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Inventory Of Poisinous Mushrooms And Consumable Mushrooms In The Bukit Barisan Tongkoh Forest Park, North Sumatera

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ABSTRACT

Macroscopic mushrooms can be divided into poisonous mushrooms and non-toxic mushrooms. In addition, there are also macroscopic mushrooms that can be consumed and cannot be consumed. The purpose of this study was to inventory the types of poisonous mushrooms and types of mushrooms that can be consumed in the Forest Park, Bukit Barisan Tongkoh, North Sumatera. The research was carried out from October 2021 to January 2022. Methods : the research method used was the cruise method. Sampling of mushrooms was carried out using the "purposive area sampling" method by looking at the characteristics of the mushrooms body as a description. Purposive area sampling method was used in species collection, and data were analyzed descriptively. As the results there were 8 genera of poisonous mushrooms found in that place, those were : *Amanita sp*, *Collybia* sp, *Coprinus* sp, *Lactarius* sp, *Omphalotus* sp, *Panaeolus* sp, *Psathyrella* sp and *Scleroderma* sp. In addition, we also found 7 genera of edible mushrooms. They were *Agaricus* sp, *Cantharellus* sp, *Fammulina* sp, *Hygrocybe* sp, *Marasmius* sp, *Pluteus sp* dan *Volvariella sp.* Each fungus is identified based on shape, size, texture, odor, substrate, spores, habitat and edibility.

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1. INTRODUCTION

Indonesia is a country that has a very high level of biodiversity, both in terms of the number of macroorganisms and the number of microorganisms. Indonesia has tropical rain forests where the environmental conditionals are very supportive for the growth of microflora. Tropical rain forest is a very suitable habitat for the growth of microflora species, one of which is a type of fungus (Yunida, 2014).

Fungi are eukaryotic, spore-forming, sexually and asexually reproducing organisms, which cannot form their own food but are obtained from the oxidation of organic compounds. Fungi do not have chlorophyll and their cell walls are composed of chitin and do not undergo differentiation in their tissues (Hidayat, 2016). Macroscopic mushrooms have a general structure consisting of body part, namely blades, caps, stalks, volva rings. Macroscopic fungi can grow in various types of habitats, from cold to tropical habitats. Generally, macroscopic fungi grow on rotting wood, litter of soil, leaves and even in animal waste and there are also fungi that grow on other fungi that have undergone decay (Tampubolon, 2012).

In the wild during the rainy season, many fungi can be found on rotting or rotting wood, under the influence o dryness or in other damp places. So far, mushrooms are widely used by the community as food, some are even used as medicines. However, there are also some mushrooms that are dangerous or not recommended for consumption because they are feared to contain toxins that can endanger human health.

Poisonous mushrooms usualy have a bright or striking color and have a pungent odor and usually these mushrooms grow in dirty places (Masrisa Hidayu, D., & Ariusmedi, M. S., 2019). According to Chew (2008), poisinous mushrooms in addition to striking color, there are also no bites from other organisms and usually smell bad because they contain sulfide compounds.

Edible mushrooms have a higher mineral salt content than beef and lamb. The amount of mineral salt contained in mushrooms can reach almost 2 times the amount of mineral salt in other vegetables. In addition, mushrooms also contain iron, copper, potassium and lime salts. Mushrooms are also rich in B

vitamins and vitamin D which come from sunlight (Darwis, W., Desnalianif, D., & Supriati, R. (2014). One of the areas in Indonesia has high diversity in the Bukit Barisan Tongkoh Forest Park (Tahura), North Sumatera, where the area reaches 51,600 Ha with air temperatures around 13^0C to 25^0C and an average humidity of around 90-100% which allows various types of organisms to live, including various types of macroscopic fungi (Annisa, 2007). The Bukit Barisan Tongkoh Forest Park (Tahura) is a strategic area for the growth of macroscopic fungi and is likely to be overgrown with poisonous mushrooms and edible mushrooms. Information from local people, that in Tahura there were found poisinous mushrooms and edible mushrooms. So far, there has been no research on the inventory of these mushrooms, therefore it is neccessary to conduct research with the aim of knowing the types of mushrooms that are poisinous and edible mushrooms found in the forest and around the location.

2. METHOD

This research was conducted from October 2021 to January 2022. The tools used are collection bottles, jars, binocular microscopes, cameras, GPS (Global Positioning System), thermometers, hygrometers, pH meters, paper labels, plastic bags and fungal identification manuals. The materials used are 70% alcohol, glycerin and aquades.

Sampling

Sampling was carried out using the the cruise method (Rugayah and Pratiwi, 2004). Observations on mushrooms included morphological characteristics of the fungus, namely the color of the mushroom body, the shape of the hood, the shape of the edge of the hood, the surface of the hood, the shape of the blade, the presence or absence of stalks, the habitat/ subtrate of soil or rock. The mushroom samples that have been obtained are put into collection bottles which have been filled with 70% alcohol and glycerin. Measurements of environmental physical factors such as temperature, humidity and pH were carried out around the sampling area.

Identification and description of poisinous mushrooms and edible mushrooms

Mushroom samples that have been obtained in the field are then taken to the Microbiology Laboratory of STIKes Santa Elisabeth Medan for further identification. Identification is done by using several reference books, including Introductory Mycology by Alexopoulus, et.al. (1996) and how to know the Gilled Mushroom by Smith, et.al. (1979).

In the observation of spores on fungi that have blades, what is observed is the spores in terms of shape, size and color. Observation of spores was carried out using a binocular microscope. For educational purposes, these mushrooms were collected and used as herbarium specimens at the Microbiology Laboratory of STIKEs Santa Elisabeth. The herbarium specimens are made in the form of all parts of the fruiting body. For mushrooms that have soft fruiting bodies, a wet preservation method is used, namely by soaking the mushrooms in plastic jars containing 70% alcohol and glycerin then closing and tightening with rubber. For mushrooms that have hard fruiting bodies, a dry preservation method is carried out by drying in an oven at 45^0C for two to three days or until the specimens are dry.

3. RESULT AND DISCUSSION

Types of poisinous mushrooms and edible mushrooms

Poisinous mushrooms and edible mushrooms can be identified based on literature studies and community information at the site. Here are examples of the types of mushrooms found :

Table 1. Types of poisinous mushrooms and edible mushrooms

No	Spesies name	Poisinous	Non poisinous	Edible	Non edible
1	*Agaricus* sp	-	+	+	-
2	*Albatrellus* sp	-	-	-	+
3	*Amanita* sp	+	-	-	-
4	*Auriscalpium* sp	-	-	-	+
5	*Camarophyllus* sp	-	-	-	+
6	*Cantharellus* sp	-	+	+	-

7	*Clavulina* sp	-	-	-	+
8	*Collybia* sp	+	-	-	-
9	*Coltricia* sp	-	-	-	+
10	*Coprinus* sp	+	-	-	-
11	*Crepidotus* sp		-	-	+
12	*Dacrymyces* sp	-	-		+
13	*Flammulina* sp	-	+	+	-
14	*Fomitopsis* sp	-	-	-	+
15	*Ganoderma* sp	-	-	-	+
16	*Gomphidius* sp	-	-	-	+
17	*Hygrocybe* sp	-	+	+	-
18	*Ischnoderma* sp	-	-	-	+
19	*Laccaria* sp	-	-	-	+
20	*Lactarius* sp	+	-	-	-
21	*Lacrymaria* sp	-	-	-	+
22	*Laetiporus* sp	-	-	-	+
23	*Lycoperdon* sp	-	-	-	+
24	*Marasmius* sp	-	+	+	-
25	*Melanoleuca* sp	-	-	-	+
26	*Mycena* sp	-	-	-	+
27	*Naematoloma* sp	-	-	-	+
28	*Omphalotus* sp	+	-	-	-
29	*Panaeolus* sp	+	-	-	-
30	*Panus* sp	-	-	-	+
31	*Phaeolus* sp	-	-	-	+
32	*Phellinus* sp	-	-	-	+
33	*Pholiotina* sp	-	-	-	+
34	*Pluteus* sp	-	+	+	-
35	*Psathyrella* sp	+	-	-	-
36	*Pseudoclitocybe* sp	-	-	-	+
37	*Psilocybe* sp	-	-	-	+
38	*Pseudohydnum* sp	-	-	-	+
39	*Polyporus* sp	-	-	-	+
40	*Rickenella* sp	-	-	-	+
41	*Russula* sp	-	-	-	+
42	*Suillus* sp	-	-	-	+
43	*Stropharia* sp	-	-	-	+
44	*Scleroderma* sp	+	-	-	-
45	*Stereum* sp	-	-	-	+
46	*Trametes* sp	-	-	-	+
47	*Tremellodendropsis* sp	-	-	-	+
48	*Tulostoma* sp	-	-	-	+
49	*Volvariella* sp	-	+	+	-

From the research that has been done, it was found that as many as 49 types of mushrooms were found in the Bukit Barisan Tongkoh Forest Park, North Sumatera. From the 49 genera of mushrooms, according to local communities and literature studies, 9 types of poisinous mushrooms and 7 types of mushrooms that can be consumed were found (Table 1.)

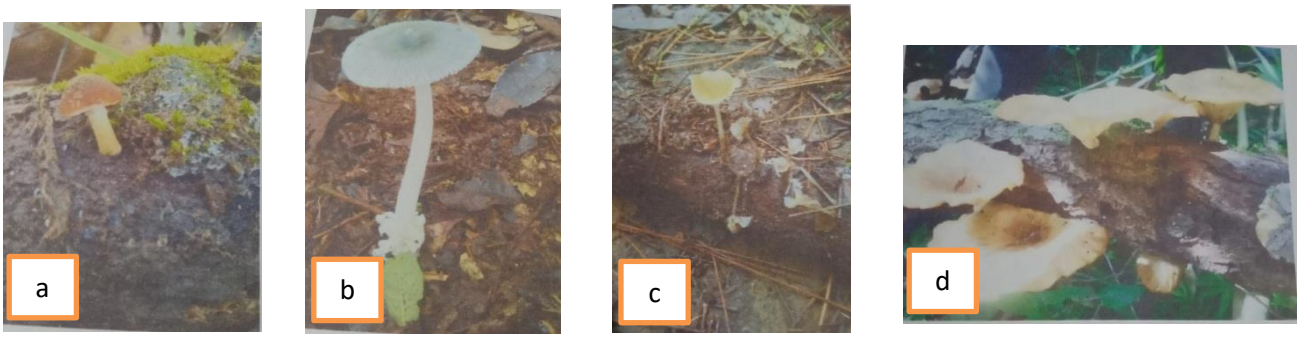
Amanita sp is a poisinous mushroom that has a striking color, namely yellow flat color. Types of poisinous mushrooms generally have stiking colors. But, there are also types of poisinous mushrooms that have a light color, namely light yellow or white. The characteristics of the fungus *Amanita* sp have soft spherical (round) with spores. The habitat is living soliter on rotten wood. This mushroom genus is known

to have the most poisinous mushrooms, namely destroying angel mushrooms and death caps (Putri, O. N. 2020).

Collybia sp fungus has a fruiting body consisting of a hood, lamellae and has a true stalk. The hood is brown with fine lines on its surface. The color of the lucky body does not change after a while being removed from the substrate. The fungus *Collybia* sp is known to have muscarine poison and causes mild symptoms in victims to cause death (Putra, I. P., & Hermawan, R. 2021).

The type of fungus of the *Coprinus* genus has a hood in the form of a wide round tube, brownish white, black spores, solitary habitat on the ground, the shape of the hood is mostly convex or cylindrical. The stems of this fungus from the *Coprinus* genus are mostly white and break easily. This is in accordance with the characteristics of poisinous mushrooms, namely poisinous mushrooms are easily destroed when touched.

Lactarius sp is a poisinous mushroom because it has a very foul smell to the nose, such as the smell of carrion, rotten eggs or the smell of ammonia. This mushroom has a funnel-shaped hood like a flower, brown spores, its habitat lives in very large colonies on dead wood.



Gambar 1. a. *Amanita* sp, b. *Coprinus* sp, c. *Collybia* sp, d. *Lactarius* sp merupakan jenis jamur beracun

Omphalotus sp is a mushroom that has a luminous fruiting body. The hood is semicircular and has a diameter of 20 cm, the upper side is yellowish brown and has small scales, but then becomes smooth and dark purple. The habitat lives in colonies with very large numbers on rotten wood. This mushroom is poisinous because the mushroom body is very soft when cookes (Masrisa Hidayu, D., & Ariusmedi, M. S. 2019).

Panaeolus sp has a hood shaped like an umbrella, rough brown spores and live in colonies. *Panaeolus* sp is a group of fungi that live on substrates mixed with livestock manure, such as buffalo, cows, chickens and other livestock. This fungus is known as koprofi or lethong because its habitat is often found in livestock manure substrates. This is also the reason why the *Panaeolus* sp is an exmple of a poisinous mushroom because usually poisinous mushrooms grow in dirty places, such as landfills, animal waste and so on. This fungus has the potential to produce toxins so it cannot be consumed (Putra, I. P. 2021).

The type of fungus *Psathyrella* sp grows on weathered wood substrate with a pH of 7 and is found at an altitude of 1670 m above sea level. Mushrooms found in the litte or soil have a brown hood and soft texture, the spores of this fungus are oval and brown in color. According to Darwis, W., Desnalianif, D., & Supriati, R (2014), the stem of this type of fungus from the *Psathyrella* genus is easily broken because it is soft, so this mushroom is said to be a poisinous mushroom, the spores of this type of fungus are purple brown to black and oval in shape.

Sato el al. (2020) explained about the *Scleroderma* sp fungus that all groups of fungi from the Sclerodermataceae family contained toxins in teh form of sclerocytotrin, but at different levels for each species and its effect on health depends on the quantity of theses compounds that eneter the human body. *Scleroderma* sp is a ball mushroom (earthball), the spores are brown, the habitat is spread widely on the soil surface.

Gambar 2. e. *Omphalotus* sp, f. *Panaeolus* sp, g. *Psathyrella* sp, h. *Scleroderma* sp merupakan jenis jamur beracun

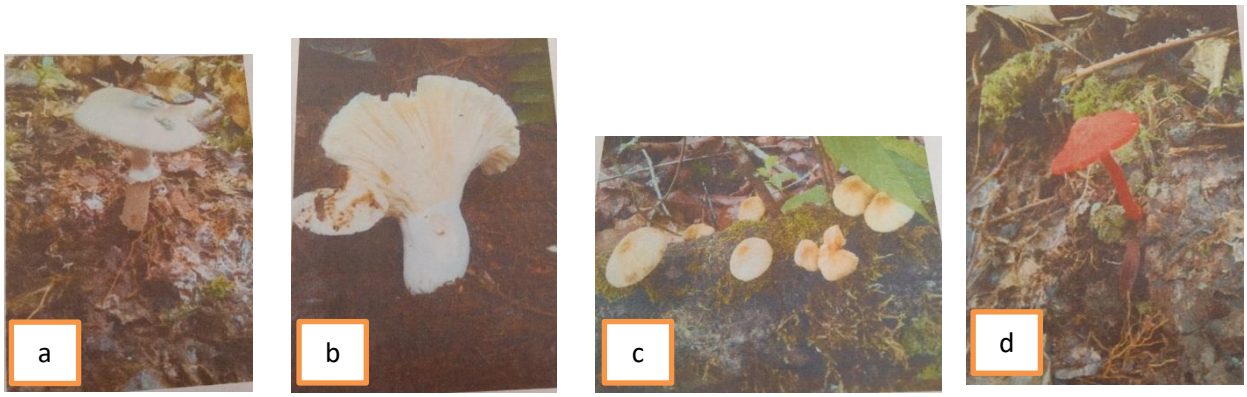
From the observations and identifications that have been cariied out, 7 genera of edible mushrooms were found, namely *Agaricus* sp, *Cantharellus* sp, *Flammulina* sp, *Hygrocybe* sp, *Marasmius* sp, *Pluteus* sp and *Volvariella* sp.

Agaricus sp or button mushrooms, also known as sun mushrooms, are examples of mushromms belonging to the medicinal mushroom group. *Agaricus* sp live solitary in soil or litter, white spores, stem (stipe) easily shake. This mushroom is an edible mushroom from the division Basidiomycetes. *Agaricus* sp has low calories, with the same high content of purines, carbohydrates and sodium as it contains several vitamins, potassium, phosphorus and some basic elements. This fungus can also be used as an antitumor because it has a polysaccharide in the form of glucomannan which forms a complex with protein and mannan and protein (Savoie, J. M., Minvielle, N., & Largeteau, M. L. 2008).

Cantharellus sp has the shape of cap when young expands to form a flower vase, many elongated lamellae, white spores, the habitat lives in colonies on the ground. Under the cap or hood, the mushroom texture look wavy. This mushroom has an apricot-like odor and has slightly spicy taste. This mushroom is very good to eat.

Mushroom *Flammulina* sp is a food mushroom with long white fruiting bodies like bean sprouts, so it is known as bean sprouts, has white spores, the shape of the hood is convex (fluffy round), smooth surface. Usually this fungus grows on the surface of rotten tree trunks. This mushroom can be used in a variety of soup dishes in Japan, Korea, China and Vietnam.

Hygrocybe sp is called a red mushroom because the fruiting body is red except for the lamellae. This mushroom has a convex papillary hood, convex in the middle, smooth hood surface, hood edge with curved lines, no ring, white spores. Habitat is usually in the ground (Harahap, L. C., Symasi, F., & Efendi, Y. 2017).



Gambar 3. a. *Agaricus* sp, b. *Cantharellus* sp, c. *Flammulina* sp, d. *Hygrocybe* sp merupakan jenis jamur yang dapat dikonsumsi

Mushroom *Marasmius* sp has a short stem and wide hood. The name Marasmius comes from the Greek, namely marasmos which means drying out, meaning that the fungus *Marasmius* sp can dry out under certain conditions, but can also be humid if the environment is stable. In Tahura Tongkoh, this fungus is found on mossy wood (Hasanuddin, H. 2018).

Pluteus sp is a fungus that lives in certain areas. In Thaura Tongkoh, this fungus is found on mossy tree substrates. Thick yellow hood, smooth spores almost round. Cartilaginous fruiting body texture without characteristic odor (Putra, I. P., Sitompul, R., & Chalisya, N. 2018).

The fungus *Volvariella* sp was found living on the litter, substrate and was white in color. The surface of the hood is smooth and white. This mushroom is a food mushroom that is low in calories, does not contain sodium fiber fat, also contains selenium and niacin (essential minerals) which play a role in the immune system, thyroid system, male reproductive system and prevent cancer (Ukoima, H. N., Ogbonnaya, L. O., Arikpo, G. E., & Ikpe, F. N. 2009).

Gambar 4. e. *Marasmius* sp, f. *Plutesu* sp, g. *Volvariella* sp merupakan jenis jamur yang dapat dikonsumsi

4. CONCLUSION

The types of mushrooms found in the Bukit Barisan Tongkoh Forest Park amounted to 49 species. Of the 40 types of mushrooms found, there are 8 types of mushrooms that are poisinous and 7 types of

mushrooms that can be consumed. The types of poisinous mushrooms found were *Amanita sp, Collybia* sp, *Coprinus* sp, *Lactarius* sp, *Omphalotus* sp, *Panaeolus* sp, *Psathyrella* sp and *Scleroderma* sp. The types of mushrooms that can be consumed (edible) were *Agaricus* sp, *Cantharellus* sp, *Flammulina* sp, *Hygrocybe* sp, *Marasmius* sp, *Pluteus* sp and *Volvariella* sp.

REFERENCES

1. Alexopoulos, C. J., Mims, C. W., & Blackwell, M. (1996). *Introductory mycology* (No. Ed. 4). John Wiley and Sons.
2. Annisa, I., & Ekamawanti, H. A. (2007). KEANEKARAGAMAN JENIS JAMUR MAKROSKOPIS DI ARBORETUM SYLVA UNIVERSITAS TANJUNGPURA. *JURNAL HUTAN LESTARI*, *5*(4).
3. Chew, K. S., Mohidin, M. A., Ahmad, M. Z., Kamauzaman, T. H. N. T., & Mohamad, N. (2008). Early onset muscarinic manifestations after wild mushroom ingestion. *International journal of emergency medicine*, *1*(3), 205-208.
4. Darwis, W., Desnalianif, D., & Supriati, R. (2014). Inventarisasi jamur yang dapat dikonsumsi dan beracun yang terdapat di hutan dan sekitar Desa Tanjung Kemuning Kaur Bengkulu. *Konservasi Hayati*, *7*(2), 1-8.
5. Harahap, L. C., Syamsi, F., & Efendi, Y. (2017). Inventarisasi Jamur Tingkat Tinggi (Basidiomycetes) Di Taman Wisata Alam Muka Kuning Batam. *Simbiosa*, *6*(2), 74-84.
6. Hasanuddin, H. (2018). Jenis Jamur Kayu Makroskopis Sebagai Media Pembelajaran Biologi (Studi di TNGL Blangjerango Kabupaten Gayo Lues). *BIOTIK: Jurnal Ilmiah Biologi Teknologi dan Kependidikan*, *2*(1), 38-52.
7. Hidayat, N., Sumarsih, S., & Putri, A. I. (2016). *Mikologi Industri*. Universitas Brawijaya Press.
8. MASRISA HIDAYU, D., & Ariusmedi, M. S. (2019). JAMUR BERACUN DALAM KARYA GRAFIS. *Serupa The Journal of Art Education*, *8*(1).
9. Putra, I. P., Sitompul, R., & Chalisya, N. (2018). Ragam dan potensi jamur makro asal taman wisata Mekarsari Jawa Barat. *Al-Kauniyah*, *11*(2), 133-150.
10. Putra, I. P. (2021). Kasus-kasus keracunan jamur liar di Indonesia. *Jurnal Ekologi Kesehatan*, *20*(3), 215-230.
11. Putra, I. P., & Hermawan, R. (2021). Identifikasi Jamur Beracun Clitocybe sp. di Gresik, Indonesia (Studi Kasus). *Media Penelitian dan Pengembangan Kesehatan*, *31*(2), 119-124.
12. Putri, O. N. (2020). Implementasi Metode Cnn Dalam Klasifikasi Gambar Jamur Pada Analisis Image Processing (Studi Kasus: Gambar Jamur Dengan Genus Agaricus Dan Amanita).
13. Sato, Y., Tomonari, H., Kaneko, Y., & Yo, K. (2020). Mushroom poisoning with Scleroderma albidum: a case report with review of the literature. *Acute Medicine & Surgery*, *7*(1). http://dx.doi.org/10.1002/ams2.460
14. Savoie, J. M., Minvielle, N., & Largeteau, M. L. (2008). Radical-scavenging properties of extracts from the white button mushroom, Agaricus bisporus. *Journal of the Science of Food and Agriculture*, *88*(6), 970-975.
15. Tampubolon, S. (2012). Keanekaragaman Jamur Makroskopis di Hutan Pendidikan Universitas Sumatera Utara Desa Tongkoh Kabupaten Karo Sumatera Utara. *Online).(http://repository. usu. ac. id/bitstream/123456789/905/1/08E00913. pdf, diakses 15 Juli 2013)*.
16. Ukoima, H. N., Ogbonnaya, L. O., Arikpo, G. E., & Ikpe, F. N. (2009). Cultivation of mushroom (Volvariella volvacea) on various farm wastes in Obubra local government of Cross River state, Nigeria. *Pakistan journal of nutrition*, *8*(7), 1059-1061.
17. Yunida, N., & Yeni, L. F. (2014). Inventarisasi jamur di gunung Senujuh Kabupaten Sambas dan implementasinya dalam pembuatan flash card. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa*, *3*(10).