

Wild Edible Mushroom Use by Tribe's People of South Gujarat, India: A Review

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Abstract- Food security remains a concern for all countries in the world, edible mushrooms are fungi that can be seen with the naked eye and are relatively easy to gather by hand. Phytochemical and nutritional constituents reveal that they have a capital importance in human and animal nutrition. The preservation of indigenous knowledge, the conservation of biodiversity, the promotion of sustainable practices, the nutritional, medical and economic importance of mushrooms have pushed scientists to become interested in the use of edible wild mushrooms by the tribes of the South Gujarat. Gujarat is one of the states in India with less consumption of edible mushrooms. Also, there is little documentation related to the use of edible mushrooms in the area; The objective of this work is to promote the recognition, utilization, and sustainable management of wild edible mushrooms. The methodology used was the reading of articles and review of previous years. Mushrooms grow in South Gujarat during the rainy season and belong to many families: Agaricaceae, Pleurotaceae, Lyophyllaceae, Tricholomataceae... Wild edible mushrooms are used by local people as source of nutrition, for the exploitation of medicinal properties and as a source of income.

Keywords- Edible, Wild mushroom, South Gujarat, Nutrition, Medicinal.

I. INTRODUCTION

Forest ecosystems are full of enormous natural resources, including wild edible plants which are used in varied and diversified ways by indigenous populations (Alka, et al., 2021). Nowadays, food security remains a concern for all countries in the world, as populations continue to grow (Fulesh & Hitesh, 2022). Wild edible mushrooms are fungi that grow naturally in the wild and are safe for human consumption (Sanjit, Bapi, Panna, & Ajay, 2019). Mushrooms helps improve the body's immune functions, with the aim of avoiding several diseases (Anmut & Galana, 2022). They also plays a vital role in the eradication of malnutrition and poverty in Gujarat in general and among the people of South Gujarat in particular (Premila, KF, & T, 2021). Edible wild mushrooms only appear periodically in nature, most often in the rainy

season and are quickly perishable. All of this therefore impacts availability in the markets (Ashok & Patel, 2014). Southern Gujarat comprises of seven districts which are Bharuch, Narmada, Navsari, Dang, Valsad and Tapi but studies carried out on the use of wild edible mushrooms are little developed in the zone. This study aims to unveil the various uses of wild edible mushrooms in South Gujarat. Several studies provided detailed knowledge about utilization of wild edible mushroom in specific location around the world. Studies conducted in South Gujarat on wild edible mushroom used by tribal people showed that 22 wild edible mushrooms are used as food by rural populations. These fungi mainly belong to family Agaricaceae, Lyophyllaceae, Pleurotaceae, Tricholomataceae and Pluteaceae and were collected from Dang, Tapi, Narmada, Navsari (Fulesh & Hitesh, 2022). Furthermore, studies on the

biodiversity of fleshy mushrooms in Navsari demonstrated that there is a diversity of wild edible mushrooms in South Gujarat. They are an important component of the ecosystem and appear seasonally, the most productive months are those from July to October. Mushrooms are cosmopolitan and can be found almost everywhere (Korat, Chopada, & Priya, 2013). In addition, the work on Proximate and mineral composition of wild fleshy fungi collected from South Gujarat has described the nutritional and medical importance of the latter (Bambhaneeya, et al., 2015). A study conducted by Tanay, 2021 in Gujarat revealed that Gujarat is one of the states in India where the consumption of edible mushrooms is less (Tanay, 2021). This review gives a clear picture on the use of wild edible mushrooms by the tribal people of South Gujarat. Also, this review would serve as a critical reference for research focused on the properties of nutritional, medicinal and an important source of income for local populations from Southern part of Gujarat.

II. PRESENTATION OF SOUTH GUJARAT

The south Gujarat lies between 21°14'-22°49'N to 72°22'-74°15'E and consists of seven districts : Vadodara, Bharuch, Narmada, Surat, The Dangs, Navsari and Valsad, covering a geographical area of 31, 495 km². It is bounded in the north to northeast by the districts of Gujarat including Anand, Kheda, Godhra and Dahod, in the east by Madhya Pradesh, in the south and southeast by Maharashtra and Dadra-Nagar Haveli and Daman. To its northwest lies the Arabian Sea and Gulf of Khambhat. Surat is the largest city in this region and second largest city in Gujarat and one of the eight largest cities in India. The study area contains a diversity of edible plants and three wildlife reserves (Bhatt, Kushwaha, Nandy, & Bargali, 2013). The economic activities of South Gujarat include agriculture, horticulture, fisheries, and industries such as textiles, chemicals, and engineering. The region is also known for its diamond cutting and polishing industry, which is a major contributor to the Indian economy. Additionally, tourism is a growing industry in South Gujarat, with attractions such as beaches, historical

sites, and wildlife sanctuaries (Meghana P, Bharat, & Beena, 2015).



Figure 1: Localization of South Gujarat in India
(Meghana P, Bharat, & Beena, 2015)

III. EDIBLE MUSHROOM

India is one of the countries with a very large population in the world. However, 75% of the population lives in rural areas. Most rural communities rely wild resources, including wild edible mushrooms that meet dietary needs during rainy times, as well as for additional dietary supplements (Mudasir, 2014). Edible mushrooms give a complete overview of the diversity of mushrooms consumed by humans (Fulesh & Hitesh, 2022). The study conducted on global development of mushroom biotechnology revealed that many species of mushrooms as *Agaricus bisporus*, *Pleurotus ostreatus* and *Lentinula edodes* are edible (Buhari & Badaru, 2015). The work on Studies on biodiversity of fleshy fungi in Navsari (South Gujarat), concluded that 11 species of wild mushrooms are edible (Korat, Chopada, & Priya, 2013). In the same vein, the work on Proximate and mineral composition of wild fleshy fungi collected from South Gujarat region of India concluded that 12 wild mushrooms are edible. According to Anusiya et al., 2021, 41 species of mushrooms are edible (Anusiya, et al., 2021). Around 400 species of wild edible mushrooms worldwide have been proven to be edible (Shuai, Honggao, Jieqing, &

Yuanzhong, 2022). In addition, 25 wild mushrooms are edible and have very important active ingredients with antioxidant and antimicrobial (Zaw Min, Ko Ko, Hnin Thanda, Marco, & Giovanni, 2020). According to Arzoo et al 17 species of mushrooms are edible (Arzoo, et al., 2023).

IV. WILD EDIBLE MUSHROOM SPECIES IN SOUTH GUJARAT

The study on wild edible mushrooms found in South Gujarat provides a comprehensive and insightful exploration of the diverse range of mushrooms utilized by tribal communities in the region. Fulesh and Hitesh, 2022 showed that 22 different wild edible fungi, belonging to families such as Agaricaceae, Lyophyllaceae, Pleurotaceae, Tricholomataceae, and Pluteaceae. Through their study, they shed light on the rich mycological heritage of southern Gujarat (Fulesh & Hitesh, 2022). Work on Proximate and mineral composition of wild flashy fungi collected from South Gujarat region of India showed the nutritional, medicinal and economic importance of 12 wild edible mushrooms which are: *Termitomyces clypeatus*, *Termitomyces versicolor*, *Pleurotus ostreatus*, *Pleurotus populinus*, *Calocybe gambosa*, *Sparassis radicata*, *Daedaleopsis confragosa*, *Ganoderma lucidum*, *Cantharellus subalibidus*, *Fistulina hepatica*, *Clitocybe subconnexa* and *Psilocybe subaeruginosa* (Bambhaneeya, et al., 2015).

V. USE OF WILD EDIBLE MUSHROOM AS FOOD BY TRIBES PEOPLE OF SOUTH GUJARAT

Nowadays, particular attention is paid to the use of wild edible mushrooms. They are used as food for their nutritional and culinary value and are of greater importance than ever in human diets around the world. The nutritional values of mushrooms are close to those of meat and fish. They are also higher than those of many vegetables and fruits. Mushrooms are rich in vitamins, proteins, fibers, amino acids but low in fats and carbohydrates. Are considered as healthy foods because they have significant nutritional potential.

22 fungi were found to be used as food by different tribes in different parts of South Gujarat (Fulesh & Hitesh, 2022). The different tribes of South Gujarat are used to using wild edible mushrooms as food. They are highly digestible and are considered a potential source of muscle protein. They also contain vitamin D. The minerals like Na, K, Ca, Mg, S, P, and other microelements like As, Cr, Cd, Cu, Fe, Mo, Co, Mn, Ni, Pb, Se, Zn are present in wild edible mushroom. Approximately 2 to 3% fat is estimated in the majority of mushrooms (Tanay, 2021). According to Bambhaneeya et al. (2015), wild fleshy fungi have a high moisture content and are a good source of macronutrients and minerals. Mushrooms are excellent foods for diabetics. Containing vitamin B12 and folic acid which are absent in many plant foods (Bambhaneeya, et al., 2015). Increasingly, indigenous populations are interested in consuming mushrooms because they contribute to food and nutritional safety. They can consume them fresh or dry and in different meals: broth, salad, mushroom curry, in various soups and other recipes.

The nutritional value of mushroom is affected by numerous factors such as species, stage of development and environmental conditions (Joshua, K. Chandradev, Leichombam, Pulok K, & Sarangthem, 2022; Buhari & Badaru, 2015; Mahantesh, OP, & Kaniyaiah, 2014). Wild edible mushrooms occupy an inseparable place in the diet of populations in several countries around the world. They contain numerous phytonutrients such as polysaccharides, dietary fibers, and the majority of essential amino acids. They also act as dietary components of foods with great protection for the human body. South Gujarat contains a large number of mushrooms, which have been studied for their nutritional uses and their prospective applications in food. The importance of mushrooms as a food is due not only to their pleasant organoleptic properties but also to the rich content of substances which must be present in a healthy human diet. Edible mushrooms have become the best food resource to obtain protein. (Anusiya, et al., 2021; Sanjit, Bapi, Panna, & Ajay, 2019; Ashok & Patel, 2014).

VI. WILD EDIBLE MUSHROOM AS MEDICINE AND TRADITION

Wild edible mushrooms have been used for centuries by tribal communities, India is a diverse country that belongs to different types of tribal people or ethnic groups and each group has its own practices of managing natural resources for their daily use. Wild edible mushrooms are widely used in medicine because they contain many active ingredients. A few years ago, mushroom extracts and their secondary metabolites have gained considerable attention due to their biological effects, including pharmacological activities, and potential applications in modern medicine. They have a great role in ethnomedicine and the treatment of many diseases among local populations, and in some other cultural traditional uses also (Sanjit, Bapi, Panna, & Ajay, 2019). In South Gujarat, wild edible mushroom is consumed to attain good health. They are used in ethnomedicine for the treatment and prevention of many diseases. They contain important secondary metabolites and antimicrobial properties. Each tribe of India uses its own method for the treatment of diseases or in traditional medicine (Fulesh & Hitesh, 2022). Mushrooms have also been used as medicines for a very long time. Mushrooms were used to treat certain skin diseases in people (Tanay, 2021). A total of 23 species have been documented in Gujarat to treat various conditions, of which 9 species have been used to treat general aspects like convalescence, while others (14 species) have been used for specific conditions. In the Jessore community, 5 of the 7 conditions (41.2%) were related to skin problems, while in the Purna community, only 7 of the 18 conditions (38.9%) had a similar use. However, some communities use wild edible mushrooms for the treatment of various illnesses while others use them to strengthen the immune system. The use of edible mushrooms is specific to a tribe (Lahiri, Shukla, Shah, & Modi, 2010). They are a food of choice for heart patients and for the treatment of cardiovascular diseases. The calcium, magnesium and iron found in wild edible mushrooms help maintain normal muscle and nerve functions, ensure a stable heart rate, support a healthy immune system and maintain

strong bones (Bambhaneeya, et al., 2015; Buhari & Badaru, 2015; Ashok & Patel, 2014). The studies carried out on aspects of mushrooms and their extracts as natural antimicrobial agents concluded that mushrooms have medical properties like antibacterial, anticancer, and antioxidant activity, mushrooms are a highly nutritious food source (Arzoo, et al., 2023). Several species of wild edible mushrooms identified in Gujarat are used in other states of India in traditional medicine and are involved in the treatment of numerous diseases by local tribes. Some tribes use mushrooms to treat problems such as pneumonia, constipation, eczema, skin infections (pimples, lesions, boils, measles, chickenpox and many others), strengthening the immune system.

VII. MUSHROOMS AS A SOURCE OF INCOME

Wild edible mushrooms constitute an important source of income for the local tribes of South Gujarat. They are part of the diets of people in many developing countries, and also contribute to the livelihoods of people who collect and sell them. In addition, there is an economic impact of wild edible mushrooms on the income of local populations in the southern Gujarat region of India. Mushroom cultivation can be a profitable business, especially in developing countries where there is a shortage of food and a need for economic development (Bambhaneeya, et al., 2015; Ashok & Patel, 2014). Wild edible mushrooms contribute 5 to 24% of household income in indigenous communities in the Achanakmaar-Amarkantak Biosphere Reserve in central India. However, it is important to note that this percentage can vary depending on the location, season and availability of wild edible mushrooms, as well as market demand and prices (Alka, et al., 2021). The sustainable harvesting and commercialization of wild edible mushrooms offer opportunities for income generation and economic empowerment within tribal communities. The cultivation of certain species of edible mushrooms, such as shiitake or oyster mushrooms, can also be a profitable enterprise for small-scale farmers or entrepreneurs. For example, in some parts of China and India,

mushroom cultivation has become a major industry, providing income for thousands of farmers (Joshua, K. Chandradev, Leichombam, Pulok K, & Sarangthem, 2022; Sanjit, Bapi, Panna, & Ajay, 2019; Shuai, Honggao, Jieqing, & Yuanzhong, 2022).

VIII. CONCLUSION

The study focused on the use of wild edible mushroom in South Gujarat show that Wild edible mushrooms are used as food in various forms such as skewers, broth, and in many soups. In addition, they contain various active compounds to which they have shown different medicinal interests and used by the tribal peoples of world in general and South Gujarat in particular. Traditional knowledge of the preparation of medicines from mushrooms could help scientists in the manufacture of medicines based on mushrooms. They also constitute a source of income for local populations. This study will be important for future researchers to identify the major active compounds responsible for different medicinal activities. The conservation of the different species of the locality within the research centers can help researchers to come into possession of certain specimens easily. The cultivation of mushrooms and the domestication of certain species could help resolve the problems of rarity and lack of mushrooms at certain times of the year.

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