



EVALUATION OF THE MYCOCHEMICAL COMPONENTS AND ANTIBACTERIAL ACTIVITY OF *CHLOROPHYLLUM MOLYBDITES* (AGARICALES)

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ABSTRACT

Metabolic extract of *Chlorophyllum molybdites* was investigated for their biochemical components and antimicrobial activity using agar well diffusion method. Bacteria such as *Streptococcus progenies*, *Staphylococcus auras*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aureginosa*.

KEYWORDS: *Streptococcus progenies*, *Staphylococcus auras*, *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aureginosa*.

INTRODUCTION

Mushrooms have widely been appreciated all over the world for their nutritional and medicinal properties (Gupta et al., 2018; Chang and Wasser 2017). The early civilizations of Greek, Egyptians, and Roman, Japanese and Mexican people prized mushrooms for their therapeutic value (Hobbs 1995; Guzman 2015). The pharmacological potential of mushrooms has not been fully investigated yet. Mushrooms are superior nutritional supplement and attributed with magnificent medicinal values. The antimicrobial properties of certain mushrooms provide human disease control that is generally safe and effective. Several mushrooms have demonstrated efficient antibacterial activity as well as antifungal activity against resistant human pathogens.

Recently, mushrooms are considered to be a good source of protein and phenolic antioxidants, such as variegated acid and diboviquinone, which have been found in mushrooms (Cheung et al., 2003). *Chlorophyllum molybdites* is a very common fungus with widespread tropical and subtropical distribution. It occurs after heavy rains in and outside forests, grass lands. It commonly known as the 'green gill' or the green gilled Lepiota. It can be recognized by the large, white, scaly, pileus, distributed throughout Asia, North America, South America and Africa. *Chlorophyllum* is a monotypic genus. This species causes stomach upset of varying severity involving thirst, nausea, vomiting and diarrhea. It is one of the largest and most common mushrooms found in Eastern forest of India.

The aim of the present study is to evaluation of the mycochemical composition and antimicrobial activity of

Chlorophyllum molybdites which are present Mahendragirihilly area near by Srikakulam District.

MATERIAL METHODS

Collection, identification of Mushrooms

Samples of the wild non edible mushroom, *Chlorophyllum molybdites* were collected on forest area of Srikakulam region in November 2017. The mushroom was identified and authenticated in the department of Botany, Andhra University, Visakhapatnam, India.

Preparation of the mushroom extract

Freshly collected whole mushrooms were shade dried and finely powdered. Fifty grams of the powder were extracted with 250ml of 95% methanol solvent using Soxhlet apparatus. The residue was filtered and concentrated to a dry mass by vacuum distillation.

Preliminary Biochemical Analysis

Preliminary biochemical tests such as carbohydrates, proteins, alkaloids, glycosides, steroids, phenols, resins, tannins, quinones and flavonoids were carried out on the crude methanolic extract using standard procedures.

Antimicrobial Activity

Antimicrobial activity of the methanolic extract of *Chlorophyllum molybdites* mushroom was evaluated using agar well diffusion method. The extracts were dissolved in 25% aqueous dimethyl sulfoxide (DMSO) to produce a stock solution of 100 mg/ml. The bacterial cultures were grown overnight at 37 °C and 28°C for testing antimicrobial activity. Mueller-Hinton agar medium were sterilized in an autoclave and poured into sterilized petri plates. The bacterial inoculum was spread over the surface of agar plates with sterile glass spreader.

Four wells for antibacterial were made at equal distance using sterile cork borer. Different concentration of extract was loaded on agar well. After incubation for 24 hours at 37°C, a clear zone around a well. Studies were performed in triplicates and the mean value was calculated. For control antibiotic streptomycin was used for standardized.

RESULTS AND DISCUSSION

The preliminary mycochemical analysis of *C. molybdites* methanol extract shows the presence of active metabolites such as carbohydrates, proteins, alkaloids, glycosides, steroids, phenols, resins, tannins, quinones and flavonoids were carried based on the colour variation they were classified to high (+++), moderate (++), low (+) and no reaction(-).

The results of bioactive screening are given in Table 1. The screening indicated presence of various active constituents. These active metabolites are well known for their curative activities against several human problems. The phenolic and flavonoids compounds in mushrooms have been multiple biological effects including antioxidant and anti-inflammatory activities (Senthil kumar et al., 2016).

C. molybdites extract was observed to inhibit bacterial pathogens under in vitro condition to reveal its antimicrobial potential. Antimicrobial activity was performed against human pathogenic bacteria such as *Streptococcus pyogenes*, *Staphylococcus aureus*,

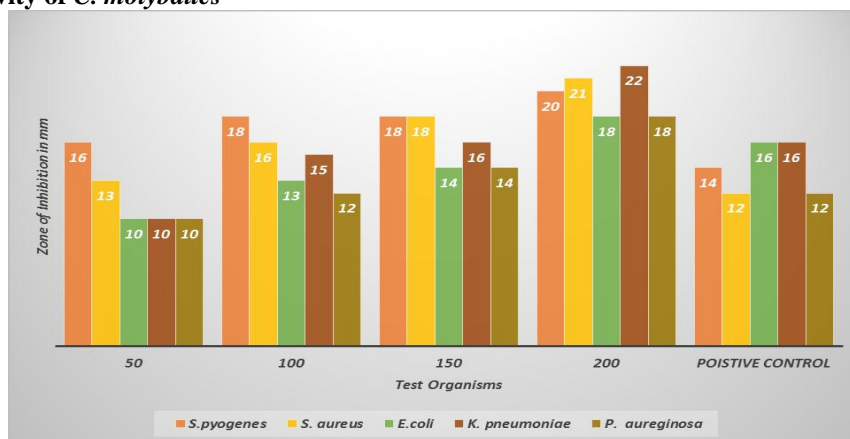
Escherichia coli, *Klebsiella pneumoniae*, *Pseudomonas aureginosa* and Streptomycin was used as positive control. The zone of inhibition increases with increase in the concentration of the methanolic extract exhibited highest activity against *Klebsiella pneumoniae* (22mm) in 200µl concentration. The Lowest activity against *Escherichia coli*, *Klebsiella pneumoniae* and *Pseudomonas aureginosa* the zone of inhibition at 50µl was 10mm.

The zone of inhibition for *S. aureus* was 21mm, *S. pyogenes* was 20mm, whereas *E. coli* and *P. aureginosa* was 18mm at 200µl for methanolic extract of *C. molybdites* respectively. As summarized in Figure 1, *C. molybdites* had a narrow antibacterial spectrum and strongly inhibited the growth of the pathogenic bacteria.

Table 1: Composition of bioactive compounds extracted from *C. molybdites*.

| Name of the Test | Result |
|------------------|--------|
| Carbohydrates | ++ |
| Proteins | ++ |
| Alkaloids | + |
| Glycosides | ++ |
| Steroids | + |
| Phenols | +++ |
| Resins | + |
| Tannins | + |
| Quinones | - |
| Flavonoids | + |

Antibacterial activity of *C. molybdites*



CONCLUSION

The *C. molybdites* not an edible mushroom but they have medicinal compounds. These results indicate that the extraction of *C. molybdites* confirm bioactive components shows the presence of phenols as a major constituent. The presence of various phenolic bioactive metabolites displayed extensive antibacterial potential. Further studies are essential to assess structural insights of bioactive compounds towards the development of potential drug for biomedical applications.

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