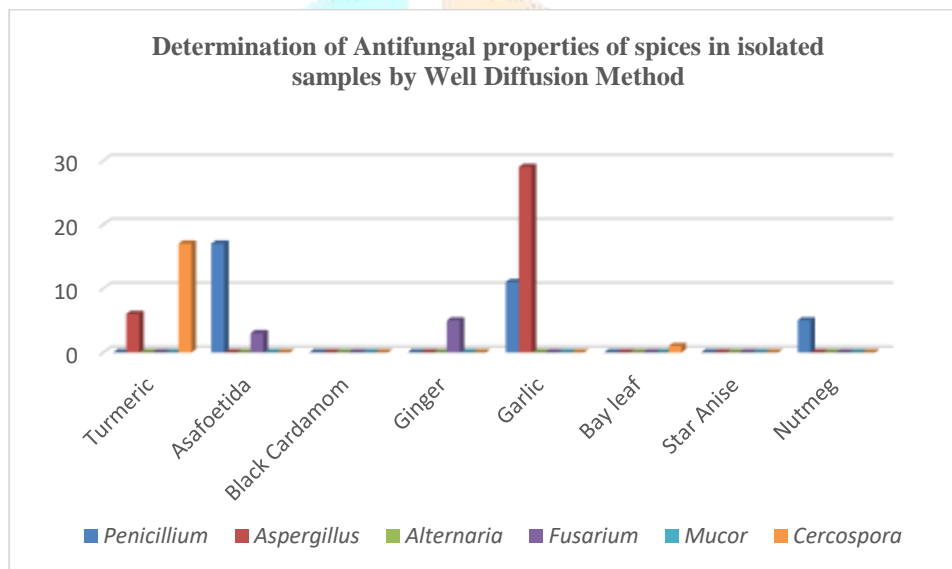
The study was performed to analyze the antifungal activities of the spices such as Turmeric (*Curcuma longa*), Asafoetida (*Ferula assa-foetida*), Black Cardamom (*Amomum subulatom Roxburgh*), Garlic (*Allium sativum*), Ginger (*Zingiberofficinale*), Star Anise (*Illicium verum*), Bay Leaf (*Laurus nobilis*), Nutmeg (*Myristica fragrans*) which is widely used spices in every day's meal. Recently, modern science is concerned about the properties of spices especially, antimicrobial and antioxidative properties. From present study we can conclude that the decoctions of spices especially that of Turmeric can be a good antifungal followed by decoction of Asafoetida, Garlic, and Ginger. They were found to possess better antifungal activity. So decoction which were found highly inhibitory to certain fungi could be tried as effective remedies against disease caused by them. . Decoction of Black Cardamom and Star Anise does't show any antifungal property against the isolated fungal genera.

Normally many antifungals are available in the market for the treatment but here our aim was to use some easily available remedies with lesser cost for the treatment or to make our body resistant by the attack of these fungal pathogens.

Table No. 2 Determination of Antifungal properties of spices in isolated samples by Well Diffusion Method

	Turmeric	Asafoetida	Black Cardamom	Ginger	Garlic	Bay leaf	Star Anise	Nutmeg
<i>Penicillium sp.</i>	-	17	-	-	11	-	-	5
<i>Aspergillus sp.</i>	6	-	-	-	29	-	-	-
<i>Alternaria sp.</i>	-	-	-	-	-	-	-	-
<i>Fusarium sp.</i>	-	3	-	5	-	-	-	-
<i>Mucor sp.</i>	-	-	-	-	-	-	-	-
<i>Cercospora sp.</i>	17	-	-	-	-	1	-	-

(-) indicates No Zone; Values in mm



The isolated fungal genera was also reported allergic to humans in previous studies of many scientists, so some measures should be taken to avoid these pathogens as much as possible. The vegetable vendors are present whole day in the market so they may develop many allergies that directly or indirectly transfer to the buyers and these vendors doesn't have enough money to treat their allergies so the use of spices can be an alternative, effective and low costing method for preventing fungal allergies.



### Location of Sample Collection



**Photo 1:** Sampling site



**Photo 2:** isolated fungal genera from site



**Photo 3:** decoctions of spices

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