

Ethnomacrofungal study of some wild macrofungi used by local peoples of Gorakhpur district, Uttar Pradesh

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Received 14 January; 2018 Revised 11 March 2019

Gorakhpur district having varied environmental condition is sanctioned with wealth of many important macrofungi but only few works has been done here to explore the diversity. The present investigation focus on the ethnomacrofungal study of Gorakhpur district. From information obtained it became clear that many macrofungi are widely consumed here by local and tribal peoples as food and medicines. Species of *Daldinia*, *Macrolepiota*, *Pleurotus*, *Termitomyces*, etc. are used to treat various ailments. Thus the present study clearly states that Gorakhpur district is reservoir of macrofungi having nutritional and medicinal benefits.

Keywords: Bhar, Bhuj, Kewat, Local villagers, Macrofungi, Tharu.

IPC code; Int. cl. (2015.01)- A61K 36/00

Traditional medicine or ethno medicine is a healthcare practice that has been transmitted orally from generation to generation through traditional healers with an aim to cure different ailments and is strongly associated to religious beliefs and practices of the indigenous people^{1,2}. Since the beginning of human civilization man has been using many herbs and herbal extracts as medicine. The classical Indian texts Rig-Veda, Atharvaveda, Charak samhita and Sushruta samhita are the evidence of the use of plants by our ancestors. It indicates that herbal medicines have been derived from rich traditions of ancient civilization and scientific heritage. Among the ancient civilizations, India has been known to be rich storehouse of medicinal plants and macrofungi. The forests in India are the principal repository of large number of medicinal macrofungi, which are largely collected as raw materials for the manufacture of drugs³. The local tribes are largely self-contained, ritually sanctioned way of life where they practice utilization of plants and macrofungi for curing many diseases⁴. Traditionally the tribes lived in and subsisted on the forests, but with increasing loss of forest areas, integration into mainstream society and urbanization, they are rapidly losing their traditional knowledge and culture⁵. Mushrooms have a long association with mankind and provide profound biological and

economical benefit. The wild mushrooms have been traditionally consumed by man with delicacy probably, for their taste and pleasing flavour. They have rich nutritional value with high content of proteins, vitamins, minerals, fibres, trace elements and low calories and cholesterol⁶.

There are lots of works which had been done on ethnomacrofungal studies in various parts of the world and also in India but this type of knowledge has scarcely been documented in the Gorakhpur district. Some of the ethnomacrofungal reports from India include the wild edible mushrooms from Western Assam⁷, Nagaland⁸, North West India⁹, West Bengal¹⁰ and Kinnaur district of Himachal Pradesh¹¹. Ethnomacrofungal uses of some macrofungi viz., *Calocybe gambosa*, *Calocybe indica*, *Macrolepiota procera* and *Tuber aestivum* from Gorakhpur district have been mentioned earlier by Vishwakarma *et al.*¹².

In order to assess the consumption of traditionally important and indigenous medicinal macrofungi survey was carried out during June 2011 to December 2014 in the different tehsils (administrative units) of Gorakhpur district. These medicinal macrofungi were used by various tribes viz., Bhar, Kewat, Bhuj, Tharu and local villagers of this region. The ethnomacrofungal information was gathered through several visits, questionnaire, group discussions with various groups and local peoples.

Material and Methods

Study area

Gorakhpur is situated in North Eastern part of Uttar Pradesh in India near the border with Nepal. It has area of 3483.8 km² with latitude of 26° 13' N and 27° 29' N and longitude of 83° 05' E and 83° 56' E. Average annual temperature of Gorakhpur is 26 °C and summer temperature varies from 30-40 °C and winter temperature 2-18 °C. Annual rainfall is 1393.1 mm and 87% of rainfall is recorded during period of June to September¹³. The soil of this area is gangetic alluvial brought down by river Rapti, Rohini, Ghaghara and Gandak from the Himalayas. It is situated on the basin of river Rapti and Rohini hence its geographical shape is a bowl type. Local topographic and drainage variation have brought about significant changes in the soil morphology, resulting in textural differences ranging from sandy through loamy and silty to heavy clayey type of soil. The major soil type includes clayey, loam, sandy loam, silt and usar or alkali soil.

Ethnomacrofungual survey

In order to assess the consumption of traditionally important and indigenous medical macrofungi, survey was carried out during June 2011 to December 2014. Collection of samples was done at Tehsil level (which includes blocks and then villages). Different Tehsil visited during survey were- Bansaon, Campierganj, Chauri Chaura, Gola, Khajni, Sadar and Sahjanwan. Macrofungual specimens were collected, photographed at the sampling site and then preserved using standard preservation techniques. Macrofungual specimens were preserved wet as well as dry following Ainsworth¹⁴. The macrofungual samples were identified on the basis of their macro and microscopic characteristic. Character of pileus and stipe such as shape, size, surface texture, in some cases behaviour of the cuticle when peeled, presence or absence of the remnants of the veil, flesh type, in some cases microscopic details of the cells in the cuticle (dermatocystidia), change in colour after bruising in case of pileus while additional information about the presence or absence of ring, base rooting mode are noted in case of stipe. Mode of gill attachment with stem indicates the genus of the sample hence it become very important to note it down. Colour of gill, its shape, type of attachment with stem should also be noted. The microscopic details of spores viz., colour, surface, texture, shape and size are also very important points which helps in proper identification of macrofungi. The samples has been confirmed by several authors¹⁵⁻³⁴ and confirmed

by various mycokeys (www.mushroomexpert.com and www.mycokeys.com). Taxa and their authors were given according to an amended CABI Bioscience electronic version³⁵. These medical macrofungi were used by local peoples and local tribes viz., Bhar, Kewat and Bhuj. The ethnomycological information was gathered through several visits, questionnaire, group discussion with various groups and local peoples and also confirmed by various literatures. In general terms they called these macrofungi as bhutki, bhumiphod or kukkurmatta.

Data collection

Information regarding utilization of macrofungi was collected through a semi-structured interview to local and tribal peoples. The semi-structured interview includes various questions regarding their knowledge on macrofungi viz., how they utilization them in traditional medicine, what are the diseases treated by the macrofungi, the parts of macrofungi they uses and especially the procedure of use of these macrofungi.

Results and Discussion

Macrofungi have been objects of much curiosity and speculation since time immortal. Gorakhpur district is situated in North Eastern part of Uttar Pradesh has subtropical climate and it also includes Terai region which is famous for its monsoon type of climate. It consists of varied topography and wide range of temperature variation through the year. Moderate rainfall in this area supports a rich floral and macrofungual diversity. Lots of varieties of macrofungi grows here throughout the year but during rainy season lots of valuable macrofungi grows in the forest regions which are used by local and tribal peoples as food and also medicine. They also use to sell these macrofungi at local markets at very high rate. Commonly sold macrofungi in local markets are *Termitomyces heimii*, *Tuber aestivum*, *Pleurotus ostreatus*, *Macrolepiota procera* etc. People use to eat these macrofungi with great delicacy and also edible macrofungi are in high demand here.

During the present survey, a total of 36 species of macrofungi belonging to 19 families (Fig. 1) were found to be traditionally used by local peoples for various purposes in Gorakhpur district. Details of macrofungi with its habitat, date and place of collection, voucher number and various uses of these macrofungi by various ethnic group are represented in Table 1 Lots of macrofungi were identified from different parts of India but North Eastern part

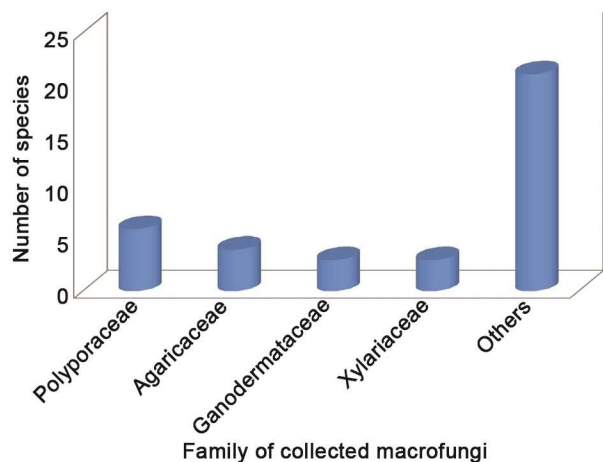


Fig. 1 — Number of species of macrofungi represented by different families.

especially Gorakhpur district is less explored in respect to ethnomacrofungal study. Only a few workers had explored this area and reported some interesting macrofungi from here^{13,36-40}. The tribals and local peoples of Gorakhpur district use these macrofungi in various forms viz., powder, paste, juice, decoction or either as whole fruiting body. Some species are used to treat more than one disorder. *Pleurotus ostreatus*, *Termitomyces heimii* and *Volvariella volvacea* are very common and generally used as food in daily diet during rainy season. Other macrofungi are used by many local and tribal peoples to cure different ailments. Furthermore, the potential benefit of this important knowledge in the field of medicine has been scarcely explored. Tantengco and Ragrario⁴¹ documented the use of macrofungi as remedy for weakness, cough, common colds and poor eyesight. They also stated that these macrofungi are also used by local peoples as food and medicines viz., *Ganoderma lucidum* are used by Ayta in Pastolan and Payangan as coffee while *Auricularia auricular-judae* and *Volvariella volvacea* are usually sautéed with garlic and onion or boiled and eaten with rice. Teke *et al.*⁴² had done an extensive ethnomycological survey in the Kilum-Ijim mountain forest reserve of Cameroon and stated that there are various macrofungi which has been used by local peoples as food and medicine. According to them *Auricularia polytricha* is use during pregnancy to cure nausea, *Daldinia concentric* for hypertension, *Ganoderma applanatum* and *Trametes versicolor* for immune system, *Lentinus squarrosulus* for system cleaning, *Polyporus dictyopus* for stomach aches and headaches, *Termitomyces microcarpus* for bone

strengthening in children and fever, *Vascellum pretense* for fever while *Xylaria* sp. to treat hypertension and fever. Apetorgbor *et al.*⁴³ done an extensive survey on ethnomycological value of macrofungi and reported that *Volvariella volvacea* helps in lowering high blood pressure, *Termitomyces globules* use as blood tonic and also help in lowering high blood pressure, *Termitomyces microcarpus* use as blood tonic, *Termitomyces clypeatus* for rheumatism, diarrhoea, and also as blood glucose lowering agent, *Termitomyces robustus* as blood tonic, *Coprinus disseminates* and *Schizophyllum commune* as blood tonic and for eye infection, *Collybia* sp. for fever and as blood tonic, *Pleurotus tuber-regium* for asthma, *Ganoderma lucidum* for cancer, *Auricularia auricular-judae* and *Trametes* sp. as blood tonic.

In the present study collected macrofungi were represented by 19 families of which Polyporaceae was found to be dominant representing 6 species which was followed by Agaricaceae representing 4 species. Ganodermataceae and Xylariaceae represents 3 species each while other families viz., Auriculariaceae (1), Coprinaceae (2), Fistulinaceae (1), Fomitopsidaceae (1), Lycoperdaceae (1), Lyophyllaceae (1), Meripilaceae (1), Morchellaceae (2), Pleurotaceae (1), Pluteaceae (2), Psathyrellaceae (2), Russulaceae (2), Schizophyllaceae (1), Sparassidiaceae (1), Stereaceae (1), contain 1 or 2 species showing the profusion of Polyporaceae (Plate 1). Sarma *et al.*⁷ studied wild edible mushrooms used by ethnic tribes of Western Assam and collected 26 different species of macrofungi belonging to 14 genera and 13 families in which Tricholomataceae was found to be dominant containing 5 species, followed by Marasmiaceae containing 4 species while Auriculariaceae and Agaricaceae contains 3 species each. Ethnomacrofungal and traditional knowledge of about the seven edible species of *Termitomyces* viz., *T. microcarpus*, *T. radicans*, *T. badius*, *T. medius*, *T. heimii*, *T. striatus* and *T. mammiformis* and 3 species of *Macrolepiota* viz., *Macrolepiota procera*, *M. dolichaula* and *M. rachodes* of North West India was studied by Kumari *et al.*⁹ and stated that these macrofungi were frequently hunted by local people of North West India during monsoon season. Chauhan *et al.*¹¹ surveyed the Kinnaur District of Himachal Pradesh and reported twelve edible macrofungi belonging to ten families and ten genera which were used by local people as supplementary food.

Table 1 — Wild macrofungi used by various tribes of Gorakhpur district to treat various ailments

S. No.	Macrofungi	Family	Habitat	Voucher No.	Date of Collection	Place of Collection	Ethnic group	Application
1.	<i>Agaricus silvaticus</i> Schaeff.	Agaricaceae	Saprobic, solitary to in group on soil	DDUNP L211	20/7/12	Sahjanwan (Barahua)	Bhar	To reduce fever
2.	<i>Auricularia auricular-judae</i> (Bull.) Quéf.	Auriculariaceae	Parasitic on <i>Tecoma capensis</i> , in group, on healthy tree	DDUNP L163	4/7/14	Sadar (Kushmi Jungle)	Bhar, Tharu	Hypocholesterolemic, antihyperglycemic, anticoagulant. <i>A. auricula</i> is boiled in a liquid to treat inflammation of the throat and for eye irritation, tooth pain and in cough
3.	<i>Coprinellus micaceus</i> (Bull.) Vilgalys	Psathyrellaceae	Saprobic, in group, on humus rich soil	DDUNP L237	19/8/11	Sahjanwan (Barahua)	Bhuj	Antimicrobial
4.	<i>Coprinopsis atramentaria</i> (Bull.) Redhead,	Psathyrellaceae	Saprobic, on rotting tree stump in group	DDUNP L238	26/9/11	Campierganj (Campierganj Jungle)	Bhar, Tharu	Antitumour, antifungal
5.	<i>Coprinus comatus</i> (O.F. Müll.) Pers.	Coprinaceae	Saprobic, in group on manure	DDUNP L231	7/7/12	Sahjanwan (Jaitpur)	Bhar, Kewat, local villagers	Antifungal, cholesterol-lowering effect and curing skin diseases
6.	<i>Coprinus disseminatus</i> (Pers.) Gray	Coprinaceae	Saprobic on rotting tree branch, in group	DDUNP L232	23/9/11	Sadar (Kushmi Jungle)	Bhuj, Tharu	Antitumour
7.	<i>Daldinia concentrica</i> (Bolton) Ces. & De Not.	Xylariaceae	Saprobic, in group, on decaying wood log	DDUNP L158	29/8/11	Khajni (Rudrapur)	Bhar, Kewat, Bhuj, Tharu	Used to treat itchiness of skin and to cure wounds, to stop bleeding and in constipation
8.	<i>Fistulina hepatica</i> (Schaeff.) With.	Fistulinaceae	Saprobic, on tree trunk	DDUNP L160	5/6/11	Sadar (Kushmi Jungle)	Bhar	Used to cure fever
9.	<i>Fomes fomentarius</i> (L.) Fr.	Polyporaceae	On decaying wood log	DDUNP L185	28/8/11	Campierganj (Campierganj Jungle)	Kewat	Used for blood coagulation
10.	<i>Fomitopsis pinicola</i> (Sw.) P. Karst.	Fomitopsidaceae	Saprobic on decaying tree (<i>Mangifera indica</i>), perennial, solitary to group	DDUNP L172	5/8/12	Sahjanwan (Badhgahan)	Bhar, Bhuj	Used as tonic to reduce inflammation of digestive tract and to stop bleeding
11.	<i>Ganoderma applanatum</i> (Pers.) Pat.	Ganodermataceae	Parasitic on <i>Tectona grandis</i> , from furrow, in group	DDUNP L189	23/9/11	Sahjanwan (Ghaghsara)	Bhar, Kewat, Bhuj, local villagers	Immunomodulating properties, pain killer, eliminates indigestion, also used to cure diabetes and high blood pressure
12.	<i>Ganoderma lucidum</i> (Curtis) P. Karst.	Ganodermataceae	Saprobic on dead woods of hard woods, solitary or in groups of 2-3	DDUNP L190	6/8/12	Gola (Sidhuapar)	Bhar, Kewat, Bhuj, Tharu, local villagers	Used to treat diabetes, dizziness, poisoning from toxic mushrooms.

(Contd.)

Table 1 — Wild macrofungi used by various tribes of Gorakhpur district to treat various ailments (*Contd.*)

S. No.	Macrofungi	Family	Habitat	Voucher No.	Date of Collection	Place of Collection	Ethnic group	Application
13.	<i>Ganoderma tsugae</i> Murrill	Ganodermataceae	Saprobic on decaying tree, solitary	DDUNPL 191	21/10/11	Sahjanwan (Barahua)	Bhar, Kewat, Bhuj, Tharu, local villagers	Used to cure cough and cold
14.	<i>Grifola frondosa</i> (Dicks.) Gray	Meripilaceae	Saprobic on decaying wood from tree furrow (<i>Tectona grandis</i>).	DDUNPL 178	25/8/11	Sahjanwan (Bankatia)	Bhar, Kewat, Bhuj, Tharu, local villagers	Antihyperglycemic, immunity booster, also used to get relief from muscle pain,
15.	<i>Lenzites betulina</i> (L.) Fr.	Polyporaceae	Saprobic on deadwood, in group with overlapping cluster	DDUNPL 179	4/4/12	Gola (Sidhuapar)	Bhar, Kewat	Antimicrobial
16.	<i>Lepiota cristata</i> (Bolton) P. Kumm.	Agaricaceae	Saprobic, solitary to in group on soil	DDUNPL 193	25/7/12	Sadar (Kushmi Jungle)	Bhuj	Used to cure skin infection
17.	<i>Lycoperdon pyriforme</i> Schaeff.	Lycoperdaceae	Saprobic, solitary to in group on soil	DDUNPL 194	11/7/11	Sadar (Kushmi Jungle)	Kewat	Used to cure stomach pain and to cure wound
18.	<i>Lycoperdon perlatum</i> Pers.	Lycoperdaceae	Saprobic, in group, along road side	DDUNPL 270	7/7/12	Sahjanwan (Jaitpur)	Bhuj, Tharu	Used to cure wounds
19.	<i>Macrolepiota rhacodes</i> (Vittad.) Singer	Agaricaceae	Saprobic, solitary to in group in lawns	DDUNPL 195	7/7/12	Campierganj (Campierganj Jungle)	Bhuj, Bhar	Used to cure diabetes and high blood pressure
20.	<i>Morchella angusticeps</i> Peck	Morchellaceae	Leaf litter	DDUNPL 196	28/11/13	Sadar (Jangle Tinkonia)	Tharu	Used for health care
21.	<i>Morchella esculenta</i> (L.) Pers.	Morchellaceae	Leaf litter	DDUNPL 197	15/10/11	Sadar (Kushmi Jungle)	Tharu	Used for health care
22.	<i>Pleurotus ostreatus</i> (Jacq.) P. Kumm.	Pleurotaceae	Parasitic on <i>Mangifera indica</i> , forms shelves	DDUNPL 250	8/7/12	Sahjanwan (Nagwa)	Bhar, Kewat, Bhuj, Tharu, local villagers	Antimicrobial, hypocholesterolemic, used in dysentery, fever and asthma
23.	<i>Pycnoporus cinnabarinus</i> (Jacq.) P. Karst.	Polyporaceae	Saprobic on dead wood, solitary to group	DDUNPL 184	27/3/12	Sadar (Jangle Tinkonia)	Kewat	Used to cure wounds, ear infection treatment
24.	<i>Russula aquosa</i> Leclair	Russulaceae	On humid soil	DDUNPL 265	28/9/14	Campierganj (Campierganj Jungle)	Bhuj, Kewat	Used for wound healing and also as immunomodulator
25.	<i>Russula emetic</i> (Schaeff.) Pers.	Russulaceae	Mycorrhizal with trees	DDUNPL 162	25/8/12	Sadar (Kushmi Jungle)	Kewat	Used for wound healing
26.	<i>Schizophyllum commune</i> Fr.	Schizophyllaceae	Parasitic on <i>Mangifera indica</i> tree in group	DDUNPL 165	11/8/11	Sahjanwan (Gida)	Bhar, Tharu	Enhance immune system
27.	<i>Sparassiss crispa</i> (Wulfen) Fr.	Sparassidiaceae	Saprobic, in group, on decaying wood log	DDUNPL 170	18/8/11	Sahjanwan (Bhilora Khurd)	Kewat	Immunity booster

(Contd.)

Table 1 — Wild macrofungi used by various tribes of Gorakhpur district to treat various ailments (*Contd.*)

S. No.	Macrofungi	Family	Habitat	Voucher No.	Date of Collection	Place of Collection	Ethnic group	Application
28.	<i>Stereum hirsutum</i> (Willd.) Pers.	Stereaceae	Saprobic on deadwood, gregarious	DDUNP L166	9/5/13	Sahjanwan (Bhilora Khurd)	Bhar	Used in wound curing
29.	<i>Termitomyces heimii</i> Natarajan	Lyophyllaceae	Symbiotic, in association with termites nest	DDUNP L259	7/7/12	Sadar (Kushmi Jungle)	Bhar, Kewat, Bhuj, Tharu, local villagers	Used as energizing tonic
30.	<i>Trametes gibbosa</i> (Pers.) Fr.	Polyporaceae	Saprobic on decaying wood log, forming rosettes on top of cut stump	DDUNP L186	5/12/11	Sadar (Belghat Khurd)	Kewat, Bhuj	Antiinflammatory, antitumour, antimicrobial
31.	<i>Trametes hirsuta</i> (Wulfen) Lloyd	Polyporaceae	Saprobic on dead woods, annual, growing in group	DDUNP L187	5/7/14	Sadar (Jangle Tinkonia)	Tharu	Useful in curing wounds
32.	<i>Trametes versicolor</i> (L.) Lloyd	Polyporaceae	Saprobic on decaying wood log, forming rosettes on top of cut stump	DDUNP L188	13/9/12	Sahjanwan (Nagwa)	Bhar, Tharu	Antimicrobial
33.	<i>Volvariella indica</i> M.K. Saini, N.J. Kaur & Atri	Pluteaceae	Saprobic, in group or scattered in garden	DDUNP L228	6/7/14	Sahjanwan (Barahua)	Bhar, Kewat	Used to cure high blood pressure
34.	<i>Volvariella volvacea</i> (Bull.) Singer	Pluteaceae	Saprobic, in group on wheat straw or husk	DDUNP L230	3/9/12	Sahjanwan (Nagwa)	Bhar, Kewat	Helps to lower high blood pressure
35.	<i>Xylaria hypoxylon</i> (L.) Grev.	Xylariaceae	Saprobic, scattered to gregarious on rotting wood	DDUNP L159	3/7/14	Sadar (Gularia)	Kewat, Bhuj	Antimicrobial
36.	<i>Xylaria polymorpha</i> (Pers.) Grev.	Xylariaceae	On decaying wood	DDUNP L174	5/8/12	Sadar (Kushmi Jungle)	Tharu	Used to induce lactation in women





Plate 1 — 1. *Agaricus silvaticus*, 2. *Auricularia auricular-judae*, 3. *Coprinellus micaceus*, 4. *Coprinopsis atramentaria*, 5. *Coprinus comatus*, 6. *Coprinus disseminatus*, 7. *Daldinia concentric*, 8. *Fistulina hepatica*, 9. *Fomes fomentarius*, 10. *Fomitopsis pinicola*, 11. *Ganoderma applanatum*, 12. *Ganoderma lucidum*, 13. *Ganoderma tsugae*, 14. *Grifola frondosa*, 15. *Lenzites betulina*, 16. *Lepiota cristata*, 17. *Lycoperdaceae pyriforme*, 18. *Lycoperdon perlatum*, 19. *Macrolepiota rhacodes*, 20. *Morchella angusticeps*, 21. *Morchella esculenta*, 22. *Pleurotus ostreatus*, 23. *Pycnoporus cinnabarinus*, 24. *Russula aquosa*, 25. *Russula emetic*, 26. *Schizophyllum commune*, 27. *Sparassis crispa*, 28. *Stereum hirsutum*, 29. *Termitomyces heimii*, 30. *Trametes gibbosa*, 31. *Trametes hirsuta*, 32. *Trametes versicolor*, 33. *Volvariella indica*, 34. *Volvariella volvacea*, 35. *Xylaria hypoxylon*, 36. *Xylaria polymorpha*

Nutritional value of macrofungi

Mushrooms are the oldest single cell protein (SCP) foods of man. Mushrooms offer tremendous applications as they can be used as food and medicines besides their key ecological roles. Mushrooms are valuable healthy foods, low in calories, fats and essential fatty acids and they are rich in vegetable proteins, vitamins and minerals⁴⁴.

They are represented as one of the world's greatest untapped resources of nutrition and palatable food of the future. Due to high amount of proteins, they can be used to bridge the protein malnutrition gap. Mushrooms as functional foods are used as nutrient supplements to enhance immunity in the form of tablets. Due to low starch content and low cholesterol, they suit diabetic and heart patients⁴⁵.

Vishwakarma *et al.*¹² evaluated the nutritional value of some edible macrofungi viz., viz. *Calocybe gambosa*, *Calocybe indica*, *Macrolepiota procera* and *Tuber aestivum* from Gorakhpur and stated that these macrofungi are rich source of protein and carbohydrate. Protein, carbohydrate, lipid, fibre, moisture and ash ranged from 31.40-49.05%, 41.25-65.00%, 0.27-1.08%, 6.41-17.97%, 54.75-76.97%, 2.64-10.34%, respectively on dry weight basis. Vishwakarma *et al.*⁴⁶ evaluated the nutritional property of four *Pleurotus* species viz., *P. cystidiosus*, *P. flabellatus*, *P. florida* and *P. ostreatus* and stated that *P. ostreatus* contains highest protein (43.70±1.77%) and fibre (18.08±1.23%) while *P. flabellatus* contains highest carbohydrate (42.69±1.75%) and lipid (0.65±0.08%).

Medicinal value of macrofungi

Macrofungi serves as important source to cure diseases as it act as natural product which doesn't show any side effects. It can be use to cure diseases from simple headache to most serious ones. It can control cardiovascular problems, act as good antiviral, antibacterial, antiparasitic, anti-inflammatory and antidiabetic properties even some mushrooms contains polysaccharides, glycoproteins and proteoglycans which help to modulate immune system and also help to inhibit tumor growth. Recent research on medicinal mushrooms shows that protein-bound polysaccharides or polysaccharopeptides produced by some macrofungi are effective immunopotentiators. It can be use as supplement for chemotherapy and radiotherapy of cancers and various infectious diseases even it shows antitumor activity⁴⁷. According to Vishwakarma *et al.*⁴⁸ macrofungi can be used as an alternative drug for diabetic treatment. It helps in controlling blood glucose as well as to overcome various complications because of it. Majority of the people believe that mushrooms cannot be cultivated. They trust on the fact that mushrooms can grow by the virtue of God and no one can cultivate or grow it. They are not aware about mushroom farming and industrialist benefit of it. Therefore awareness among people regarding the importance of macrofungi and its capitalistic effect is necessary so that they are also able to earn some income from it and also others can be able to get benefits from its nutritional and medicinal prospects.

Conclusion

From ethnomacrofungal knowledge collected from tribals and local people it became clear that due to scarcity of food in rural areas, a significant amount of wild edible macrofungi are collected and consumed, apart from this, these macrofungi are also traded by different group of local people as minor forest products at local market. These macrofungi were also used to treat various ailments like cancer, diabetes, pneumonia, wound, ear and muscle pain, various skin diseases, fever and also act as immunity booster. Species such as *Agaricus*, *Calocybe*, *Pleurotus*, *Termitomyces*, *Tuber*, *Volvariella* are considered highly delicious. The usage of these macrofungi both commercially and domestically may be due to their appealing taste, frequent occurrence and the fact that they are easily identified by the local peoples as safe for consumption.

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