

**Research Article****Antimicrobial metabolites from Macrofungi species in Northern Samar**

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**Abstract**

**Objective:** In this study, macrofungi utilized for medicine in Northern Samar were documented and identified. **Materials and methods:** Phytochemical screening was done in this work, like flavonoids, saponin, tocopherols, phenolics, tannin, steroid and ascorbic acid. The antimicrobial potential of macrofungi species was also conducted in this study using paper disc method. **Results:** Results showed that at least 28 macrofungi species were identified belonging to two divisions, the Basidiomycota and Ascomycota having 10 classes, 16 orders and 26 families but only 4 species were traditionally used for food. The results gathered in this study showed that *Trametes hirsute*, a wild macrofungi species strongly inhibit the growth of *S. aureus* and *E. coli*. **Conclusion:** This research would promote the use of macrofungi leading to a new generation of product medicinal values.

**Keywords:** Macrofungi utilization, Northern Samar, antimicrobial metabolites

**Introduction**

Different communities in Northern Samar, Philippines, utilize certain local and wild mushrooms for medicine, but such indigenous knowledge is poorly documented and unsystematically recorded. Claims of their efficacy in treating certain ailments need to be scientifically verified prior to their acceptance or adoption. It is therefore important to know and correctly identify these macrofungi species (Barros et. al., 2008).

Given the increasing prevalence of antibiotic resistance, novel and effective antibiotics are imperative. Fungi have been proposed to possess a closer genetic relationship to animals than to plants thus, they share common infective agents such as *E. coli* and *S. aureus*, presenting the potential of

producing metabolites with pharmacological activity in humans (Sartal and Alonso, 2013).

Microfungi, on the one hand, are established sources of antibiotic compounds, such as penicillin and amoxicillin. Macrofungi, on the other hand, have scarcely been studied, and only a few bioactive compounds have been isolated. Nevertheless, they have demonstrated significant pharmacological activity, like anti-inflammatory and anti-fungal activities (Minter and Kruk, 2012). This study therefore, aims to document the utilization of macrofungi species as medicine. Here, we report on the antimicrobial activity of macrofungi species- *Trametes hirsute* found in Northern Samar.

**Materials and methods****A. Inventory**

The identification of the municipalities of Northern Samar for survey purposes was based on geographic location (distribution) and accessibility. Barangay officials were present during all visits, and formatted interviews of individuals utilizing a specially prepared questionnaire. Wherever possible, or available, macrofungi samples were

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photographed and collected, and any additional information or data not covered by the questionnaire were recorded. Collected specimens were brought back to the College of Science, University of Eastern Philippines, for further taxonomic verification.



**Figure 1.** Picture of the *Trametes hirsute* species of Northern Samar, Philippines

### B. Standards and reagents

All the reagents were of analytical grade purity.

### C. Antimicrobial Testing (Paper Disc Method)

Each microorganism was streaked on a petri dish with culture media in such a manner that the entire surface of the media was streaked. Two petri dishes were prepared for each microorganism, one labeled as standard drug and the other labeled as extract. On the dish labeled standard drug, three (3) discs of antibiotic (Penicillin for *S. aureus* and Ciprofloxacin for *E. coli*) for specific microorganism were equally placed in a circular arrangement and were incubated for 24 hours. On the dish labeled extract, 3 blank discs dipped in pure extract were placed in the same manner as of the standard drug and were incubated for 24 hours. The zone of inhibition in millimeter was measured on the following day using a ruler.

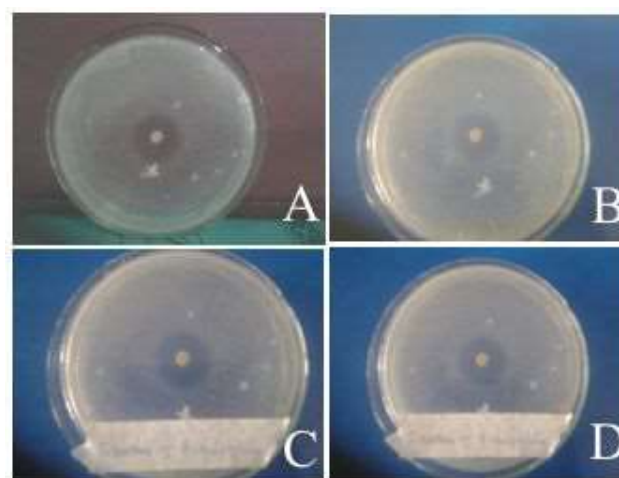
### Results and discussion

The collection of the macrofungi revealed that in the different municipalities in Northern Samar, Philippines there were 28 species of macrofungi recorded but four (4) species were locally considered or known as edible by the local residents, namely: *Schizophyllum* commune locally known as **kurakdot**, *Cantharellus cibarius* locally known by the villagers as **banay**, *Auricularia polytricha* locally known as **taingang daga**, and *Inocybe rimosa* locally known as **ligbos**. These 4 species were considered edible mostly by the majority of the municipalities. Knowledge and utilization of the various species of fungi varied

greatly between municipalities. Based on the result of the interviews, *Trametes hirsute*, a macrofungi species were locally considered or known to different communities used as medicine. Picture of the collected and identified macrofungi species is presented in Figure 1.

**Table 1.** Antimicrobial testing of standard drug and extract against test organisms

Microorganisms	Zone of inhibition	
	Standard Drug	Macrofungi extract ( <i>Trametes hirsute</i> )
<i>S. aureus</i>	23 mm	21 mm
<i>E. coli</i>	20 mm	18 mm



**Figure 2.** Pictures of the antimicrobial testing using paper disc method: (A & B) Standard drug; (C) *S. aureus* using *Trametes hirsute* extract; (D) *E. coli* using *Trametes hirsute* extract

Ethanol extracts of *Trametes hirsute* were dried and then partitioned into aqueous and ethyl acetate soluble metabolites which are evaluated for their antimicrobial activity against *E. coli* and *S. aureus*. Based on the antimicrobial results shown in Table 1 using the paper disc method of macrofungi pure extract (*Trametes hirsute*), the zone of inhibition for *E. coli* is 21 mm and for *S. aureus* is 18 mm. The result implies that the extract has an antimicrobial property comparable to the standard drug. The zone of inhibition produced a significant effect on inhibiting the growth of microorganisms and was able to meet the zone of inhibition of the standard drug. The table below shows the comparison between the standard drug and the macrofungi extract against the two test microorganisms.

### Conclusion

In this work, we have reported an identification and evaluation of the macrofungi species in different municipalities in Northern Samar for antimicrobial properties. This study presents an idea about the different uses

of the various species of macrofungi varied greatly between municipalities. Based on the results obtained, the presence of antimicrobial property of the macrofungi extract was confirmed. The results of this study might be the basis that unknown macrofungi can be used directly to promote health advantage.

### Recommendations

It is further recommended that researches and experimentations on the isolation and identification of the active component of the extract, and the toxicity analysis of the wild macrofungi be conducted. Further studies would surely be a great contribution to our local food and pharmaceutical industries.

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