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An analysis of Gucchi Mushroom

Dr Prafull Kumar

SOA, Sanskriti University, Mathura, Uttar Pradesh, India

Email Id- prafull@sanskriti.edu.in

ABSTRACT: ***Mushrooms have recently emerged as the most nutrient-dense food on the planet. Gucchi Mushrooms are an edible fungus with the scientific name Morchella esculenta. It is one of the most economically important and noteworthy wild mushroom species. In India, it is the costliest vegetable in the world, costing between Rs 20000 and Rs. 30000 per kilogramme. It flourishes in a cold environment and on a steep slope. It may be found at elevations of 2500-3500 meters in a forest habitat. It is primarily found in India in the districts of Doda in Jammu and Kashmir (J&K) and Kullu in Himachal Pradesh (HP). As a result, J&K's production of Gucchi Mushrooms has been granted the Geographical Indications (GI) label. Due to its high price, it plays a vital role in the economy of the country. This research summarizes the introduction, function, and medical nomenclature of the Gucchi Mushroom, as well as a brief explanation of its related species. More study in this sector has a lot of promise, and we need to develop our Gucchi Mushroom production technology. In the future, the Gucchi mushroom will transform the Indian mushroom business, assisting farmers in their economic development.***

KEYWORDS: ***Edible, Esculenta, Gucchi, Morchella, Mushrooms.***

1. INTRODUCTION

In today's world, mushrooms are the most nutrient-dense food. Ascomycetous and basidiomycetous mushrooms are the two types of mushrooms that exist. Button mushrooms (Agaricus), oyster mushrooms (Pleurotus), paddy straw mushrooms (Volvariella mushroom), and other mushrooms belong to the basidiomycetous class of mushrooms. Ascomycetes are dominated by Morchella (true morels) and tubers. Morchella is a fungus that is classified as Ascomycota, Pezizomycetes, Pezizales, Morchellaceae, and Morchella ex. Pers. Several edible species are found in this genus[1].

The Morchella mushroom, also known as Gucchi in India, is one of the world's most costly edible fungus, as illustrated in Figure 1. Gucci is recognized for its gastronomic and gourmet delights, as well as its excellent taste. Due to its high content of total polysaccharides, glucosamine, vitamin D, antioxidants, and other minerals, it is used to treat a range of ailments, including arthritis, anemia, and cancer. Apothecia, a morel ascocarp, has an unknown commercial value. They are primarily exported from India to Europe and the United States of America. Because the gucchi mushroom is so expensive, it's sometimes referred to as "mountain gold." In thick coniferous woods with humus-rich loamy soil, the Morchella mushroom flourishes. It flourishes in a cold environment and on a steep slope. It may be found at elevations of 2500-3500 meters in a forest habitat. It occurs as a mycorrhizal or saprobic relationship in hardwood and coniferous trees. It blooms from March to July and is primarily found in Jammu and Kashmir's forests as well as Himachal Pradesh's[2].

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Figure 1: Shows the Physical Appearance of Morchella Mushroom Commonly Known as Gucchi Mushroom [3]**.**

The Gucchi Mushroom is classed scientifically as indicated in Table 1. Morchella Esculenta is the scientific name for a fungus that belongs to the Morchellaceae family. The name Esculenta comes from a Latin word that means "edible."

Table 1: Illustrates The Scientific Classification of Gucchi Mushroom On the Basis of Their Preferences.

Kingdom	Fungi
Division	Ascomycota
Subdivision	Pezizomycotina
Class	Pezizomycetes
Order	Pezizales
Family	Morchellaceae
Genus	Morchella
Species	Morchella Esculenta

1.1. Similar species of Morchella Escullenta:

1.1.1. Morchella Conica Pers:

As illustrated in Figure 2, Morchella Conica Pers is generally conical in form. Morchella Conica Pers is also known as "Conica." They are primarily found in Turkey and are members of the Morchella Esculenta (Morchellaceae) family.

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Figure 2: Illustrates the Conical Shape Of Morchella Conica Pers Similar Species Of Morchella Esculenta Mostly Found In Turkey [3]**.**

1.1.2. Morchella Elata:

It is one of the most important classes in the Morchella Family, often known as the Black Morel. It measures 10-15 cm in height and 8 cm in breadth, as illustrated in Figure 3. The majority of these may be found in North America, Europe, and China.

Figure 3: Shows the Physical Appearance of Morchella Elata Mostly Found in North America, China, and Europe [3]**.**

2. LITERATURE REVIEW

Paul et al. discussed about the therapeutic and nutritional benefits of the Gucchi Mushrooms, also known as Thunthoo in the Doda area of J&K. Long ago, the district's agricultural community used a well-managed cooperative technique to gather the fungus from forested areas. Farmers have been trained by their families and communities how to recognize the fungus, detect distribution patterns, and harvest it. Elders and members of the community have also passed down their knowledge and skills in distinguishing Morchella esculenta from other poisonous wild mushrooms. Women and children harvest it on the edges of forested areas and settlements, while males trek in groups further into the dense trees. Gucchi marketing has not been recognized as a potential stumbling block. It's been used for ages to treat stomach problems and indigestion, as well as a tonic, wound healing, and joint pain relief. On the other hand, its medicinal advantages are restricted to the highlands and isolated areas[4].

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Garcia et al. examined Morchella esculenta at various temperatures. Three types of models were examined to describe the kinetics: a slab diffusion model and two empirical equations, Peleg and Weibull. The rehydration process was properly reproduced by all three models. Only statistically significant differences in equilibrium moisture content were detected in the Peleg model when compared to rehydration temperature. The kinetic parameters of the models were temperature dependent. This influence was described using the Arrhenius connection[5].

Morchella Pers. is a delicious and highly edible morel mushroom that thrives in mild timber, according to *Nitha et al.* The mycelium of this fungus is commonly used as a flavoring component. The goal of this research was to investigate if an aqueous-ethanol extract of M. esculenta grown mycelium might protect Swiss albino mice from acute renal damage caused by cisplatin and gentamicin. Cisplatin and gentamicin, when administered combined, resulted in severe renal failure, as evidenced by a significant increase in blood urea and creatinine concentrations. When the extract was administered at 250.0 and 500.00 mg/kg body weight, the increases in blood creatinine and urea caused by cisplatin and gentamicin were decreased[6].

3. IDENTIFICATION

The Gucchi Mushroom has a cylindrical form. The pileus, or top part of the plant, weighs 70-80 percent of the total weight of the plant. Pileus has a round or irregular pit and is 3-9 cm long and 2.5-4.8 cm wide. It might be yellow, brown, pale, or black in hue. The bottom part of the plant, known as the stalk or stipe, contributes for 20 to 30 percent of the entire plant weight. It is hollow and measures 1.0 to 04 cm in length and one to three centimeter in thickness. When young, it is white to pale grey in color, but as it grows, it turns a greyish brown color. Stipes' base has been somewhat enlarged, and it now supports the upper section. When it's new, it's 2cm to 25cm in length, but it shrinks to 0.1 to 1cm in length after drying [7].

3.1. Active Constituents of Gucchi Mushrooms:

The active components identified in the fruiting body of the Gucchi Mushroom (Morchella esculenta) depicted in Figure 4 include carotenoids, tocopherols, phenolic compounds, and organic acids. Beta carotenes and lycopene are two types of carotenoids.

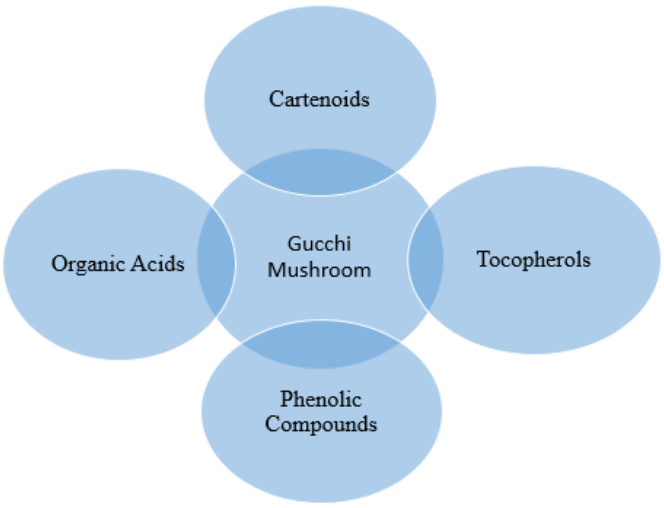

Figure 4: Illustrates the Active Component Found in the Fruity Body of Gucchi Mushrooms.

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3.2. Anti-Bacterial Properties:

Mycelia in Morchella esculenta exhibit antimicrobial characteristics. The investigations also demonstrate that removing Morchella Esculenta with chloroform, ethanol, or methanol has antibacterial properties. Antibacterial activity has been found in Escherichia coli, Staphylococcus aureus, Enterobacter cloacae, Listeria monocytogenes, and Salmonella typhimurium[8].

3.3. Pharmacological Properties:

For over two thousand years, Morchella species have been employed in Old-styled Chinese medicine, as well as in Japan and Malaysia, to treat a range of diseases. Because they contain a diverse variety of macromolecules with bio-active and nutritional properties, traditional hill communities used them as a source of healing. It's commonly used to treat phlegm, indigestion, and cardiac issues. Gucchi mushroom powder can be used as an antibiotic, wound healer, and stomach pain reliever.

3.4. Gucchi Mushroom's Biological and Anti-Inflammatory Qualities:

Escherichia coli, Bacillus mesentericus, and Bacillus subtilis are all susceptible to Gucchi Mushroom extract. The polysaccharide found in Gucchi Mushrooms has antibacterial and anti-actinomycete effects. The antioxidant properties of its methanol and ethanol extracts are outstanding. The platelets combination inhibitors quarantined from Gucchi mushroom's developing bodies had been awarded a right to immunostimulatory action of galactomannan polysaccharide produced from Gucchi Mushroom. A patent has been awarded for skin-lightening cosmetics that contain a melanin synthesis inhibitor produced from farmed Gucchi Mushroom.

4. DISCUSSION

Mushrooms are a necessary and beneficial plant that develops in nature and has a diverse variety of features. The mushroom's flavor, as well as the essential compounds it contains, are what make it so important in pharmacology. Mushroom extract may be used to cure a range of ailments, but it's most often utilised to treat cancer.

4.1 Production Status:

Since artificial production of Gucchi mushrooms is difficult, wild morels have become a lucrative Wild morels have become a valuable industry since artificial cultivation of Gucchi mushrooms is difficult. Gucchi has been admired by mankind since before the dawn of time. Its existence in wooded areas was associated to a variety of tales, including magic and thunderstorms, despite the lack of scientific evidence. Gucchi's nutritional advantages grabbed people's attention over time, prompting them to seek artificial cultivation. Because of their fruit bodies' attachment to plant roots, gucchi mushrooms were originally considered to be obligatory parasites. Scientists discovered that Gucchi may be both mycorrhizal and saprophytic after that. Gucchi's requirement for a mycorrhizal connection was considered to be the major reason why previous attempts to cultivate the fungus in India and other areas of the world had failed.

Thanks to scientific assistance, Gucchi domestication achieved genuine success in France in 1882. It was infected artificially and grew outdoors. Its cultivation was later recorded in 1904 on apple compost, but it failed to have a significant impact. For the first time in 1982, the Gucchi mushroom was successfully grown under artificial conditions. The primary

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comprehensive researchers on the Gucchi mushroom life cycle were instructed to examine the numerous phases of development in 1990. In addition, until 2012, a few more Gucchi mushroom cultivation patents were awarded[9].

4.2. Availability:

Mushrooms so far have been gathered in India from their natural habitats in the North-Western Himalaya. Mushrooms fructification can be found under forest trees, fruit orchards, open grassland, bushes, and in rare cases, ancient cemented buildings. The ideal season to collect mushrooms is in the spring and summer. They are, nevertheless, infrequently seen in the wet and fall seasons [10].

4.3 General uses:

Locals in India make Gucchi with rice and vegetables and believe it to be as nutritious as meat or fish. It's also used in health care, however therapeutic applications differ amongst traditional hill communities divided by language, culture, and geography. Gucchi is produced by boiling the fruiting bodies in water; locals in the Kullu District of Himachal Pradesh cook it in milk.

4.4 Challenges:

Since the foundation of the Indian Councils of Agricultural Researches (ICAR)-Directorate of Mushroom Research in Solan (HP), India has sought to domesticate Gucchi mushrooms (DMR). The trial, on the other hand, yielded no significant results. Based on the findings and proposals of the Research Advisory Committee, ICAR-DMR, Solan refocused its efforts in 2019 on studying the potential of Morel farming in India (RAC). Dr. VP Sharma, Director ICAR-DMR, Solan, presented this challenge to Dr. Anil Kumar, Scientist (HP).

An institutional research project named "Standardization of Morchella mushroom growing technique" was completed by Dr. Anil Kumar (Principal Investigator). We utilised Morchella genus cultures with high sclerotial generation capacity for our study. The method for preparing the substrate for the cultivation of Gucchi mushrooms was standardized. After continuing intense in vitro experiments on induction of ascoma (fruit bodies) in Morchella (Gucchi), three small ascomata of 0.5 to 1cm were generated.

5. CONCLUSION AND IMPLICATIONS

Mushrooms are a necessary and beneficial plant that develops in nature and has a diverse variety of features. The mushroom's flavor, as well as the essential compounds it contains, are what make it so important in pharmacology. Mushroom extract may be used to cure a number of ailments, but it is most often utilised to treat cancer. Now India is the succeeding producer of Gucchi mushrooms and it has joined the group of countries like United States, China, France, etc. who are successfully producing Gucchi mushrooms. Also, geographical indications (GI) tag has been given to the Doda district of Jammu and Kashmir to grow Gucchi Mushrooms. However, we must continue to improve our technology before it can be distributed to agricultural communities. It is hoped that it would be passed to the farmers in the following 2-3 years. Original Gucchi Mushrooms may cost anywhere between Rs. 10000 and Rs. 30000 per kilogram in India. In the future the Gucchi mushroom will change the Indian mushroom business, assisting farmers in their economic development.

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