Economically important wild mushroom of Mayurbhanj, Odisha, India

Abstract

In forest-dominated areas, the local communities depend on forests for their food, medicine, and livelihood. Seasonal livelihoods are observed mostly in these areas. Wild edible mushrooms are a seasonal source of livelihood and food for tribal communities. Keeping the importance of wild mushrooms in providing livelihood opportunities, an attempt has been made to document the economically important wild edible mushrooms of Mayurbhanj, Odisha, India. Results revealed that about 10 species are collected from the forest which are used to sell in weekly markets and roadsides of the study areas. Among the enumerated wild mushroom, the highest price was observed with "Rugda/Phutka" mushrooms (*Astraeus hygrometricus*).It was noticed that *Termitomycesmicrocarpus*is the first choice of the sellers and buyers too. The *Amanita egregia*is also very much popular among the buyers due to good yield and palatability.The paper highlights the importance of wild mushrooms as Non-Timber Forest Produces and recommendsthe need for value addition for sustainable livelihood opportunities.

Introduction

Communities depend on forests and forests depend on communities. In most forest dominant districts of Odisha, the local communities depend on forests and their products for day-to-dayneeds. The communities in these areas collect food, medicine and Non-Timber Forest Produces to get a livelihood. Day by day we are losing our forests due to over-extraction, climate change, deforestation, and other anthropogenic activities. These problems lead to the migration of communities and the extinction of indigenous traditional practices. Therefore, there is a need to document economically important forest products to improve their livelihood opportunities. Mayurbhanj is a forest and tribal-dominateddistrict of Odisha. The local tribal people of Mayurbhanj collect various forest products and use them in day-to-day life and also used to sell them in local markets to get a livelihood [1, 2]. They used to sell honey, resin of *Shorearobusta* (Jhuna), kendu (*Diospyros melanoxylon*), jamun (Fruit of *Syzygiumcumini*), rope made up from stem bark of siali (*Phaneravahlii*), wild mushrooms, red weaver ant, the root of mudika (*Cissampelos pareira*) and plant parts of some locally available medicinal plants. Among them, wild mushrooms are collected duringthe rainy season and used to sell as seasonal products (Plate 3-4). They are also consumed as food. These mushrooms play an important role in providing food and livelihood. Therefore, an attempt has been made to document the economically important wild edible mushroom, collected by the local communities of Mayurbhanj district, Odisha, India. The study providesbasic knowledge about them for future research works and making strategies for their commercialization for commercial utilization and development [3,4].

Methodology

The survey works are carried out from 2020 to 2022 in Mayurbhanj district of Odisha, India. The weekly markets are selected and visited during the rainy season, including state highways, district roads, village roads and tribal villages. Informationwascollected from tribal

sellersand collectors of wild mushrooms and tabulated. The mushrooms are identified using the available literature [3-5] and morphological characters.

Results

A total of 10 most common economically important mushroom species have been tabulated, belonging to 8 families. These mushrooms are sold in the local marketsand on roadsides (Plate 1). These mushrooms are highly nutritious and complete healthy food for all age groups as per the opinions and information (Plate 2). They are rich in protein, dietary fibre, vitamins and minerals. Most common enumerated species are *Amanita caesarea, Amanita egregia, Russula rosea, Termitomycesmicrocarpus, Volvariellavolvacea*etc. These mushrooms aresold for Rs. 10 to Rs. 30 per leaf plate or bowl (Plate 4).

Table 1. Enumerated mushrooms having economic values from the study areas

Mushrooms	**Family**	**Local name**	**Price (Per leaf plate)**
Amanita caesarea	Amanitaceae	Bhanu chatu	Rs. 20/-
Amanita egregia	Amanitaceae	Manda chatu	Rs.20/-
Astraeus hygrometricus	Diplocystaceae	Phutka/ Rugda	Rs.30/-
Boletus edulis	Boletaceae	Jamu chatu	Rs.20/-
*Gomphus*Spp.	Gomphaceae	Gendaphul	Rs.20/-
Macrolepiota procera	Agaricaceae	Khadadachatu	Rs.10/-
Russula rosea	Russulaceae	Patrachatu	Rs.10/-
Termitomycesheimii	Lyophyllaceae	Benuachatu	Rs.20/-
Termitomycesmicrocarpus	Lyophyllaceae	Bali chatu	Rs.20/-
Volvariellavolvacea	Pluteaceae	Pala chatu	Rs.10/-

Discussion

Other researchers are also reported on the wild mushrooms. In 2013, Sachan et al. [5] reported some Indigenous knowledge of ethnic tribes forutilization of wild mushrooms as food and medicine in SimilipalBiosphere Reserve.A total of 14 species of fleshy mushrooms belonging to 8genera and 6 families were reported. Some mushrooms are like*Russula emetic, Russuladelica,Termitomyceseurrhizus, Agaricussilvaticus,Pleurotusostreatus* etc.In 2018, Panda et al. [6] reported about 14 wild edible mushroom species belonging to 5 families from different locations and local markets of Mayurbhanj district, Odisha. Some reported wild edible mushrooms are like*Termitomyceseurhizus, Volvorellavolvacea, Termitomycesheimi, Russula rosea, Russulaalbonigra, Russulabrevipes, Amanita egergia* and *Astraeus hygrometricus,*regularly collected by the local people during the rainy season. In 2019, Panda et al. [7] reported a total of 20 wild edible mushroom species belonging under nine families from ten different places in three districts Mayurbhanj, Keonjhar and Balasore of Northern Odisha, India. Among them the order Agaricales was dominant, showing maximum numberof species and the genus *Russula* exhibited maximum number of speciesfollowed by *Termitomyces* and *Amanita*.In 2020, Rout et al. [4] studied the mushroom diversity in

Dhenkanal district of Odisha and reported about 60 species of wild mushrooms belonging to 33 genus and 25 families among which 10 species are edible and consumed by local communities.In 2021, Mishra et al. [3] studied the wild mushroom diversity of Rairangpur ForestDivision, Odisha, India and its medicinal uses and recorded 99 wild mushroom species belonging to 56 genera of 37 families. Among these 41 species were edible and 15 mushrooms were consumed by local and tribal communities in that study area. Family Agaricaceae and Polyphoraceaewere reported the most dominant. In 2013, Manna and Roy [8] reported on the economic contribution of wild edible mushrooms to a forest fringe ethnic community in some eastern lateritic parts of Indiathat the net value of revenue from wild edible mushrooms was estimated to be contributing 9.83 and10.29 % of total annual income of a Santal family of theChoupahari and Gonpur forests. Diversity and economic values of medicinal mushrooms ofChattishgarhare recorded and discussed on medicinally important mushrooms, edible, nonedible and poisonous mushrooms [9]. In 2019, Verma [10] reported some information on wild edible mushrooms collected from Sal forests of Dindori district, Madhya Pradeshby personal interviewing of rural folk or tribal people and found commonly collected mushrooms from salforests like*Astraeus hygrometricus, Russulacongoana, Termitimycesclypeatus, T. eurhizus, T. microcarpus*and*Termitomyces* sp.In 2022, Sharma et al. [11] studied the ethnomycology of wild edible and medicinal mushrooms in district Jammu, J&K (UT), India and reported 14 edible fleshy mushrooms with medicinal values. Some culturally important and frequently consumed species are *Termitomycesheimii, Termitomycesclypeatus,* and*Termitomyces striatus* var. *annulatus.* In 2021,Qwarse et al. [12] reported some wild mushroom species used by the local communitiesin the Selous-Niassa corridor in Namtumbo district, Ruvuma region, Tanzania, and documented a total of 32 edibleand inedible wild mushroom species belonging to thirteen genera and eleven families. Among these wild mushrooms, 34.38% were edible, 25% were medicinal andedible, 31.25% did not have known uses, 6.25% were medicinal only and 3.12% were poisonous.

From the above discussion, it is observed that survey of the diversity of wild mushrooms has been carried out in different locations throughout the globe, but there is very less or no documentation of the economic importance of these wild edible mushrooms.Also, many reports are available on the medicinal properties of wild edible mushrooms. As these mushrooms are one of the major livelihood options for the tribal communities near forests, hence need more surveys and value addition of them to improve the lifestyle of the tribals in the aspect of health and financial support.

Future recommendation

The present study recommends the following activities:

1. Extensive exploration works are needed to document all possible economically important wild mushrooms of the Mayurbhanj district, Odisha, India.
2. Analysis of food values is needed.
3. Analysis of pharmacological values should be carried out.
4. Short-term and long-term impacts should be analysed to avoid negative effects on health.
5. Need study on ecological association ship with landscapes of enumerated wild mushrooms.
6. Value addition of enumerated wild mushrooms should be carried out.

Conclusion

Wild mushrooms are the important part of tribal people. They collect them during rainy seasons, consume as a day-to-day meal and sell to get livelihood support. Deforestation and other negative impacts of anthropogenic activities on forest are increasing lead to reduce the quantity of wild mushrooms. Therefore, for achieving the sustainable food need and livelihood, need to conserve the forest and have to develop the farming techniques of enumerated species from the present study. It will be helpful to mitigate food problems and related health issues in tribal areas.

References

1. Kumar S. (2015). Life support plant species among aboriginals of Similipal Biosphere Reserve Forest, Odisha: Diversity and Conservation. International Journal of Biological Sciences and Engineering. 6(2): 80-86.
2. Kumar S. (2017). Yam (*Dioscorea* species): Future functional wild food of tribal Odisha, India. In Frontiers in bioactive compounds. Bentham Science Publishers Limited.
3. Mishra AK, Mishra S, Rathore S, Naik V, Patil S and Kumar S. (2021). Wild Mushroom Diversity of Rairangpur ForestDivision, Odisha, India & Its Medicinal Uses. European Journal of Medicinal Plants. 32(9): 19-27.
4. Rout Y, Behera F, Kumar S, Sahoo MP and Devi RS. (2020). Mushroom Diversity of Dhenkanal District, Odisha, India: Source of Alternative Foods and Medicines. European Journal of Medicinal Plants. 31(7): 33-41.
5. Sachan SKS, Patra JK and Thatoi HN. (2013). Indigenous knowledge of ethnic tribes for utilization of wild mushrooms as food and medicine in SimilipalBiosphere Reserve, Odisha, India. International Journal of Agricultural Technology. 9(2): 403-416.
6. Panda MK, Barik KL, Thotoi HN and Tayung K. (2018). Diversity of Wild Edible Mushrooms in Mayurbhanj District of Odisha, India. Environment and Ecology. 6(2). 219-225.
7. Panda MK, Thotai HN, Sahu SC and Tayung K. (2019). Wild edible mushrooms of Northern Odisha, India: data on distribution and utilization by ethnic communities. Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences. 5(2): 248-268.
8. Manna S and Roy A. (2013). Economic contribution of wild edible mushrooms to a forest fringe ethnic community in some eastern lateritic parts of India. Journal of Forestry Research. DOI 10.1007/s10310-013-0411-4.
9. Soni I and Soni MY. (2017). Diversity and economic value of medicinal mushroom of Chhattisgarh. Indian Journal of Scientific Research. 13(2): 152-157.
10. Verma RK. Pandro V, Mishra SN, Raj D and Asaiya AJK. (2019). Sal Forest: A Source of Wild Edible Mushrooms for Livelihood Support to Tribal People of Dindori District, Madhya Pradesh, India. International Journal of Current Microbiology and Applied Sciences. 8(1): 563-575.
11. Sharma R, Sharma YP, Hashmi SAJ, Kumar S, Manhas RK. (2022). Ethnomycological study of wild edible and medicinal mushrooms in district Jammu, J&K (UT), India. Journal of Ethnobiology and Ethnomedicine. 18(1):23. doi: 10.1186/s13002-022-00521-z.
12. Qwarse M, Moshi M, Mihale MJ, Marealle AI, Sempombe J and Mugoyela V. (2021).Knowledge on utilization of wild mushrooms by the local communities in the

Selous-Niassa Corridor in Ruvuma Region, Tanzania. Journal of Yeast and Fungal Research. 12(1): 8-19.

Plate1: **Mushrooms sold in the local markets**

Plate 2:Wild mushrooms

Plate 3: Wild mushrooms collected in rainy season and used to sell as seasonal products

Plate 4: Mushrooms are sold in leaf plate or bowl