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Comparison between the Biological Activity of *Agaricus bisporus F*ruiting Bodies and *Albizzia lebbeck* Leaves Extract against Different Pathogenic Microoganisms

Abstract-*. In this study, antibacterial activity of ethyl acetate extracts of Agaricus bisporus fruiting bodies and ethyl acetate extracts of Albizzia lebbeck leaves were examined in-vitro with (2) two pathogenic bacteria (Escherichia coli and Proteus) and yeast (Candida albicanus), following agar well diffusion method using different concentrations (25, 50, and 100µl). The extracts of Agaricus bisporus and Albizzia lebbeck were showed potent antimicrobial activity against tested bacteria and yeast. Agaricus bisporus fruiting bodies extract was showed the highest inhibitory effect versus growth of bacteria and yeast were tested in this study. The E. coli and Proteus were found to show large sensitivity to the extracts of Agaricus bisporus with 12 and 13mm inhibition zones respectively at 25 µl concentration while Candida albicanus was more resistant to this extract with inhibition zone of 9mm at 25 µl concentration. In the same time the inhibition zone of Albizzia lebbeck against E coli, Proteus and Candida albicanus were 12, 10.8, 6mm respectively at 25 µl concentration.*

Keywords*- Agaricus bisporus, Albizzia lebbeck, Biological Activity of Agaricus bisporus, Escherichia coli, Proteus, and Candida albicanus.*

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1. Introduction

The causative of Infections remains the major impendence to the human validity. Although many antimicrobial agents have been isolated as natural- synthetic, the pathogenic microorganisms settle resistance to international antimicrobial to growing common health problem; several specific plants has constant important therapeutic help to relieving the sickness of human kind. The drugs derived from plant is revival very important chiefly due to the stream common faith known "green medicine" is innocent and more reliable than the expensive artificial medications, plentiful of that have opposite side effects. This state provided the urge to the research for new antimicrobial articles from different origins like mushrooms and medical plants [1]. The study of [2] was pointed to the mushrooms that had long been used for treatment and food since decenniums. It is now increasingly known that true diet controls and regulates many functions of human body and thus shares in the servicing of state of good health, requisite to reduce the hazard of many diseases. Modernistic pharmacological study affirms large parts of classical information related the medicinal effects of mushrooms due to their antifungal, antibacterial, antioxidant and antiviral merits, besides being used as functional foods. The fruiting bodies Extracts and the mycelia of different types of mushrooms have been noted for antimicrobial activity against large range of infectious bacteria [3,4]. Table mushroom, cultivated mushroom or button mushroom, these names of Agaricus bisporus, are an eaten basidiomycete fungus, which naturally occur in pastures, farms and prairies. The form of original overland endures a brownish cap and dark brown gills but more commonplace is the present variant with a white form, having white cap, stalk and flesh and brown gills [5].

2. Materials and Methods

I. Collecting Plant Samples

Plant samples (leave) was collected from garden of Baghdad University. Plant samples were washed with distal water, dried at home temperature, homogenized to smooth powder by using electric grinder, and then saved in vial [6].

II. Microorganisms

Microorgans are identified species were obtained from Biological Department Collage of Science University of Baghdad. *Escherichia coli* and *Proteus* were cultured on Mueller Hinton Agar

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(MHA) (Himedia/ India), *Candida albicans* was cultured on Sabouraud Dextrose Agar (SDA) (Himedia/India) Table 1 show the microorganisms and the source of the isolates.

III. Preparation of Plant Extract

Ethyl acetate was used as a polar solvent .It is use to extracted leaves of *Albizzia lebbeck,* The extraction was done by solving dried powder plant material (20gm) in ethyl acetate (Laboratory reagent/ England) solvent using Soxhlet apparatus (Electro thermal/ England) and 200ml of solvent were added and heated for 8 hour at 70 Cº and left to dry in oven (Memmert/ Germany) for two days to obtain powder dry extract and then the extract was stored at 4 C̊ in Refrigerator (Brosh/ Lebanon) until use. The concentration that has been prepared using the following formula:

C1 V1 =C2 V2

C= Concentration

V= volume

According to this formula prepared four concentrations (0, 25, 50, 100) mg/ml [7].

IV. Collection of fungi sample

Fungi samples (fruiting bodies) were collected from college of Agriculture of Baghdad University. Fungi samples were washed gently with distill water and dried at room temperature and homogenized to smooth powder by using electric grinder and then saved in air light vial.

V. Preparation of fungi extract

Ethyl acetate was used as a polar solvent to extract the fruiting body of *Agaricus bisporus* .The extraction was done by solving the dried powder fungi material (20gm) in ethyl acetate solvent using soxhlet apparatus and 200ml of solvent was added and then heated for 8 hour at 70 C̊. The extract was dried by oven over night to obtain powder dry extract and then stored at 4C° until use. The concentration was prepared by using DMSO (Dimethyl sulphoxide) from this formula:

C1 V1 =C2 V2

According to this formula, it was prepared four concentrations (0, 25, 50, and 100) mg/ml.

Table 1: refer to the microorganisms and the source of the isolates

No.	Microorganisms	Source of isolates
1	*Escherichia coli*	Diarrhea
2	*Proteus*	Urine
3	*Candida albicans*	Vagina

Figure 1: *Albizzia lebbeck* plant

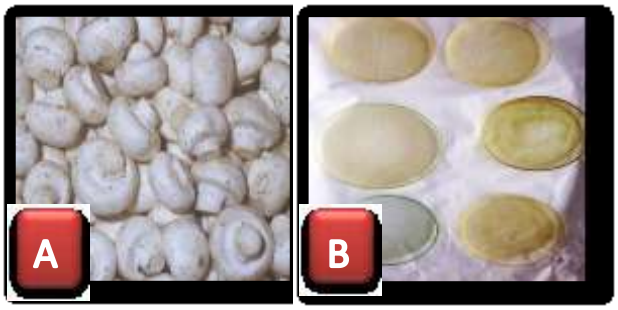

Figure 2: (A) fruiting bodies of *Agaricus bisporus*. (B) Ethyl acetate extracts of *Agaricus bisporus*

VI. The method of agar well diffusion

This method is used for determine antimicrobial activity of fungi extract and plant extract, about amount 15-20 mL of MHA or SDA agar were poured on petro plates of same size and allowed to solidify. Agar surface of each plate was streaked by a sterile cotton swab with the microorganism. Agar plate was punched with a sterile cork borer (Thomas Co/ USA) of 4 mm size and (0, 25, 50, 100) mg/ml of each sample was poured with micropipette (Huawei/ China) in this bores. DMSO was used as control. The plates were allowed to standby for 30 min. The plates were incubated at 37°C for 48 h. [8].

2. Result and Discussion

I. Activity of Albizzia lebbeck as antimicrobial agent

The extract of ***Albizzia lebbeck*** **(**ethyl acetate extract**)** leaves was tested for this antimicrobial agent. The extracts doses of 1000 mg /ml of were prepared by dissolved suitable volume of ***Albizzia lebbeck*** extracts in DMSO. The inhibition zones were measured in mm for every organism. The crud extract of ***Albizzia lebbeck*** give highest activity against *Proteus* 16mm inhibition zone at 100 µl while the lower activity against *Candida albicans* 9mm inhibition zone at the same concentration 100 µl. DMSO as control did not showed any activity (Table 2, Figure 3, 4, 5).

Table 2: The Effect of *Albizzia lebbeck* leaves extract on three microorganisms growth

Doses→ Microorganism↓	25 µl	50 µl	100 µl	control
Escherichia coli	12	13.8	15	-
Proteus	10.8	14	16	-
Candida albicans	6	7	9	-

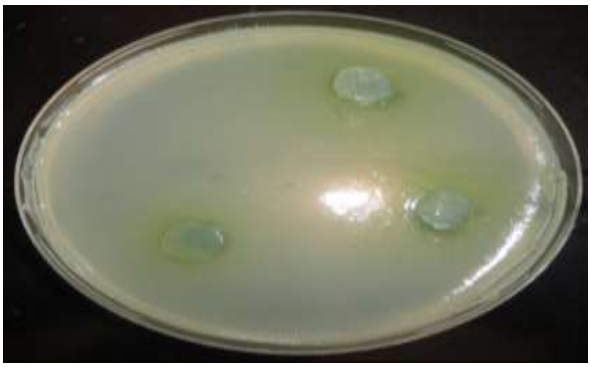

Figure 3: Inhibition zone of Albizzia *lebbeck* leaves extract against *Escherichia Coli*.

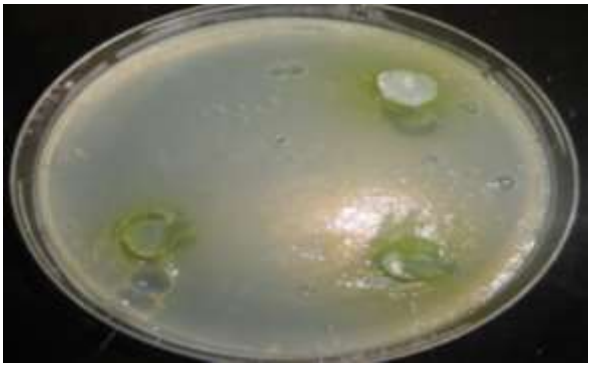

Figure 4: Inhibition zone of *Albizzia lebbeck* leaves extract against *Proteus*

Figure 5: Inhibition zone of *Albizzia lebbeck* leaves extract against *Candida albicans.*

II.Activity of Agaricus bisporusas as antimicrobial agent

Ethyl acetate extract of *Agaricus bisporus* fruiting bodies was tested as antimicrobial agent. The doses of 1000 mg / ml of extracts was prepared by dissolved suitable volume of *Agaricus bisporus* extracts in DMSO. The solution of test compounds (25 µl, 50 µl, 100 µl and control 50 µl) were added in wells on the media plates and incubated at 37 °C for 48 hr. The inhibition zones of this microbe's growth was measured in mm for each organism. DMSO as a control did not give any activity. The crud extract shows positive antimicrobial activity against *E. coli*, *Proteus* (bacteria) and *Candida albicans* (yeast) which was more than the activity of *Albizzia lebbeck* ethyl acetate extract leaves against the same microbial species. (Table 3, Figure 6, 7).

Table 3: Biological activity of *Agaricus bisporus* ethyl acetate extract on three microorganisms growth

Dosages→ Microorganism ↓	25 µl	50 µl	100 µl	control
Escherichia coli	13	14.3	16	-
Proteus	12	14	17	-
Candida albicans	9	12	14	-

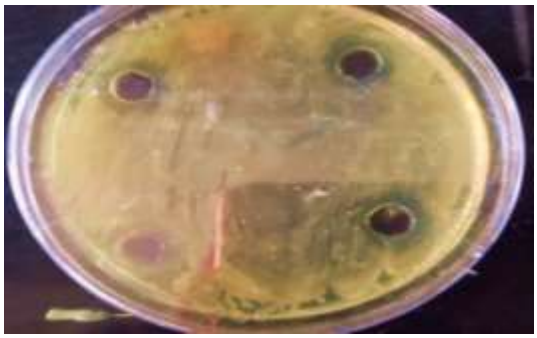

Figure 6: Inhibition zone of *Agaricus bisporus* extract against *Candida albicans*

Figure 7: Inhibition zone of *Agaricus bisporus* leafs extract against *E. coli.*

Discussion

In this study, the extractions of *Albizzia lebbeck* and *Agaricus bisporus* were evaluated for their antimicrobial activities with isolated bacteria *Escherichia coli*, *Proteus* and *Candida albicans*

as yeast and compare between them. The result above refers to the *Agaricus bisporus* extract that have the biological activity more than *Albizzia lebbeck* extract when tested against the same microorganism at same incubation temperature, period and another conditions. Although the *Albizzia lebbeck* extract as a good antimicrobial effecter depended to [7, 9] researches but in this study it was found that the *Agaricus bisporus* extract was the best antimicrobial agent compare with of *Albizzia lebbeck* extract. Mushrooms have been unparalleled health-fostering and many medicinal substances have been isolated from it and dispensed world wide [10]. Similar results were obtained in a previous study such as the study of [4] showed, The extracts methanolic and acetone of *Agaricus bisporus* were awarded great growth inhibition of (2) two bacteria were tested in different concentrations (25%, 50%, 75%, 100%). Methanolic extract of *Agaricus bisporus* was give highest inhibition 16.67% and 20.00% at 100% concentration of this extract opposite *S. aureus* and *E. coli* respectively and the acetone extract showed maximum inhibition of 16.67% and 17.77% at 100% concentration against S. aureus and *E. coli* respectively. Added to that the study of [11] explain The inhibition growth of *Candinda albicans* by mushroom extracts ranged between (18 ± 0.3-11 ± 0.2), *Aspergillus niger* (20 ± 0.3-13± 0.2) and the inhibition zone of mushroom extract on *Erwinia spp.* ranged from 18 ± 0.1 mm to 12 ± 9.2 mm, *Ralstonia spp.* (14 ± 0.3-11 ± 0.1), *Enterococcus faecalis* (15 ± 0.3-09 ± 0.2). The Mushrooms has many bioactive contents acts as antimicrobial agents that can be produced as possible antibacterial and antifungal agents [4, 12].

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Author biography

Israa A. Al-Temimay she was born in 1980 in Baghdad/ Iraq. Received the B.Sc., MSc. and Ph.D. degrees from University of Baghdad, in 2002, 2005, and 2015 respectively, all in Collage of science, Biology Department. Ph.D. research was done in university of Malaya (UM)/ Malaysia. She is currently Lecturer in biology department/ collage of science in University of Baghdad, Baghdad, Iraq. Her research interests include mycology, cancer care, mushroom, microbiology and others.