

Traditional Utilization of Wild Edible Mushrooms among the Local Communities of District Kishtwar, Jammu and Kashmir, India

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ABSTRACT

In the present study, documentation of the traditional uses of some wild edible mushrooms extracted from different ethnic tribes dwelling in forests of Kishtwar of Jammu & Kashmir was made. The majority of the collected wild edible mushrooms are consumed fresh, while some are used after drying. A short description of wild edible mushrooms (WEMs), along with their local name and medicinal use, is presented. Additionally, the ethnomycological notes and folk names of WEMs have also been added.

Key words: Edible, Ethnomycology, Kishtwar, Jammu and Kashmir, Mushroom

INTRODUCTION

Since ancient times, wild edible mushrooms have been utilized by humans all over the world for their nutritional and medicinal properties. In the last few decades, their scientific and socio-economic scale has increased many folds owing to their rich flavor, potent nutritional profile, and many health benefits. Their high-quality protein content, characterized by high digestibility, has made them a highly desirable food worldwide. These have been an additional source of livelihood for people from different parts of the world (Manoharachary *et al.*, 2005; Sharma *et al.*, 2022), which generate cash income through market trade for these people and help to reduce their vulnerability to poverty by strengthening their livelihoods by generating a reliable income (Boa, 2004; Chang and Lee, 2004; Mau *et al.*, 2004). The local knowledge arouses due to the dependence of humans on mushrooms, leads to traditional knowledge. People from different cultures have attained this valuable knowledge of their nutritional and medicinal uses through trial and error. Ethnic tribes use wild mushrooms as their traditional medicine as well as food items from ancient times throughout the world, and their diverse uses will be helpful to prove different medicinal characterizations. Within local communities, this knowledge is passed from one generation to the next, which is one of the few fragile but effective ways of perpetuating knowledge about useful fungi (Li *et al.*, 2021). If not adequately documented, this significant traditional knowledge about edible and medicinal wild mushrooms may have been lost to history worldwide. It is easier to identify wild mushrooms correctly, deal with poisoning, use them in different ways, raise awareness of traditional knowledge, and sell them for

more money when traditional knowledge is properly documented. Fatal incidents of mushroom poisoning may increase in different regions of the world if this crucial knowledge is not adequately preserved (Khaund and Joshi, 2014; Sarma *et al.*, 2010; Basumatary and Gogoi, 2016). Additionally, the problem of identifying edible fungi can also be solved by promoting the folk taxonomy of the WEM.

Due to the existence of various ethnic tribes, district Kishtwar, which is located in the northwest of Jammu and Kashmir (J&K), has a rich heritage of employing WEMs for medicinal and culinary uses (Verma *et al.*, 2023). Nevertheless, not much research has been done to characterize and document these WEMs (Wani *et al.*, 2010; Kumar and Sharma, 2011; Kaul and Kachroo, 1974; Malik *et al.*, 2017). In the current study, traditional knowledge about common and lesser-known WEMs of Kishtwar was gathered and documented by broad surveys, followed by interviews utilizing a semi-structured questionnaire.

MATERIALS AND METHODS

Collection and identification of mushrooms

Systematic and periodic surveys of different locations in district Kishtwar were conducted, and careful field records were made for habitats, hosts, and substrates. Photographs of collection sites and fruit bodies were taken for further studies. Macroscopic features were studied from fresh material, and microscopic structures were observed from dried material. Free-hand sections were observed using 5% potassium hydroxide (KOH) and Congo Red. Microcharacters were observed with a camera attached to an Olympus microscope CX23. Further identification and confirmation were done using standard literature, monographs, and books. Online websites like

www.mycology.com and www.mushroomexpert.com were also used for identification and related information. All the specimens were submitted to the herbarium of the Department of Botany, University of Jammu, Jammu, Jammu & Kashmir, India.

Ethnomycological data collection

The ethnomycological study was carried out between March 2019 to October 2022. Data were collected from local informants using semi-structured questions and interviews. All informants were interviewed at least three times for the collection of information regarding historical background, edibility status, traditional usage, methods of preservation, the commercial importance of fleshy fungi, and possible reasons for the lower diversity of wild edible fungi in the region. All the interviews and discussions were conducted in different local dialects. The verification of the macrofungal species was done in the rainy season, and the informants were requested to accompany us on the field visit to confirm the species and information thereof. With the help of identified specimens and photographs already with us.

RESULTS AND DISCUSSION

Eleven species of mushrooms belonging to 11 genera and 10 families were documented in the present survey. *Helvella crispa*, *Geopora arenicola*, and *Morchella esculenta* are the only species in the collection that are members of the phylum *Ascomycota*; the other species represent *Basidiomycota*. A short macromorphological description of these macrofungal species along with photographs and descriptions of habits and habitats are provided herein. Additionally, the edibility status and medicinal qualities are mentioned.

1. *Helvella crispa* (L.) Quéf. (Figure 1a)

Carpophore cup shaped 20-40 mm in diameter, grey-brown, margins slightly splitted, smooth, whitish to creamish. Stipe short, 25-35 mm, white, broader at the apex and narrow towards end, interior chambered.

Habit and habitat: Humicolous, ectomycorrhizal, growing gregarious to scattered on soil in coniferous forests of *Cedrus deodara*.

Specimen examined: Jammu and Kashmir, Kishtwar, Qaderna, 33°38'19.80"N 75°43'39.77"E, Elev. 2575m, 28 July 2022, Faisal Mushtaq, HBJU/M/03.

Vernacular name: Kan marde

Medicinal properties: This mushroom is highly rich in antioxidants and having anti-allergic impacts. In the study area it is used for the treatment of asthma and chronic cough. The powdered form when taken

with milk help in relief against intestinal inflammation and mouth ulcers.

2. *Geopora arenicola* (Lév.) Kers, *Svensk Bot. Tidskr.* 68(3):345 (1974) (Figure 1b)

Ascocarps 11–42 mm in diam., sessile, near about 30 mm deep inside soil; external surface buff brown, minutely roughened with flexuous hairs which bind the substratum so that whole exterior of apothecium is encrusted with soil; inner surface creamish to pure white.

Habit and habitat: Humicolous, growing gregarious to scattered on soil in coniferous forests of *Cedrus deodara* and *Pinus wallichiana*.

Specimen examined: India, Jammu and Kashmir, Kishtwar, Sonder, 33°28'17.66"N 75°49'32.97"E, Elev. 2100 m, 9 June, 2019, Faisal Mushtaq and Roshi Sharma, HBJU/M/06.

Vernacular name: Kundi, Padur, Khuduz.

Medicinal properties: *Geopora arenicola*, considered as a potent source of many phenolic compounds; these phenols are known to exhibit antioxidant properties which can efficiently neutralise many harmful oxygen-centered free radicals and other reactive oxygen species (ROS) (Keles *et al.*, 2011; Lalotra *et al.*, 2016).

3. *Morchella esculenta* (L.) Pers., *Syn. Meth. Fung.* (Gottingen) 2:618 (1801) (Figure 1c)

Apothecia 45-65 mm long, pileate; pileus 15-40 mm wide, ovate, apex obtuse, pitted, pits irregular to somewhat regular, yellowish brown, becoming blackish on drying; stipe hollow, soft, concolorous with pileus or creamish brown, slightly enlarged at base.

Specimen examined: Jammu and Kashmir, Kishtwar, Sonder, 33°28'7.32"N 75°49'43.49"E, Elev. 2311m, March 2021, Faisal Mushtaq, HBJU/M/06.

Habit and habitat: Humicolous, ectomycorrhizal, gregarious in forest of *Pinus roxburghii* and *P. wallichiana*.

Vernacular name: Guchchi, Kutch

Medicinal properties: This mushroom is considered as highly medicinal and used for heart ailments, general weakness, brain tonic and arthritis. Fruiting body of *Morchella esculenta* possesses a wide range of active constituents which include tocopherols, carotenoids, organic acids and phenolic compounds. Tocopherols consist of α -tocopherol, γ -tocopherol and δ -tocopherol. Carotenoids contain β -carotene and Lycopene (Ajmal *et al.*, 2015).

Family: Agaricaceae

4. *Macrolepiota procera* (Scop.) Singer, *Pap. Mich. Acad. Sd.* 32:141 (1948) **(Figure 1d)**

Pileus 65-95 mm in diameter, convex then flat, umbonate, surface white, marked with prominent brown scales on entire surface, snuff brown at center, margins inrolled; lamellae up to 6mm wide, free, crowded, unequal, wavy, concolourous with pileus; Context white; Stipe 70-90 × 6-14 mm wide, central, equal, solid, smooth, swollen at the base, concolourous with pileus; Annulus present, superior, movable, evanescent, creamish; Odour mild.

Habit and habitat: Humicolous, solitary to scattered in cultivated fields, grasslands and scattered, mixed forest of conifers and *Populus* sp.

Specimen examined: India, Jammu and Kashmir, Kishtwar, Ekhala 33°32'57"N 75°48'29"E, Elev. 2108 m, Faisal Mushtaq and Roshi Sharma, HBJU/M/12.

Vernacular name: Maazkhel, Chaitar

Medicinal properties: This mushroom is considered an excellent source of nutrition and considered important to cure nutritional deficiency disorders. The parasol mushroom (*Macrolepiota procera*) is a fungus that is often included in the diet as a replacement for meat products. Its fruiting bodies are known for their unique flavor and aroma. *M. procera*, which is valued as an edible and medicinal mushroom, has potent cytotoxic, antiproliferative, apoptotic, and anti-invasion effects on A549 lung cancer cells (Seçme *et al.*, 2018).

5. *Coprinus comatus* (O.F. Müll.) Pers., *Tent. disp. meth. fung.* (Lipsiae), 62 (1797) **(Figure 1e)**

Pileus 62-85 × 41-62 mm, conical at young becoming expanded convex at maturity, white coloured turning blackish-brown from margins at extreme maturity because of auto-digestion; surface semi-dry with conspicuous shaggy scales on entire surface, paler brown scales towards apical portion; margins entire when young but dissolves away with maturity; Lamellae free, crowded, whitish when young become blackish with maturity and liquefy on ageing; Stipe cylindrical with a conspicuous bulbous base, 81-118 mm in length, white, smooth, central, hollow, fleshy; Annulus evanescent, fibrous; white; Odour pleasant when young; Spore print black.

Habit and habitat: Humicolous, solitary to scattered in grasslands.

Specimens examined: India, Jammu and Kashmir, Kishtwar, Palmar, 33°38'19.80"N 75°43'39.77"E,

Elev. 2575m, 25 July 2021, Faisal Mushtaq and Roshi Sharma, HBJU/M/14.

Vernacular name: Safaid Haidar, Bam Haider

Medicinal properties: The extracts of *Coprinus comatus* exhibit antiproliferative effects in estrogen receptor positive (MCF-7) and human estrogen receptor negative (MDA-MB-231, BT-20) (Gu and Leonard, 2006). Besides, selective antiproliferative effects in human T cell leukaemia Jurkat cells have been exhibited by glycan binding protein (Y3) isolated from *Coprinus comatus* (Zhang *et al.*, 2017).

Family: Physalacriaceae



Figure 1: a, *Helvella crispa*; b, *Geopora arenicola*; c, *Morchella esculenta*; d, *Macrolepiota procera*; e, *Coprinus comatus*.

6. *Flammulina velutipes* (Curtis) Singer, *Li/ba* 22: 307 (1951) [1949] **(Figure 2f)**

Pileus 90-150 mm, orange yellow at edges and darker at center, convex when young becoming planoconvex on maturation, irregular, lobate, cuticle smooth, viscid, with striate margins. Lamellae pale yellow turning light brown, slightly adnexed, unequal; Stipe 65-115 × 30-60 mm, cylindrical and slightly tapered towards base, curved or twisted, yellow, velvety all over, quickly becoming blackish brown; annulus absent; context pale yellow, fine,

watery and soft in the cap, leathery and fibrous in the stipe; Odour mild; Taste mild; Spore print creamish white.

Habit and habitat: Lignicolous, caespitose on stumps of *Juglans regia* L. and *Salix alba* Thunb.

Specimens examined: India: Jammu and Kashmir, Kishtwar, Loharna, 33°25'27.39"N 75°47'57.46"E, Elev. 2821 m, 17 August 2020, Faisal Mushtaq, HBJU/M/23.

Vernacular name: Tele header, Dailoo

Medicinal properties: *Flammulina velutipes* is generally used in general body weakness. *Flammulina velutipes* (velvet shank, golden needle mushroom, or winter mushroom), has high palatability due to its delicious taste and many nutritional values. Different bioactive constituents including polysaccharides, proteins, glycoproteins, PUFAs, phenols, and sesquiterpenes have been isolated from this mushroom. These compounds give it healing properties like, antitumor and anticancer activities specially in breast cancer patients, anti-atherosclerotic and thrombosis inhibition activity, cholesterol lowering effects and antihypertensive, anti-ageing and antioxidant properties, help in restoring memory and overcoming learning deficits, anti-inflammatory, immunomodulatory, anti-bacterial, ribosome inactivation, and melanosis inhibition (Tang *et al.*, 2016; Mitra *et al.*, 2020).

Family: *Pleurotaceae*

7. *Pleurotus ostreatus* (Jacq.) P. Kumm., Führ. Pilzk. (Zerbst): 104 (1871) **(Figure 2g)**

Pileus 22–68mm wide, creamish, depressed infundibuliform, dark brown at center and slightly brown at margins, margins inrolled; Lamellae sub-decurrent, unequal, crowded at the margins, sub-distant at the base, wavy, concolorous; Stipe eccentric to centric, 26–38 × 5–8 mm, concolorous with pileus, context fleshy, solid; Odour pleasant, Taste mild.

Habit and habitat: Lignicolous, growing in clusters on dead logs or living trees of hardwoods.

Specimen examined: India, Jammu and Kashmir, Kishtwar, Janakpur, 33°30'21.92"N 75°49'5.85"E, Elev. 2907 m, 12 August 2020, Faisal Mushtaq, HBJU/M/24.

Vernacular name: Panj-haeder

Medicinal properties: *Pleurotus ostreatus* has been used in traditional Chinese medicine and is famous for its delicious taste and high quantities of proteins, carbohydrates, vitamins and minerals, as well as low

fat content. *P. ostreatus* is a potent antimicrobial agent against *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Salmolnella typhii*, and *Bacillus subtilis*, along with this it shows antiviral, anti-tumour, anti-inflammatory, antioxidant, blood fat lowering, anti-tumour and immunoregulatory properties (Sun and Liu, 2009; Oyetayo and Ariyo, 2013).

Family: *Cantharellaceae*

8. *Cantharellus cibarius* Fr., *Syst. mycol.* (Lundae) 1: 318 (1821) **(Figure 2h)**

Basidiomes 45–75 mm long; Pileus 15–45 × 35–96 mm, pastel yellow or light yellow, dry, smooth, convex shape, infundibuliform at maturity with depression in the centre, margins inrolled, wavy, and smooth, cuticle peeling 50%; Context yellowish, firm; true gills absent, present in the form of decurrent veins, edges concolorous, crowded, forkation present; Stipe 35–52 × 6–12 mm, equal (cylindrical), pastel yellow or light yellow (1A4), dry, annulus absent, central position; Context solid, yellowish and fibrous.

Habit and habitat: Humicolous, gregarious to caespitose, growing in coniferous forest of *Abies pindrow* and *Cedrus deodara*.

Specimen examined: India: Jammu and Kashmir, Kishtwar, Sonder, 33°28'21.48"N 75°49'54.88"E, Elev. 2261m, 28 August, 2020, Faisal Mushtaq, HBJU/M/36.

Vernacular name: Ruth header, Haldee chalte, wan-haeder

Medicinal properties: *Cantharellus cibarius* has a unique aroma and taste. This mushroom has a wide variety of biological properties, including, anti-hypoxic, antimicrobial, anti-inflammatory, antioxidant, antihyperglycemic, cytotoxicity, iron-chelation activity, wound healing and significant antimicrobial activities (Mendez-Espinoza *et al.*, 2013; Vlasenko *et al.*, 2019).

Family: *Sparassidaceae*

9. *Sparassis crispa* (Wulfen) Fr., *Syst. Mycol.* (Lundae) 1:465(1821) **(Figure 2d)**

Basidiocarps 105–230 mm wide and 135–195 mm high, large, rounded, cauliflower-like, sessile, composed of several broad flattened crimped branches usually wavy, warm buff; branches fleshy, 25–45 mm wide, irregularly lobbed.

Specimen examined: India, Jammu and Kashmir, Kishtwar, Ekhala, 33°35'17"N 75°45'07"E, Elev.

2497 m, 12 August 2020, Faisal Mushtaq and Roshi Sharma, HBJU/M/30.

Habit and habitat: Humicolous, scattered, growing in coniferous forests of *Abies pindrow* and *Cedrus deodara*.

Vernacular name: Bhaud haider, Posh haider.

Medicinal properties: *Sparassis crispa* is a well-known edible and medicinal mushroom, having a wide range of medicinal properties including anti-carcinogenic, immunity enhancing, anti-inflammatory, hematopoietic, anti-hypertensive, anti-angiogenic, antiviral, anti-allergic, anti-diabetic, wound-healing, antioxidant, anti-coagulant and cytokine induction. These properties are due to the presence of special secondary metabolites like sparassol, methyl-2,4-dihydroxy-6-methylbenzoate, methyl-dihydroxymethoxy-methylbenzoate, ergosterol peroxides, and benzoate derivatives that are useful in the treatment of various human ailments (Lee *et al.*, 2018; Sharma *et al.*, 2022).

Family: *Laetiporaceae*

10. *Laetiporus sulphureus* (Bull.) Murrill, *Annl. Mycol.* 18 (1/3):51 (1920) (Figure 2e)

Annual, sessile to laterally substipitate, fleshy when fresh. Pileus initially knob-shaped to applanate, up to 85-165 mm wide and 35-45 mm thick. Pileal surface light orange to light brown, fading to brownish yellow with age. Margin slightly viscous, minutely tomentose to glabrous, azonate to faintly zonate, radiately furrowed pileus surface, light yellow pore surface; white context, tubes concolorous with pore surface, Odour pleasant, Taste sour.

Specimen examined: India, Jammu and Kashmir, Kishtwar, Palmar, Qedarna, 33°28'27.93"N 75°47'34.52"E, 2356m, 28 July, 2021, Roshi Sharma, Faisal Mushtaq and Yash Pal Sharma, HBJU/M/31.

Habit and habitat: *Lignicolous*, growing on living tree trunk of *Populous* sp.

Vernacular name: Gaub

Medicinal properties: *Laetiporus sulphureus* is one of the traditionally used medicinal mushroom. It is a sulphur yellow coloured polyporous mushroom and popularly known as "chicken of the woods". "Laetiporins C and D" are the two major triterpenes obtained from *L. sulphureus* (Sandargo *et al.*, 2019; Hyde *et al.*, 2019) were isolated in this study. The extracts obtained from the fruiting bodies of this mushroom showed a number of medicinal properties such as antitumor, antioxidant, antimicrobial, anti-inflammatory, immunomodulation, and antihyperglycemic activities because of their

biologically active components such as phenolics, triterpenes, and polysaccharides (Zhang *et al.*, 2018).

Family: *Hericiaceae*

11. *Hericium erinaceus* (Bull.) Pers., *Commentatio de Fungis Clavaeformibus*: 27(1797) (Figure 2f)

Basidiomes 56-166 × 42-69 mm, white to yellowish white (2A2), stipitate. Primary branches arising from a base rooted into the dead wood; Primary branches wide up to 11 mm, yellowish white (2A2) in colour, has small spines (up to 3 mm long) all around, giving rise to secondary branches. Secondary branches comparatively thinner (up to 8 mm), lack no spines and bearing tertiary branches; Tertiary branches are fertile, wide up to 4 mm and bear spines. Spines dense, tapering, pendant, white, up to 28 mm long; Context yellowish white (2A2), Taste and Odour pleasant; Spore deposit white to yellowish white (2A2).



Figure 2: f, *Flammulina velutipes*; g, *Pleurotus ostreatus*; h, *Cantharellus cibarius*; i, *Sparassis crispa*; j, *Laetiporus sulphureus*; k, *Hericium erinaceus*.

Habit and habitat: Solitary, growing on dead wood of *Cedrus deodara* in coniferous forest.

Specimens examined: India, Jammu and Kashmir, Kishtwar, Janakpur 33°30'34.11"N 75°48'2.47"E, Elev. 2264m, Faisal Mushtaq and Y.P. Sharma, HBJU/M/40, August 12, 2021.

Vernacular name: Rael gub, Jhat haider

Medicinal properties: *Hericium erinaceus*, is highly prized mushroom in the study area and is choice edible due to its unique taste and texture. It is extensively used in traditional Chinese medicine and has long been recognized for its medicinal properties due to the presence of many bioactive metabolites, therapeutic polysaccharides, and β -glucans. Due to its benefits for the nervous system, it is commonly referred as nature's nutrient for the neurons (Chong *et al.*, 2020; Venturella *et al.*, 2021). *H. erinaceus* also exhibits anticancer, antioxidative, anti-inflammatory, antidiabetic, antimicrobial, immunostimulant, hypolipidemic and antihyperglycemic properties.

Edibility status and culinary uses of wild edible mushrooms among local populace

Evaluation of the edibility status and culinary applications of WEMs showed that the traditional use of these mushrooms is very important to the local people, particularly to those who reside in the isolated, mountainous areas. Numerous fungus species, which are abundant in this area, are essential to the traditional diet and cultural practices of the local indigenous populations. The evidence collected from ethnomycology revealed that these populations exhibited mycophilic behavior. The respondents in the study provided varied explanations for utilizing edible mushrooms, such as their mouthwatering flavor, accessibility and availability, ability to replace meat, and potential for increased income generation. Mushrooms like 'Dhingri' (*Pleurotus* sp.), 'Kanger' (*Cantharellus cibarius*), 'Maazkhel' (*Macrolepiota procera*), 'Kundi' (*Geopora* spp.), and 'Guchchi' (*Morchella* spp.) were highly sought after for their distinct flavors and nutritional value (Kumar and Sharma, 2011; Lalotra *et al.*, 2018; Sharma *et al.*, 2022).

The region's culinary customs heavily rely on the complex knowledge that has been passed down through the generations about the identification and usage of these fungi (Sharma *et al.*, 2022). They also included information on the several ways to prepare the harvested WEMs. When eaten raw, mushrooms were typically fried, or they could be prepared along with other veggies, meat, or mushrooms. Certain types of macro fungi were dried and conserved so they could be eaten in the winter, when vegetables are scarce (**Figure 3**). Furthermore, the gathering

and sale of these mushrooms was a vital source of income for many local communities, making them a major contributor to the local economy (**Table 1**).

This interplay between traditional knowledge, economic sustenance, and gastronomic delight highlights the significance of comprehending the edible state and culinary possibilities of wild mushrooms in Jammu and Kashmir.

Folk taxonomy of wild edible mushrooms in the study area

The traditional knowledge in a specific region is influenced by the way locals interpret and connect to their natural environment. The transcription of folk taxonomy into the proper taxonomic classification was empowered through large number of frequent interactions and interviews. Key informants and locals, spanning a wide age range, were interviewed in their native Kashmiri and Kishtwari languages using a specifically created semi-structured questionnaire. The generic word for mushrooms is "haeder," but their individual names have been suggested based on factors such as their substrate, related host, or in certain situations, even their macro-morphological characteristics. For instance, *Hericium erinaceus* is known locally as "rael-gab," referring to the plant's growth on *Abies pindrow*, which is named "rael" in native dialect. Various epithets for wild mushrooms were also generated based on the shape of sporocarps, like, *Helvella cripsa*, *Geopora arenicola* are commonly called 'kankich' meaning ear-shaped mushrooms. The folk name of *Cantharellus cibarius* was 'wan-haeder' which implies growing in forests (locally called 'wan') (**Table 1**).

Another important factor considered in the identification of mushrooms was taste. Locals used a variety of prefixes, such as "maazkhel" (*Macrolepiota procera*) and "maaz-haeder," which means "taste-like meat." These colloquial names for these wild edibles would contribute to folk taxonomy, which mycologists could use while looking for these mushrooms in isolated forest areas. Relevant information on the species' market price, common names, and consumption pattern was also noted (**Table 1**). In the past, research has been done on the accessibility of mushrooms, their evaluation of various elements for accurate identification, and the ways in which locals from particular regions of Jammu and Kashmir have used them (Kumar and Sharma, 2011; Lalotra *et al.*, 2016).



Figure 3: a-b, Interaction with locals in the field gathering traditional knowledge; c, Garlands of dried morels; d, Traditional drying of *Pleurotus* sp.; e-h, Culinary preparation of some mushroom species.

Table 1: Usage Form and Medicinal use of wild edible mushrooms documented from the study area.

S.No.	Species name	Consumed form	Market sale price in Rs/Kg	Vernacular name	Meaning	Medicinal use
1.	<i>Helvella crispa</i>	Fresh/dried	50-70	Kan marde, Thunthoo,	Ear like, Come out after thundering Edible morel	General body tonic, Cough (chaas)
2.	<i>Morchella esculenta</i>	Fresh /dried	8000-12000	Bhata Kutch, Thunthoo	Mushrooms eaten with rice.	Dod badawan (lactating mothers), Kamzoori (weakness).
3.	<i>Geopora arenicola</i>	Fresh/dried	100-150	Pyale Haider, Kundii, Kann Kutch	Bowl shaped. Mortar Shaped mushrooms, Ear shaped edible mushroom	Neendri khatri (Sleep inducing), Weakness (kamzoori), Nazla zukam (cold).
4.	<i>Macrolepiota procera</i>	Fresh	70-80	Maazkhel Chaitar	Meat like taste, Umbrella Shaped	Nutritional Disorders
5.	<i>Coprinus comatus</i>	Fresh	20-50	Safaid Haidar, Bam Haider	White mushroom, Mushroom growing on dung.	Kamzori (weakness), General body tonic
6.	<i>Flammulina velutipes</i>	Fresh	70-80	Tele header, Dailoo, and Shamo	Yellow colour mushroom	Weakness (kamzoori), General body tonic
7.	<i>Pleurotus ostreatus</i>	Fresh/dried	120-140	Panj-haeder	Palm shaped mushroom	Dama (asthama), Jigruk dod (liver disease). Cooked along with bottle gourd and served to patients recovering from jaundice.
8.	<i>Sparassis crispa</i>	Fresh	100-150	Bhaud haider, Maazkhel Posh haider	Meat like taste, Sheep like, Flower like mushroom	General body tonic, Sugaras (Diabetes).
9.	<i>Laetiporus sulphureus</i>	Fresh/dried	150-250	Gaub	Growing on wood logs	Kamzoori (Weakness)
10.	<i>Cantharellus cibarius</i>	Fresh/dried	80-90	Ruth header, Haldee chaltee, wan-haeder	Yellow colour mushroom, grown in forest	Wound healing (zakhamas ang), General weakness (Kamzoori). Used as a tonic for bone and optic wellness.
11.	<i>Hericium erinaceus</i>	Fresh/Dried	250-300	Rael-gab, Jhat haider	Mushroom growing on <i>Abies</i> . Fur like mushroom.	Digestive Disorders (badhazmi, maede maz jalan (Stomach problem).

CONCLUSIONS

The Himalayan region's diverse topography, climate, and vast forest cover create an ideal habitat for the luxuriant growth of a wide variety of mushrooms. As such, the area needs to be thoroughly researched for these vital resources (WEMs). In addition, myco-medicinal research and food security may benefit from the indigenous knowledge discovered through an ethnomycological survey. Plans for the long-term ecological functions of these mushroom genetic resources must be developed. The local population's traditional medical practices should be validated through clinical examination of their usage in vivo. Lastly, efforts for conserving these mushroom genetic resources are needed to ensure the continued provision of ecosystem services.

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