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# STUDY THE EFFECT OF AQUEOUS EXTRACT FOR PLEUROTUS OSTREATUS AGAINST ASPERGILLUS FUMIGATUS AND ASPERGILLUS NIDULANS

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**Abstract**
The study aimed to manufacture an aqueous extract of the *Pleurotus ostreatus* fungus and evaluate its effectiveness against fungi isolated from rotting fruits. The diagnosis of fungal isolates was made by looking at them under a microscope and analyzing their exterior appearance. Aqueous extract was prepared from *Pleurotus ostreatus* fungus. By cutting *Pleurotus ostreatus* basidiocarps into slices, After a 24-hour oven drying process at 50 ± 2 °C, they are ground into a fine powder. After soaking ten grams of *P.ostreatus* powder in distilled water at a ratio of 1:10 (w/v), the mixture was heated for thirty minutes at 60 ± 2 °C. After 30 minutes of room temperature storage with a cover on, strain the boiling mushroom powder. Filtration centrifugation (10,000 × g for 30 min at 4°C) was used to remove suspended residues, and the supernatant was then collected. The study examined the inhibitory effect of the aqueous extract on the isolated fungi. The diameter of the control colony was 30 mm, but when using aqueous extract of *Pleurotus ostreatus*, it was reduced to 22.5 mm. This indicates that the aqueous extract has an inhibitory effect on the growth of *Aspergillus fumigatus* fungus. The aqueous extract had the effect of preventing the *Aspergillus nidulans* fungus from growing. The colony diameter in the control sample was 34.5 mm, but the colony diameter in the sample treated with aqueous extract was 27.5 mm. The efficacy of the aqueous extract against fungus was demonstrated.

**Keywords: *Pleurotus ostreatus*, aqueous extract, pathogenic plant fungi**

## Introduction

Mushrooms are rich in minerals, vitamins, crude fiber, and quality protein. In addition to their nutritional value, mushrooms contain physiologically advantageous bioactive compounds that support overall health. They generate a large variety of highly valuable secondary metabolites for medicinal purposes. Antioxidant, antibacterial, anticancer, cholesterol-lowering, and immunostimulatory mushrooms are among their health-promoting qualities. [1]. [2] Many living things depend on oxidation to produce the energy needed for biological processes. Recent changes in lifestyle or environmental variables including radiation, pollution, cigarette smoke, and pesticides can produce free radicals in people all over the world. Numerous studies have discovered that some species of mushrooms, particularly those from the Basidiomycetes genus, have therapeutic properties such as antioxidant, antimicrobial, anticancer, and immunostimulatory effects. As a result, this can lead to further oxidative stress, which is responsible for damages in DNA, proteins, and membranes as well as contribute to current non-communicable diseases. [3]

***Pleurotus ostreatus***

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*Pleurotus ostreatus* (Jacq.ex.fr) P.kumm is the binomial name. There are roughly 40 species in the genus *Pleurotus*, which is often known as "oyster mushrooms." They occur widely in tropical and subtropical regions and are easily artificially farmed. *Pleurotus* genus includes P. *ostreatus, P. florida, P. sajorcaju, P. highbing51, P. flabellatus , P. cystidiosus, P. sapidus, P. eryngii, P. tuberegium, P. ulmarium, P. citrinopileatus, P. pulmonarius, P. geesteranus* and others, some of which deserve special attention because of their significant nutritional significance and therapeutic potential. [4].

Whereas scientific classification of *P. ostreatus* mushrooms were belongs to, Taxonomic Description
Kingdom : Fungi
Phylum: Basidiomycota
Class : Agaricomycetes
Order : Agaricales
Family : Pleurotaceae
Genus : *Pleurotus*
Species : *P. ostreatus*

**Mycological Characteristics**

The fruiting body's form is referenced in both the scientific and colloquial names. The English common name "oyster" and the Latin "ostreatus" refer to the shape of the cap, which resembles the bivalve of the same name, while the Latin word "pleurotus" (sideways) refers to the sideways growth of the stem with respect to the cap. *P. ostreatus* has a wide, fan-shaped, oyster-shared cap that is 5 to 25 cm in length. Natural examples can be white, grey, tan, or dark brown.[4] The edge is inrolled when the plant is young and smooth, frequently with some lobed and wavy areas. Fig. 1 demonstrates the *P. ostreatus* fruit bodies. White and solid, flesh varies in thickness depending on how it is arranged. Gills: If the mushroom has gills, they are white to cream in color and descend onto any existent stalks. Stipe: The stipe is attached to wood lateral to its off-center location. Spore print: The mushroom's spore print appears white to lilac-grey and is best observed on a dark surface. [12]

Figure : *Pleurotus ostreatus*

**Materials and methods**

**Sample collection:**

Samples were collected from all rotten fruits and vegetables after purchasing them from local markets

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and leaving them for a period of time.

**Identification of fungi:**

For five to ten days, various fungal colonies were discovered on SDA at 37°C. These colonies had varying characteristics, including density and dark green color., White or yellow compact colonies colonies are initially white to light yellow-colored. In the light of day, creamish-yellow; in the dark, more grayishpale grayishPale grayish-brown colony .White to cream-colored to grayish-brown colony smooth radial furrows. Different fungal colonies were examined submicroscopically and macroscopically during the incubation period in order to document their hyphae structure, growth, and mycelium type. Filamentous fungi have been grown on SDA in different regions. SDA culture dishes. The first plate was incubated at 37°±1 C, while the other plate was incubated at 25°±1 C. The growth of pure cultures of each mold colony was examined to show its microstructure under magnification and illustrated using fungal keys. Brochures.

**Microscopic and macroscopic examination:**

In this study, phytopathogenic fungi were diagnosed according to [6]. This definition is based on the following

1-Topography, color, and uniformity of the colony.

2- Reversal of colony (color, major pigment).

3-Microscopic morphology (hyphal structures, size, shape, and arrangement of microconidia and macroconidia).Using lactophenol cotton blue dye, many preparations from various fungal growth sites were examined under a microscope to reveal spores, which included small, single-celled microconidia and big, septate macroconidia. After gently heating the slide under a spirit lamp to eliminate air bubbles and aid in staining (extra stain was wiped off with tissue paper), the cover slip was placed on. [7].

**Preparation of aqueous extract of *Pleurotus ostreatus:***

*Pleurotus ostreatus* mushrooms were purchased from local markets, the plant was cut into slices, dried in an oven at a temperature of 50 ± 2 °C for a whole day, and then ground into a fine powder. After soaking ten grams of *P. ostreatus* powder in distilled water at a ratio of 1:10 (w/v), the mixture was heated for thirty minutes at 60 ± 2 °C. After 30 minutes of covering the boiling mushroom powder at room temperature, strain it. Filtration centrifugation (10,000 × g for 30 min at 4°C) was used to remove suspended residues, and the supernatant was collected.

**Effect of aqueous extract of *Pleurotus ostreatus* against mold**

After adding 1 ml of *Pleurotus ostreatus* aqueous extract to the Petri dish, the medium was allowed to dry. The molds are then grown and incubated for seven days at room temperature, until the colonies grow completely, and then the diameter of the colony growth is measured and compared with the control.

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## Result and Discussion

***Aspergillus fumigatus :***

A common saprotroph in nature, *A. fumigatus* is mostly found in soil and decomposing organic materials, including compost heaps, where it is crucial to the recycling of carbon and nitrogen.[1] Fungal colonies generate conidiophores, which are hundreds of tiny, grey-green conidia (2-4 μm) that easily take off into the air. Since neither mating nor meiosis have ever been seen in *A. fumigatus*, it was believed for a long time that the species could only reproduce asexually. 145 years after Fresenius first described *A. fumigatus*, it was demonstrated in 2008 that the species possesses a completely functional sexual reproduction cycle.[2] Despite the fact that *A. fumigatus* can be found in regions with radically diverse habitats and climates, it exhibits little genetic diversity and little population genetic divergence worldwide. [3] even so there isn't much genetic variety created. *A. fumigatus* is the most common cause of invasive fungal infection in immunocompromised people, such as organ transplant recipients, AIDS patients, and those undergoing immunosuppressive treatment for autoimmune or neoplastic diseases.[4] *A. fumigatus* is a leading source of morbidity and mortality in these people, mostly causing invasive lung infection.[8] Furthermore, in immunocompetent hosts, *A. fumigatus* can result in allergic bronchopulmonary aspergillosis, allergic illness, or persistent pulmonary infections.[9]

Mildew culture on agar plate,

Microscopic feature under (40 x)

Culture properties of an *A. fumigatus* colony cultivated on PDA for 4 days at 28°C are displayed. B: Rough-walled conidia, stipe, conidia, strigmata, and cone head of *A. fumigatus* are visible with optical microscopy (400X).

***Aspergillus nidulans:***

*A. nidulan*s It is a saprophytic fungus called that causes fruit rot. There are two methods of reproduction for *A. nidulans*: sexual and asexual. During sexual reproduction, *A. nidulans* produces fruiting bodies called as cleistothecia. Conversely, *A. nidulans* reproduces mostly asexually by producing conidia. Conidiophores are specialized asexual structures. produce conidia. Conidia undergo a variety of morphological and physiological changes during development and maturity, including modifications to the integrity of their cell walls, their ability to withstand stress, and the secondary metabolism necessary for conidial dormancy.[10]

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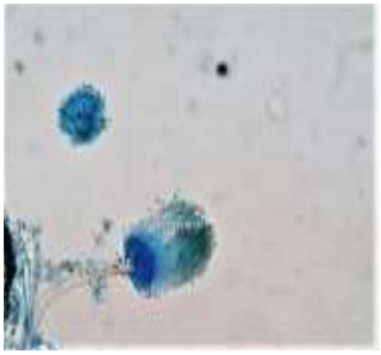
**Mildew culture on agar plate**



**Microscopic feature under (40 x)**

**Table(1): The effect of Aqueous extract of *Pleurotus ostreatus* With Against Fungi**

| Fungi | Control | water extract *Pleurotus ostreatus*(mm) | percintage decrease(mm) |
|---|---|---|---|
| *A. nidulans* | 29.16 | 21.25 | -27.1262 |
| *A. fumigatus* | 30 | 22.5 | -25 |

We conclude that the aqueous extract of the *Pleurotus ostreatus* plant showed higher antifungal activity against *A.nidulans* with an area of inhibition of 21.5 compared to the diameter of the control colony of 29.16. It inhibited *A. fumigatus* with an area of inhibition of (22.5), while the diameter of the fungal colony in the control group was (30). [10]

**Conclusions**

The fungus has been isolated from rotting fruits and vegetables. The aqueous extract of the *Pleurotus ostreatus* fungus was used as an antifungal, and the extract proved effective in inhibiting the growth of the diameter of the colonies compared to the diameter of the control colony.

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