

**WILD EDIBLE MUSHROOMS OF UTTARAKHAND  
HIMALAYA: DIVERSITY, DISTRIBUTION, NUTRITIVE  
VALUE AND MEDICINAL POTENTIAL**

**SECOND ANNUAL PROGRESS REPORT  
(From September 01, 2017 to August 31, 2018)**

**Sanction Letter No. and Date: GBPI/IERP-NMHS/15-16/24/27 Dt. 31.03.2016**

**Submitted To:**

**GB Pant Institute of Himalayan Environment and  
Development, Kosi – Katarmal, Almora 263643  
Uttarakhand, India**

**Submitted By:**

**Prof. R. P. Bhatt  
Principal Investigator  
Department of Botany & Microbiology  
H. N. B. Garhwal University, Srinagar  
(Garhwal) – 246174 Uttarakhand, India**

**G.B. PANT INSTITUTE OF HIMALAYAN ENVIRONMENT & DEVELOPMENT**

**UTILIZATION CERTIFICATE**

(IERP Projects in the Himalayan Region)

(To be sent in Duplicate)

For the financial year (from September 01, 2017 to August 31, 2018)

1. Title of the Project/Scheme: **WILD EDIBLE MUSHROOMS OF UTTARAKHAND HIMALAYA: DIVERSITY, DISTRIBUTION, NUTRITIVE VALUE AND MEDICINAL POTENTIAL.**
2. Name of the Organization & Principal Investigator: **Department of Botany & Microbiology, H.N.B. Garhwal University, Srinagar, Garhwal, Uttarakhand, Prof. R.P. Bhatt.**
3. GBPIHED Letter No. & Date of sanctioning the project: **GBPI/IERP-NMHS/15-16/24/27 Dt. 31. 03. 2016.**
4. Amount brought forward from the previous financial year quoting Letter No. & date on which the approval to carry forward the said amount was given: **Rs. 20,156.00 vide letter No. GBPI/IERP-NMHS/15-16/24/27 Dt. 14 August, 2018.**
5. Amount received from GBPIHED during the financial year (please give No. and dates of sanctions showing the amount paid): **Rs. 3,41,044.00 vide letter No. GBPI/IERP-NMHS/15-16/24/27 Dt. 14 August, 2018. Money transferred by CENTRAL/RTGC Core Dt. 05.10.2018.**
6. Total amount that was available for expenditure (including Commitments incurred during the financial year). (Serial Nos. 4+5): **Rs. 20,156.00 + Rs. 3,41,044.00 = Rs. 3,61,200.00.**
7. Actual expenditure (excluding commitments) during the financial year: **Rs. 3, 11,200.00.**
8. Unspent balance refunded, if any (please give details of Cheque No. etc.): **Nil**
9. Balance amount available at the end of financial year: **Rs. 50,000.00**
10. Amount allowed to be carried forward to the next Financial Year vide letter No. and Date. **Rs. 50,000.00**

Certified that the expenditure of Rs. 3,11,200.00 (Rs. Three Lakh eleven thousand two hundred only) mentioned against column 7 was actually incurred on the project/scheme for the purpose for which it was sanctioned.

Place: Srinagar (Garhwal)

Date: 05.03.2019



Signature of  
Principal  
Investigator

(Seal)  
**Prof. R. P. Dhat**  
Department of Botany & Microbiology  
H.N.B. Garhwal University  
(A Central University)  
Srinagar (Garhwal) Uttarakhand-246174



Signature of  
Account Officer/  
Finance Officer

(Seal)

विश्व अर्थशास्त्र  
विभाग (मदरवात)-246174



Signature of  
Registrar

(Seal)

H.N.B. Garhwal University  
(A Central University)



Signature of Head  
of the Department/  
Institution

(Seal)  
**HEAD**  
Department of Botany & Microbiology  
H.N.B. Garhwal University  
(A Central University)  
Srinagar Garhwal - 246174  
UTTARAKHAND

Our Ref. No.

Date:

ACCEPTED AND COUNTERSIGNED  
COMPETENT AUTHORITY, GBPIHD

APPENDIX III

**G.B. PANT INSTITUTE OF HIMALAYAN ENVIRONMENT & DEVELOPMENT**

**STATEMENT OF EXPENDITURE  
(IERP Projects in the Himalayan Region)**

Statement showing the expenditure of the period from September 01, 2017 to August 31, 2018.

Sanction No. & Date: **GBPI/IERP-NMHS/15-16/24/27 Dt. 31. 03. 2016.**

1. Total outlay of the project: **Rs. 13,20,000.00 (Rs. Thirteen lakh twenty thousand only).**
2. Date of start of the project: **September 01, 2016.**
3. Duration: **Three years (w.e.f. September 01, 2016 to August 31, 2019).**
4. Date of Completion: **August 31, 2019.**
5. (a) Amount received during the financial year: **Total Rs. 3,41,044.00**  
1<sup>st</sup> instalment: **Rs. 3,41,044.00 vide CENTRAL/RTGS Core dated 05. 10. 2018.**  
2<sup>nd</sup> instalment: **Nil**
- (b) Unspent amount carried forward from previous financial year:  
**Rs. 20,156.00 (Bank Interest).**
- (c) Bank interest received, if any: **Rs. 1,751.00 (Rs. One thousand seven hundred fifty one only).**
- (d) Total amount available for expenditure (a+b+c) **Rs. 3,62,951.00 (Rs. Three lakh sixty two thousand nine hundred fifty one only).**

6. Position of grant received, spent and balance/excess expenditure at the close of the financial year.

	Amount received +Amount carried forward	Amount spent	✓Balance/excess expenditure
(I) Salaries/wages of staff			
Research Associate(s)			
Sr. Research Fellow (s)			
Junior Research Fellow(s)			
Project Fellow (s)	2,11,200.00	2,11,200.00	Nil
Lab Assistant/Technician(s)			
Field Assistant(s)			
Field Attendant(s)			
Total	2,11,200.00	2,11,200.00	Nil
(II) Permanent Equipment purchased (item wise )	Nil	Nil	Nil
Total	-----	-----	-----
(III) Expendable items	Nil	Nil	Nil
Total	-----	-----	-----
(IV) Travel and POL (Vehicle expenses)	50,000.00	50,000.00	Nil
Total	50,000.00	50,000.00	Nil
(V) Consumable	50,000.00	Nil	50,000.00
Total	50,000.00	Nil	50,000.00
(VI) Other cost of the project (item wise)	Nil	Nil	Nil
Total	-----	-----	-----
(VII) Contingencies	50,000.00	50,000.00	Nil
Total	50,000.00	50,000.00	Nil
(VIII) Institutional Charges, if any	Nil	Nil	Nil
Total	-----	-----	-----
<b>GRAND TOTAL (I to VIII)</b>	<b>3,61,200.00</b>	<b>3,11,200.00</b>	<b>50,000.00</b>

7. (a) State the amount and the item, in which excess expenditure incurred with reasons:  
Nil


(b) State the amount and the item, in which less expenditure incurred:

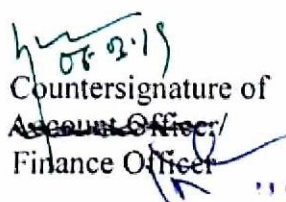
Rs. 50,000.00 Consumables


(c) Balance in hand on 01.09.2018: Rs. 50,000.00


(d) Further requirement of funds from 01.09.2018 to 31.08.2019 Rs. 3,37,600.00 (Rs. Three Lakh thirty seven thousand six hundred only) as per Breakup given below:

A- Salary Project Fellow	Rs. 2,37,600.00
B- Permanent Equipment	Rs. Nil
C- Expendables	Rs. Nil
D- Consumable	Rs. Nil
	<b>Rs. 50,000.00 (balance in hand)</b>
E- Travel	Rs. 50,000.00
F- Other Project cost	Rs. Nil
G- Contingency	Rs. 50,000.00
<b>Total:</b>	<b>Rs. 3, 37,600.00</b>

  
Signature of  
Principal  
Investigator  
**Prof. R. P. Bhatt**  
Department of Botany & Microbiology  
H.N.B. Garhwal University  
(A Central University)  
Srinagar (Garhwal) Uttarakhand-246174

  
Countersignature of  
~~Account Officer~~  
Finance Officer  
(Seal)  
H.N.B. Garhwal University  
(A Central University)  
Srinagar (Garhwal) Uttarakhand-246174

  
Signature of  
Registrar  
(Seal)  
H.N.B. Garhwal University  
(A Central University)  
Srinagar (Garhwal) Uttarakhand-246174

  
Signature of Head  
of the Department/  
Institute  
**HEAD**  
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H.N.B. Garhwal University  
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Srinagar Garhwal - 246174  
UTTARAKHAND

**SECOND ANNUAL PROGRESS REPORT**

1. Project title: **WILD EDIBLE MUSHROOMS OF UTTARAKHAND HIMALAYA: DIVERSITY, DISTRIBUTION, NUTRITIVE VALUE AND MEDICINAL POTENTIAL.**

2.1 Name of Principal Investigator (PI): **Prof. R.P. Bhatt**

2.2. Name of the Project Fellow: **Mr. Upendra Singh**

3. Project sanction letter no. & date of sanction: **GBPI/IERP-NMHS/15- 16/24/27 dated 31.03. 2016.**

4.1. Total outlay sanctioned: **Rs. 13,20,000.00 (Rs. Thirteen lakh twenty thousand only).**

4.2. Duration of the project: **Three years (w.e.f. September 01, 2016 to August 31, 2019).**

5. Date of start: **September 01, 2016.**

6. Grant received during the year: **Rs. 3,41,044.00 + Rs. 20,156.00 (Bank Interest) = Rs. 3,61,200.00**

7. Expenditure incurred during the year: **Rs. 3,11,200.00**

8. Broad area of research: **Biodiversity and Conservation**

9. Sub area of the project: **Wild edible mushrooms of Uttarakhand Himalaya: Diversity, distribution, nutritive value and medicinal potential.**

10. Approved objectives of the project: **The present study is aimed to explore the wild edible mushrooms of Uttarakhand Himalaya, their distribution, nutritive analysis of selected edible mushrooms, enlisting of mushrooms having therapeutic potentials and finally recommend the suitable edible forms for commercial exploitation.**

**11. Methodology:**

**11.1. Systematic studies:** An extensive survey was conducted during the rainy months of 2018 in different localities/habitats and forest types to explore the edible mushroom flora of Uttarakhand Himalaya. Detailed field notes included the colour, shape, size, markings, change of colour on cutting or bruising, smell and taste, presence or absence of veil etc. Various chemical spot tests were performed in the field/laboratory with fresh specimens. The spore prints of the fresh specimens were taken on glass slides either in the field or laboratory. The microscopic study included the measurement of spores, hymenium,

sterile structures, hyphal arrangements, amyloid reactions, presence or absence of clamp connections.

The specimens were preserved wet as well as dry. The identification of wild edible mushrooms was done upto species/taxon level following standard keys and monographs.

**11.2. Mycorrhizal Association:** The mycorrhizal connections were established by digging the soil and tracing the roots of the tree to the fructifications (Young, 1936, 1940; Zak, 1971, 1973).

**11.3. Edibility:** The edibility of the mushrooms was determined by making enquiries from the local people and also confirming from the literature.

**11.4. Distribution:** The distribution of wild mushrooms including the edible forms in Uttarakhand Himalaya will be recorded.

**11.5. Nutritional Analysis:** Analysis of selected edible mushrooms will be performed for the presence of (i) Proteins (ii) Lipids (iii) Carbohydrates (iv) Fibres (v) Ash using the protocols mentioned by Longvah & Deosthale (1998); Manzi *et al.* (2001) and Pushpa & Purushothama (2010).

The edible mushrooms selected for this study include both wild and cultivated mushrooms namely, *Morchella esculenta* “Guchhi”; *Agaricus bisporus* “White button mushroom”; *Cantharellus cibarius* “Golden chanterelle”; *Grifola frondosa* “Maitake”; *Pleurotus ostreatus* “Oyster mushroom”; *Lactarius subindigo* “Indigo milk cap”; *Lactarius volemus* “Weeping milk cap” and *Russula brevipes* “Short-stemmed *Russula*”.

**11.6. Medicinal potential:** Efforts will be made for the exploration, identification and documentation of various wild mushrooms with the therapeutic potentials from Uttarakhand. For this enquiries would be made from the tribals and local inhabitants of Uttarakhand for the use of wild mushrooms in various ailments.

## **12. Work Plan:**

### **I<sup>st</sup> year**

- General survey for the selection of sites both in Garhwal and Kumaon region for collecting the wild edible mushrooms.
- Photography of mushrooms, vegetation and forest types.
- Identification of wild mushrooms including the edible ones, their distribution in Uttarakhand, edibility and mycorrhizal associations.



## II<sup>nd</sup> year

- Visit of different collection sites for the wild edible mushrooms.
- Photography of mushrooms, vegetation and forest types.
- Identification of wild mushrooms including the edible ones, their distribution in Uttarakhand, edibility and mycorrhizal associations.
- Nutritional analysis of selected edible mushrooms will be performed for the presence of (i) Proteins (ii) Lipids (iii) Carbohydrates (iv) Fibres and (v) Ash using the protocols mentioned by Longvah & Deosthale (1998); Manzi *et al.* (2001) and Pushpa & Purushothama (2010).
- The tribals and local inhabitants will be asked for the use of wild mushrooms in various ailments.

## III<sup>rd</sup> year

- Visit of different research sites for the wild edible mushrooms.
- Photography of mushrooms, vegetation and forest types.
- Identification of wild mushrooms including the edible ones, their distribution in Uttarakhand, edibility and mycorrhizal associations with higher plants.
- Determination of total ash, total proteins, fat content, fibre content and total carbohydrates in selected edible mushrooms.
- Enumeration of wild mushroom forms with the therapeutic potentials used locally by the tribals and local folk of Uttarakhand in the treatment and cure of various ailments.
- Some of the edible forms suitable in mass cultivation would be recommended for commercial utilization.
- Compilation of Final Technical Report etc.

### 13. Salient research achievements as per work plan/objectives covered:

- i) Singh U, **Bhatt RP**, Stephenson SL, Uniyal P and Mehmood T (2017). Wild edible mushrooms from high elevations in the Garhwal Himalaya—II. *Current Research in Environmental & Applied Mycology* **7** (3): 208–226.
- ii) Uniyal P, Das K, **Bhatt RP**, Singh U and Mehmood T (2017). *Lactarius olivaceoumbrinus*: a new addition to Indian mycobiota from Uttarakhand, India. *Journal on New Biological Reports* **6** (1): 52–57.
- iii) Singh U, Das K, Vizzini A, **Bhatt RP**, Uniyal P and Mehmood T (2017). *Gliophorus flavoviridis*, a new species in the family *Hygrophoraceae* from India. *Phytotaxa* **327** (3): 283–289. **Impact Factor: 1.24**
- iv) **Bhatt RP**, Singh U, Uniyal P (2018). Healing Mushrooms of Uttarakhand Himalaya, India. *Current Research in Environmental & Applied Mycology* **8** (1): 1–23.
- v) **Singh U**, Das K, Uniyal P and Mehmood T (2018). *Hygrocybe rajendrae* (*Hygrophoraceae*), a new species of subsection *Squamulosae* from Indian Himalaya. *Nordic Journal of Botany* **36** (1/2): e01627. **Impact Factor: 0.847**
- vi) Mehmood, T, **Bhatt RP**, Uniyal P, Singh U and Chowdhary AK (2018) Morphological and phylogenetic characterization of genus *Amanita* from

Uttarakhand, India-1 *Current Research in Environmental & Applied Mycology* **8** (1): 118-134.

- vii) Mehmood, T, Das K, Hosen, MI, **Bhatt RP**, Uniyal P and Singh U (2018) Two new species of *Amanita* (Amanitaceae) from North-western Himalaya, India. *Phytotaxa* 367 (3): 219-232. **Impact Factor: 1.24**
- viii) **Bhatt RP**, Uniyal P, Singh U, Mehmood T, Ghosh A and Das K (2019) New additions to the Indian mycobiota from Uttarakhand Himalaya. *Indian Phytopathology* (**Accepted**).
- ix) **Singh U** and Das K (2019). *Hericium rajendrae* sp. nov. (Hericiaceae, Russulales): an edible mushroom from Indian Himalaya. *Nova Hedwigia* (**Accepted**)

**14. Summary of Annual Progress:** During second year of the project following work has been done.

**a) Field survey and selection of sites:**

An extensive field survey was conducted during March to October, 2018 in different type of forest ecosystems and habitats as well as elevation ranges to explore the edible mushroom flora of the Uttarakhand Himalaya. The collection sites were visited regularly. The distant sites were explored after every 10-15 days interval, by temporarily camping at respective places for making maximum collections. Some of the collection sites are mentioned below:

Sr. No.	Survey site	Altitude (m)	Dominant hosts
<b>Garhwal Division</b>			
<b>District Pauri Garhwal</b>			
1.	Adwani	1700–1900	<i>Quercus, Pinus, Cupressus, Cedrus, Myrica, Rhododendron</i>
2.	Bughani	900–1000	<i>Pinus</i>
3.	Chaurikhal	1900–2000	<i>Quercus, Pinus, Cupressus, Cedrus, Myrica, Rhododendron, Taxus</i>
4.	Dudhatoli trek	1800–2700	<i>Quercus, Pinus, Alnus, Cedrus, Myrica, Rhododendron</i>
5.	Kanskhet	1750–1850	<i>Quercus, Pinus, Alnus, Myrica, Rhododendron</i>
6.	Lansdown	1650–1750	<i>Quercus, Pinus, Cedrus, Myrica, Rhododendron</i>
7.	Parsundakhal	1400–1500	<i>Pinus</i>
<b>District Rudraprayag</b>			
8.	Chopta	2350–2650	<i>Quercus, Alnus, Abies, Cedrus, Myrica, Rhododendron, Lyonia</i>
9.	Chirbatiya	2100–2200	<i>Quercus, Pinus, Myrica, Rhododendron</i>

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10.	Hariyali Devi forest	1600–1700	<i>Pinus</i>
11.	Kartikswami	2350–2400	<i>Quercus, Rhododendron, Lyonia</i>
12.	Kund	1000–1050	<i>Pinus</i>
<b>District Chamoli</b>			
13.	Bedni	3100–3300	<i>Quercus, Rhododendron, Picea</i>
14.	Gwaldum	1850–1950	<i>Pinus</i>
15.	Mandal	1500–1600	<i>Quercus, Rhododendron</i>
<b>District Uttarkashi</b>			
16.	Bhatwari	1700–1800	<i>Quercus, Rhododendron</i>
17.	Taluka	2000–2100	<i>Abies, Quercus, Myrica, Rhododendron</i>
<b>District Tehri Garhwal</b>			
18.	Badiyargarh	900–1000	<i>Pinus</i>
19.	Dhanolti	2250–2350	<i>Cedrus</i>
20.	Ranichauri	1700–1800	<i>Quercus, Rhododendron, Pinus</i>
<b>District Dehradun</b>			
21.	Chakrata	2050–2120	<i>Quercus, Rhododendron</i>
22.	Deoban	2250–2350	<i>Quercus, Rhododendron</i>
23.	Mussoorie	1900–2050	<i>Cedrus</i>
<b>District Haridwar</b>			
24.	Cheela	300–350	<i>Shorea</i>
<b>Kumaon Division</b>			
<b>District Bageshwar</b>			
25.	Dwali	2500–2600	<i>Quercus, Myrica, Rhododendron</i>
<b>District Almora</b>			
26.	Binsar wild life sanctuary	2000–2150	<i>Quercus, Myrica, Rhododendron, Lyonia</i>
27.	Jageshwar	1800–1900	<i>Cedrus</i>
<b>District Nainital</b>			
28.	Nainital town	1750–1950	<i>Quercus, Myrica, Rhododendron, Cedrus</i>
29.	Bheemtal	1650–1750	<i>Cedrus</i>
30.	Mukteshwar	2250–2300	<i>Quercus, Pinus, Cedrus</i>
<b>District Champawat</b>			
31.	Mayawati	1900–2000	<i>Quercus, Rhododendron, Cedrus</i>

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During our fungal forays from March to October, 2018 a total of 365 collections were made from the forests of Uttarakhand Himalaya. Following is the list of mushrooms investigated from the collection of 2018.

Name of species	Distribution
<b>ASCOMYCOTA</b>	
<b>Family Chlorociboriaceae</b>	
<i>Chlorociboria aeruginascens</i> (Nyl.) Kanouse ex C.S. Ramamurthi, Korf & L.R. Batra	Khirsu, Adwani
<b>Family Cordycipitaceae</b>	
<i>Cordyceps militaris</i> (L.) Fr.	Chopta, Dhakuri
<i>Ophiocordyceps sinensis</i> (Berk.) G.H. Sung, J.M. Sung, Hywel-Jones & Spatafora	Dhakuri
<b>Family Discinaceae</b>	
<i>Gyromitra infula</i> (Schaeff.) Quél.	Chopta
<b>Family Helvellaceae</b>	
<i>Helvella crispa</i> (Scop.) Fr.	Khirsu, Adwani, Chopta, Dhakuri
<i>Helvella macropus</i> (Pers.) P. Karst.	Chopta, Dhakuri
<i>Helvella lacunosa</i> Afzl.	Chaurikhal, Mukteshwar
<b>Family Hypocreaceae</b>	
<i>Hypomyces lateritius</i> (Fr.) Tul. & C. Tul.	Chopta
<i>Hypomyces lactifluorum</i> (Schw.) Tul. & C. Tul.	Chopta
<b>Family Leotiaceae</b>	
<i>Leotia lubrica</i> (Scop.) Pers.	Khirsu, Chamba, Sankari
<b>Family Morchellaceae</b>	
<i>Morchella esculenta</i> (L.) Pers.	Pauri town, Khirsu
<b>Family Pezizaceae</b>	
<i>Peziza badia</i> Pers.	Pauri town, Phedkhal
<b>Family Pyronemataceae</b>	
<i>Aleuria aurantia</i> (Pers.) Fuckel	Khirsu, Chopta, Pharsuli, Tungnath trek
<i>Geopora arenicola</i> (Lév.) Kers	Pauri town
<b>Family Sarcoscyphaceae</b>	
<i>Wynnea americana</i> Thaxt.	Chopta, Dhakuri
<b>Family Xylariaceae</b>	
<i>Xylaria polymorpha</i> (Pers.) Grev.	Chopta
<b>BASIDIOMYCOTA</b>	
<b>Family Agaricaceae</b>	
<i>Agaricus augustus</i> Fr.	Chopta, Binsar, Dhakuri
<i>Agaricus campestris</i> L.	Chirbatiya, Mussoorie
<i>Agaricus micromegethus</i> Peck	Pauri town
<i>Agaricus placomyces</i> Peck	Pauri town, Adwani
<i>Agaricus xanthodermus</i> Genev.	Khirsu, Phedkhal
<i>Agaricus silvicola</i> (Vittad.) Peck	Chopta, Bhatwari, Khanskhet
<i>Calvatia cyathiformis</i> (Bosc) Morgan	Chauras Campus HNBGU
<i>Chlorophyllum molybdites</i> (G. Mey.) Masee	Pauri town, Chirbatiya, Khirsu
<i>Chlorophyllum rachodes</i> (Vittad.) Vellinga	Pauri town, Chirbatiya, Khirsu
<i>Coprinus comatus</i> (O. F. Mull.) Pers.	Chopta, Pauri town
<i>Lycoperdon perlatum</i> Pers.	Phedkhal, Chopta, Lansdown, Dhanulti, Pipalkoti
<i>Lycoperdon pyriforme</i> Schaeff.	Phedkhal, Chopta, Chamba, Dhanaulti,

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<i>Macrolepiota procera</i> (Scop.) Singer	Furti, Kanskhet Phedkhal, Pauri town, Chopta, Adwani, Hariyali, Gajar
<b>Family Amanitaceae</b>	
<i>Amanita argenteoalba</i> Mehmood, K. Das, Iqbal Hosen, R.P. Bhatt & Uniyal	Dhakuri, Baniyakund
<i>Amanita avellaneosquamosa</i> S. Imai	Chopta-Baniyakund
<i>Amanita caesareoides</i> Lj.N. Vassiljeva	Chopta-Baniyakund, Chamoli, Gajar, Phedkhal
<i>Amanita ceciliae</i> (Berk. & Broome) Bas	Chopta-Baniyakund
<i>Amanita chepangiana</i> Tulloss & Bhandary	Cheela
<i>Amanita cinnamomescens</i> Tulloss, S. H. Iqbal, A. N. Khalid & Bhandary	Chopta-Baniyakund, Pipalkoti, Gajar
<i>Amanita concentrica</i> T. Oda, C. Tanaka & Tsuda	Phedkhal, Khirsu, Adwani, Chamoli town, Furti, Mukteshwar
<i>Amanita cornelii</i> Mehmood, K. Das, Iqbal Hosen, Tulloss & R.P. Bhatt	Baniyakund-Chopta, Phedkhal
<i>Amanita dhakuriana</i> Mehmood, K. Das, Iqbal Hosen, R.P. Bhatt & U. Singh	Dhakuri, Chopta, Duggalbitta
<i>Amanita emodotrygon</i> Mehmood, Tulloss, K. Das, Iqbal Hosen & R.P. Bhatt	Hariyali Devi, Badiyargarh, Dudhatoli trek
<i>Amanita farinosa</i> Schwein.	Chopta-Baniyakund, Khirsu, Dhakuri
<i>Amanita flavipes</i> S. Imai	Phedkhal, Chopta-Baniyakund, Chamoli town
<i>Amanita fritillaria</i> (Berk.) Sacc.	Phedkhal, Jakhdhar
<i>Amanita griseofolia</i> Zhu L. Yang	Chopta-Baniyakund
<i>Amanita griseoverrucosa</i> Zhu L. Yang	Phedkhal
<i>Amanita hemibapha</i> var. <i>ochracea</i> Zhu L. Yang	Binsar, Pipalkoti, Gajar, Chopta- Baniyakund.
<i>Amanita hemibapha</i> (Berk. & Broome) Sacc.	Hariyali Devi, Bughani, Jakhdhar, Badiyargarh, Chaurikhal
<i>Amanita manginiana</i> W.F. Chiu	Phedkhal, Jageshwar
<i>Amanita oberwinklerana</i> Zhu L. Yang & Yoshim. Doi	Phedkhal
<i>Amanita orientifulva</i> Zhu L. Yang, M. Weiss & Oberw.	Chopta-Baniyakund
<i>Amanita orientigemmata</i> Z.L. Yang & Yoshim Doi	Khirsu, Phedkhal, Surkanda Chamba, Mukteshwar
<i>Amanita orsonii</i> Ash. Kumar & T.N. Lakh.	Deoban
<i>Amanita pakistanica</i> Tulloss, S.H. Iqbal & Khalid	Taluka, Phedkhal, Mukteshwar
<i>Amanita pallidrosea</i> P. Zhang & Zhu L. Yang	Phedkhal
<i>Amanita pantherina</i> (DC.: Fr.) Krombh.	Phedkhal, Pauri town, Lansdowne
<i>Amanita parvipantherina</i> Zhu L. Yang, M. Weiss & Oberw.	Phedkhal, Chopta-Baniyakund, Lansdowne
<i>Amanita pillosella</i> Bas	Chopta-Baniyakund, Dhakuri
<i>Amanita princeps</i> Corner & Bas	Hariyali Devi, Badiyargarh, Chaurikhal
<i>Amanita pseudoporphyrina</i> Hongo	Purola, Phedkhal, Pauri town, Mayawati,

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<i>Amanita rajendrae</i> Mehmood, K. Das, Uniyal	Parsundakhal
<i>Amanita rubrovolvata</i> S. Imai	Gajar,
	Phedkhal, Pauri town, Khirsu, Adwani,
	Chopta- Baniyakund, Mukteshwar,
	Chakrata, Surkanda
<i>Amanita subglobosa</i> Zhu L. Yang	Phedkhal, Surkanda, Adwani, Chakrata
<i>Amanita subjunquillea</i> Imai	Phedkhal, Pauri town, Adwani
<i>Amanita subjunquillea</i> var. <i>alba</i> Z.L. Yang	Phedkhal, Mayawati
<i>Amanita subparvipantherina</i> Zhu L. Yang, Qing Cai & Yang Y. Cui	Chopta-Baniyakund, Mukteshwar, Dhakuri
<i>Amanita tullossiana</i> Mehmood, Iqbal Hosen, K. Das & R.P. Bhatt	Baniyakund, Mukteshwar
<i>Amanita umbrinolutea</i> (Secr. ex Gill.) Bataille.	Phedkhal, Bedni, Pedhkhal, Sankri
<i>Amanita vaginata</i> (Bull.: Fr.) Lam.	Pauri town, Chakarata
<i>Amanita virgineoides</i> Bas	Phedkhal
<b>Family Auriculariaceae</b>	
<i>Auricularia auricula-judae</i> (Bull.) Quél.	Chopta,, Dhakuri
<i>Auricularia nigricans</i> (Sw.) Birkebak, Looney & Sanchez-Farcia	Adwani, Ranichauri, Surkanda, Chakrata
<b>Family Boletaceae</b>	
<i>Boletus indoedulis</i> D. Chakr., K. Das, A. Baghela, S. Adhikari & Halling	Chopta, Dhakuri, Phedkhal
<i>Phylloporus rhodoxanthus</i> (Schwein.) Bers.	
	Purola, Adwani, Phedkhal, Chopta, Khirsu, Lansdown
<i>Strobilomyces confusus</i> Singer	Chopta, Tungnath,, Dhakuri, Phedkhal
<i>Strobilomyces strobilaceus</i> (Scop.) Berk.	Phedkhal, Chopta, Khirsu, Bhattwari, Pauri town, Mayawati
<b>Family Cortinariaceae</b>	
<i>Cortinarius violaceus</i> (L.) Gray	Adwani, Chopta, Bedni, Tungnath, Chakrata
<b>Family Dacrymycetaceae</b>	
<i>Calocera viscosa</i> (Pers.) Fr.	Chopta, Dayara
<b>Family Diplocystaceae</b>	
<i>Astraeus hygrometricus</i> (Pers.) Morgan	Chirbatiya, Pauri town, Furti
<b>Family Entolomataceae</b>	
<i>Clitopilus paurii</i> (T.J. Baroni, Moncalvo, R.P. Bhatt & S.L. Stephenson) Noordel. & Co-David	Pauri town
<b>Family Fomitopsidaceae</b>	
<i>Laetiporus sulphureus</i> (Bull.) Murrill	Tungnath trek, Dhakuri, Chopta
<b>Family Ganodermataceae</b>	
<i>Ganoderma lucidum</i> (Curtis) P. Karst.	Pauri town, Khirsu, Mukteshwar
<b>Family Geastraceae</b>	
<i>Geastrum triplex</i> Jungh.	Adwani
<b>Family Gomphaceae</b>	
<i>Ramaria sanguinea</i> (Pers.) Quél.	Chopta
<i>Turbinellus floccosus</i> (Schwein.) Earle ex Giachini & Castellano	Chopta, Tungnath trek, Dhakuri, Gajar

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<b>Family <i>Hericiaceae</i></b>	
<i>Hericum coralloides</i> (Scop.) Pers.	Chopta, Tungnath trek, Dhakuri
<i>Hericum erinaceus</i> (Bull.) Pers.	Chopta, Dhakuri
<b>Family <i>Hydnaceae</i></b>	
<i>Cantharellus cibarius</i> Fr.	Pauri town, Kund, Chopta, Lansdown, Mayawati, Hariyali, Adwani, Parsundakhal, Chaurikhal, Gwaldum Adwani, Hariyali
<i>Cantharellus lateritius</i> (Berk.) Singer	Pauri town, Phedkhal, Adwani, Parsundakhal
<i>Cantharellus minor</i> Peck,	Purola, Phedkhal, Jageshwar, Khirsu, Adwani, Pauri town, Chamoli town, Pipalkoti, Chopta, Mussoorie Adwani
<i>Craterellus cornucopioides</i> (L.) Pers.	
<i>Craterellus parvogriseus</i> U. Singh, K. Das, Buyck	Adwani, Jageshwar, Phedkhal, Chopta, Tarkeshwar, Gajar
<i>Hydnum repandum</i> L.	
<b>Family <i>Hygrophoraceae</i></b>	
<i>Hygrocybe cantharellus</i> (Fr.) Murril	Chopta
<i>Hygrocybe rajendrae</i> U. Singh, K. Das, Uniyal & Mehmood	Chopta
<i>Gliophorus flavoviridis</i> U. Singh, K. Das & R.P. Bhatt	Chopta
<b>Family <i>Hymenochaetaceae</i></b>	
<i>Coltricia cinnamomea</i> (Jacq.) Murrill	Chopta, Dudhatoli trek
<b>Family <i>Lyophyllaceae</i></b>	
<i>Termitomyces microcarpus</i> (Berk. & Broome) R. Heim	Badiyargarh
<b>Family <i>Marasmiaceae</i></b>	
<i>Marasmius oreades</i> (Bolton) Fr.	Phedkhal, Chopta, Bedni, Tungnath trek
<b>Family <i>Meripilaceae</i></b>	
<i>Grifola frondosa</i> (Dicks.) Gray	Chopta, Tungnath trek, Dhakuri, Dwali
<b>Family <i>Phaeotremellaceae</i></b>	
<i>Phaeotremella foliacea</i> (Pera.) Wedin, J.C. Zamora & Millanes	Chopta, Dhakuri
<b>Family <i>Physalacriaceae</i></b>	
<i>Armillaria mellea</i> (Vahl) P. Kumm.	Chopta, Dhakuri
<i>Mucidula mucida</i> (Schrad.) Pat.	Chopta, Mukteshwar
<b>Family <i>Pleurotaceae</i></b>	
<i>Pleurotus ostreatus</i> (Jacq.) P. Kumm.	Phedkhal, Chopta
<b>Family <i>Polyporaceae</i></b>	
<i>Fomes fomentarius</i> (L.) Fr.	Chopta
<i>Trametes versicolor</i> (L.) Lloyd	Bheemtal, Khirsu
<b>Family <i>Psathyrellaceae</i></b>	
<i>Coprinellus disseminatus</i> (Pers.) J.E.Lange	Khirsu, Mussoorie
<i>Coprinellus micaceus</i> (Bull.) Vilgalys, Hopple & Jacq. Johnson	Silogi, Ranichauri, Chopta, Adwani
<i>Parasola plicatilis</i> (Curtis) Redhead,	Khirsu, Chaurikhal

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Vilgalys and Hopple

*Psathyrella candolleana* (Fr.) Maire

Pauri town, Chamba

**Family Russulaceae**

*Lactarius abbotanus* K. Das & J.R. Sharma

Abbot Mount, Furti, Phedkhal

*Lactarius camphoratus* (Bull.) Fr.

Adwani, Chirbatya, Chopta, Mandal,  
Pauri

*Lactarius deliciosus* (L.) Gray

Bedni, Chopta-Baniyakund, Dhakuri,  
Dwali, Jageshwar, Nainital, Tungnath  
Chopta-Baniyakund

*Lactarius dirkii* Uniyal, K. Das, Baghela &  
R.P. Bhatt

*Lactarius fuliginosus* (Fr.) Fr.

Bedni, Chakrata, Chopta, Tungnath

*Lactarius horakii* Nuytinck & Verbeken

Adwani, Parsundakhal, Surkanda

*Lactarius laeticolor* (S. Imai) Imazeki ex Hongo

Chakrata, Dhakuri, Jageshwar, Mandal,  
Purola, Sankri

*Lactarius lignyotus* Fr.

Dhakuri, Chopta

*Lactarius mayawatianus* K. Das & J.R. Sharma

Chakrata, Chopta, Nainital

*Lactarius montoyae* K. Das & J.R. Sharma

Dhakuri, Chopta, Nainital

*Lactarius mukteswaricus* K. Das, J.R. Sharma &  
Montoya

Adwani, Chopta, Dhanolti, Kund,  
Mandal, Phedkhal, Pauri

*Lactarius nodulisporus* Uniyal, K. Das &  
R.P. Bhatt

Dhakuri

*Lactarius olivaceoumbrinus* Hesler & A.H. Sm.

Tungnath trek

*Lactarius pyriodorus* K. Das & Verbeken

Chopta

*Lactarius rubrifluus* Gillet

Parsundakhal, Surkanda

*Lactarius sanjappae* K. Das, J.R. Sharma &  
Montoya

Chopta, Lansdown, Pauri, Silogi

*Lactarius scrobiculatus* (Scop.) Fr.

Chopta, Deoban, Nainital, Purola,  
Tungnath

*Lactarius singeri* Uniyal, K. Das & R.P. Bhatt

Chopta, Baniyakund

*Lactarius subindigo* Verbeken & E. Horak

Bhimtal, Bhowali, Binsar, Bughani,  
Kanskhet, Phedkhal

*Lactarius verbekena* K. Das, J.R. Sharma &  
Montoya

Nainital, Phedkhal, Chopta

*Lactarius vesterholtii* K. Das & D. Chakr.

Chopta, Tungnath

*Lactarius yazooensis* Hesler & A.H. Sm.

Chamba, Kund, Phedkhal, Pipalkoti

*Lactarius zonarius* (Bull.) Fr.

Adwani, Binsar, Chamba, Kund,  
Mussoorie, Phedkhal

*Lactifluus corrugis* (Peck) Kuntze

Dhakuri, Chopta, Jakhddhar, Sankri

*Lactifluus glaucescens* (Crossl.) Verbeken

Chopta, Hariyali Devi, Khirsu

*Lactifluus hygrophoroides* (Berk. & M.A. Curtis)  
Kuntze

Buakhal, Dudhatoli trek, Jakhddhar,  
Mandal, Phedkhal

*Lactifluus limbatus* (D. Stubbe & Verbeken) D.  
Stubbe

Chopta-Baniyakund

*Lactifluus paleus* (Verbeken & E. Horak)  
Verbeken

Chopta-Baniyakund, Dhakuri

*Lactifluus pilosus* (Verbeken, H.T. Le &  
Lumyong) Verbeken

Phedkhal, Jakhddhar

*Lactifluus piperatus* (L.) Roussel

Adwani, Chaurikhal, Chopta, Dhakuri,  
Hariyali Devi, Jakhddhar, Phedkhal

*Lactifluus rajendrae* P. Uniyal & K. Das

Hariyali Devi

*Lactifluus subvellerus* (Peck) Nuytinck

Chopta, Lansdown, Jakhddhar, Pharsuli,



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<i>Lactifluus vellereus</i> (Fr.) Kuntze	Phedkhal
<i>Lactifluus volemus</i> (Fr.) Kuntze	Dhakuri, Silogi
	Adwani, Binsar, Chopta, Jakhdhar,
	Nainital, Phedkhal
<i>Russula aeruginea</i> Lindblad ex Fr.	Chopta
<i>Russula albida</i> Peck	Adwani, Phedkhal
<i>Russula albonigra</i> (Krombh.) Fr.	Chopta, Dhakuri
<i>Russula amoenicolor</i> Romagn.	Adwani, Phedkhal, Mukteshwar
<i>Russula brevipes</i> Peck	Khirsu, Chopta, Pauri town
<i>Russula chloroides</i> (Krombh.) Bres.	Adwani, Chopta
<i>Russula cyanoxantha</i> (Schaeff.) Fr.	Adwani, Pauri town, Chaurikhal,
	Mayawati
<i>Russula delica</i> Fr.	Dhakuri, Khirsu
<i>Russula densifolia</i> Secr. ex Gillet	Chopta, Chaurikhal, Phedkhal
<i>Russula emetica</i> (Schaeff.) Pers.	Chopta, Dhakuri
<i>Russula heterophylla</i> (Fr.) Fr.	Adwani
<i>Russula hookeri</i> Paloi, A.K. Dutta & K.	Chopta, Dhakuri
Acharya	
<i>Russula indoalba</i> A. Ghosh, Buyck, Baghela,	Chopta, Dhakuri
K. Das & R.P. Bhatt	
<i>Russula indoarmeniaca</i> A. Ghosh, K. Das &	Chopta
R.P. Bhatt	
<i>Russula laurocerasi</i> Melzer	Jakhdhar
<i>Russula mukteshwarica</i> K. Das, S.L. Mill.,	Adwani, Pauri town, Mukteshwar
J.R. Sharma & R.P. Bhatt	
<i>Russula natarajanii</i> K. Das, J.R. Sharma &	Chopta, Dhakuri
Atri	
<i>Russula nigricans</i> Fr.	Dhakuri, Chopta, Jakhdhar
<i>Russula pauriensis</i> A. Ghosh, K. Das &	Pauri town
Buyck	
<i>Russula petersenii</i> A. Ghosh & K. Das	Chopta
<i>Russula pseudoamoenicolor</i> A. Ghosh, Buyck,	Khirsu
K. Das, Baghela & R.P. Bhatt	
<i>Russula rajendrae</i> A. Ghosh & K. Das	Chopta
<i>Russula rosea</i> Pers.	Chopta, Phedkhal, Dhakuri
<i>Russula sarnarii</i> A. Ghosh, K. Das & R.P.	Hariyali Devi
Bhatt	
<i>Russula sharmae</i> K. Das, Atri & Buyck	Chopta
<i>Russula thindii</i> K. Das & S.L. Mill.	Chopta, Deoban
<i>Russula vesca</i> Fr.	Tungnath trek, Chopta
<i>Russula virescens</i> (Schaeff.) Fr.	Phedkhal, Adwani, Dudhatoli trek,
	Chaurikhal
<b>Family Schizophyllaceae</b>	
<i>Schizophyllum commune</i> Fr.	Pauri town, Chirbatiya
<b>Family Sclerodermataceae</b>	
<i>Pisolithus arhizus</i> (Scop.) Rauschert	Chauras Campus HNBGU
<i>Scleroderma areolatum</i> Ehrenb.	Phedkhal, Khirsu, Gwaldum

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**Family Sparassidaceae**

*Sparassis latifolia* Y.C. Dai & Zheng Wang Abbot Mount

**Family Strophariaceae**

*Stropharia rugosoannulata* Farl. ex Murrill Sankari, Khirsu, Surkanda, Adwani

**Family Tremellaceae**

*Tremella fuciformis* Berk. Chopta, Mandal

*Tremella mesenterica* Retz. Chopta, Dhakuri

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## Edible Fungi:

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**Name of species**

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**ASCOMYCOTA****Family Helvellaceae**

*Helvella crispa*

**Family Morchelaceae**

*Morchella esculenta*

**Family Pyronemataceae**

*Aleuria aurantia*

**Family Hypocreaceae**

*Hypomyces lateritius*

**BASIDIOMYCOTA****Family Agaricaceae**

*Agaricus augustus*

*Agaricus campestris*

*Agaricus silvicola*

*Calvatia cyathiformis*

*Chlorophyllum rachodes*

*Coprinus comatus*

*Lycoperdon perlatum*

*Lycoperdon pyriforme*

*Macrolepiota procera*

**Family Amanitaceae**

*Amanita caesareoides*

*Amanita chepangiana*

*Amanita hemibapha*

*Amanita princeps*

*Amanita vaginata*

**Family Auriculariaceae**

*Auricularia auricula-judae*

*Auricularia nigricans*

**Family Boletaceae**

*Boletus indoedulis*

*Phylloporus rhodoxanthus*

*Strobilomyces confusus*

*Strobilomyces strobilaceus*

**Family Cortinariaceae**

*Cortinarius violaceus*

**Family *Dacrymycetaceae***

*Calocera viscosa*

**Family *Diplocystaceae***

*Astraeus hygrometricus*

**Family *Fomitopsidaceae***

*Laetiporus sulphureus*

**Family *Gomphaceae***

*Ramaria botrytis*

*Turbinellus floccosus*

**Family *Hericiaceae***

*Hericium coralloides*

*Hericium erinaceus*

**Family *Hydnaceae***

*Cantharellus cibarius*

*Cantharellus lateritius*

*Cantharellus minor*

*Craterellus cornucopioides*

*Craterellus parvogriseus*

*Hydnum repandum*

**Family *Hygrophoraceae***

*Hygrocybe cantharellus*

**Family *Lyophyllaceae***

*Termitomyces microcarpus*

**Family *Marasmiaceae***

*Marasmius oreades*

**Family *Meripilaceae***

*Grifola frondosa*

**Family *Phaeotremellaceae***

*Phaeotremella foliacea*

**Family *Physalacriaceae***

*Armillaria mellea*

**Family *Pleurotaceae***

*Pleurotus ostreatus*

**Family *Psathyrellaceae***

*Coprinellus micaceus*

**Family *Russulaceae***

*Lactarius camphoratus*

*Lactarius deliciosus*

*Lactarius fuliginosus*

*Lactarius rubrifluus*

*Lactarius subindigo*

*Lactifluus corrugis*

*Lactifluus hygrophoroides*

*Lactifluus volemus*

*Russula brevipes*

*Russula cyanoxantha*

*Russula flavida*

*Russula vesca*

*Russula virescens*

**Family *Sparassidaceae***

*Sparassis latifolia*

**Family Strophariaceae**

*Stropharia rugosoannulata*

**Family Tremellaceae**

*Tremella fuciformis*

*Tremella mesenterica*

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**Ectomycorrhizal Fungi:**

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**Family Agaricaceae**

*Calvatia cyathiformis*

*Lycoperdon perlatum*

*Lycoperdon pyriforme*

**Family Amanitaceae**

*Amanita pallidorosea*

*Amanita argenteoalba*

*Amanita avellaneosquamosa*

*Amanita caesareoides*

*Amanita ceciliae*

*Amanita chepangiana*

*Amanita cinnamomescens*

*Amanita concentrica*

*Amanita cornelii*

*Amanita dhakuriana*

*Amanita emodotrygon*

*Amanita farinosa*

*Amanita flavipes*

*Amanita fritillaria*

*Amanita griseofolia*

*Amanita griseoverrucosa*

*Amanita hemibapha*

*Amanita hemibapha* var. *ochracea*

*Amanita manginiana*

*Amanita oberwinklerana*

*Amanita orientifulva*

*Amanita orientigemmata*

*Amanita orsonii*

*Amanita pakistanica*

*Amanita pantherina*

*Amanita parvipantherina*

*Amanita pillosella*

*Amanita princeps*

*Amanita pseudoporphyria*

*Amanita rajendrae*

*Amanita rubrovolvata*

*Amanita subglobosa*

*Amanita subjunquillea*

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*Amanita subjunquillea* var. *alba*

*Amanita subparvipantherina*

*Amanita tullossiana*

*Amanita umbrinolutea*

*Amanita vaginata*

*Amanita virgineoides*

**Family Boletaceae**

*Boletus indoedulis*

*Phylloporus rhodoxanthus*

*Strobilomyces confusus*

*Strobilomyces strobilaceus*

**Family Cortinariaceae**

*Cortinarius violaceus*

**Family Diplocystaceae**

*Astraeus hygrometricus*

**Family Gomphaceae**

*Ramaria botrytis*

*Turbinellus floccosus*

**Family Hydnaceae**

*Cantharellus cibarius*

*Cantharellus lateritius*

*Cantharellus minor*

*Craterellus cornucopioides*

*Craterellus parvogriseus*

*Hydnum repandum*

**Family Russulaceae**

*Lactarius abbotanus*

*Lactarius camphoratus*

*Lactarius deliciosus*

*Lactarius dirkii*

*Lactarius fuliginosus*

*Lactarius horakii*

*Lactarius laeticolor*

*Lactarius lignyotus*

*Lactarius mayawatianus*

*Lactarius montoyae*

*Lactarius mukteswaricus*

*Lactarius nodulisporus*

*Lactarius olivaceoumbrinus*

*Lactarius pyriodorus*

*Lactarius rubrifluus*

*Lactarius sanjappae*

*Lactarius scrobiculatus*

*Lactarius singer*

*Lactarius subindigo*

*Lactarius verbekena*

*Lactarius vesterholtii*

*Lactarius yazooensis*

*Lactarius zonarius*

*Lactifluus corrugis*

*Lactifluus glaucescens*

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*Lactifluus hygrophoroides*  
*Lactifluus limbatus*  
*Lactifluus paleus*  
*Lactifluus pilosus*  
*Lactifluus piperatus*  
*Lactifluus rajendrae*  
*Lactifluus subvellereus*  
*Lactifluus vellereus*  
*Lactifluus volemus*  
*Russula aeruginea*  
*Russula albida*  
*Russula albonigra*  
*Russula amoenicolor*  
*Russula brevipes*  
*Russula chloroides*  
*Russula cyanoxantha*  
*Russula delica*  
*Russula densifolia*  
*Russula emetica*  
*Russula heterophylla*  
*Russula hookeri*  
*Russula indoalba*  
*Russula indoarmeniaca*  
*Russula laurocerasi*  
*Russula mukteshwarica*  
*Russula natarajanii*  
*Russula nigricans*  
*Russula pauriensis*  
*Russula petersenii*  
*Russula pseudoamoenicolor*  
*Russula rajendrae*  
*Russula rosea*  
*Russula sarnarii*  
*Russula sharmae*  
*Russula thindii*  
*Russula vesca*

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**b). Nutritional analysis:** Following ten species of both wild and cultivated edible mushrooms were selected for nutritional analysis:

- (i) *Agaricus bisporus* (Cultivated)
- (ii) *Cantharellus cibarius* (Wild)
- (iii) *Grifola frondosa* (Wild)
- (iv) *Lactarius deliciosus* (Wild)
- (v) *Lactifluus hygrophoroides* (Wild)
- (vi) *Laetiporus sulphureus* (Wild)
- (vii) *Morchella esculenta* (Wild)
- (viii) *Pleurotus ostreatus* (Cultivated)
- (ix) *Pleurotus ostreatus* (Wild)
- (x) *Russula brevipes* (Wild)

Among nutritional analysis carbohydrates, proteins, lipids and ash contents of each of the mushroom species were estimated. The estimated values of these nutrients in the ten mushroom species are shown in **Table 1**.

Table 1: Nutritional analyses of ten wild and cultivated edible mushrooms

Sr. No.	Name of Mushroom species	Carbohydrate (mg/g)	Protein (mg/g)	Lipid (mg/g)	Ash (%)
1.	<i>Agaricus bisporus</i> (Cultivated)	9.15	1.8	0.74	7.5
2.	<i>Cantharellus cibarius</i> (Wild)	8.56	0.8	0.13	14.5
3.	<i>Grifola frondosa</i> (Wild)	14.59	2.83	1.42	6.5
4.	<i>Lactarius deliciosus</i> (Wild)	7.47	1.6	0.78	6
5.	<i>Lactifluus hygrophoroides</i> (Wild)	6.45	0.88	0.12	7.5
6.	<i>Laetiporus sulphureus</i> (Wild)	20	1.08	0.33	5
7.	<i>Morchella esculenta</i> (Wild)	11.76	2.33	0.90	5
8.	<i>Pleurotus ostreatus</i> (Cultivated)	13.65	2.4	0.34	8
9.	<i>Pleurotus ostreatus</i> (Wild)	18.69	2.9	0.47	4
10.	<i>Russula brevipes</i> (Wild)	10.03	1.35	0.26	12.5

The present nutritional analysis revealed that carbohydrate contents were ranging from 6.45–20 mg/g in the mushroom species under focus. Highest amount of carbohydrate was present in *Laetiporus sulphureus* (20 mg/g), whereas *Lactifluus hygrophoroides* showed lowest value of it (6.45 mg/g). The protein contents varied from

0.8–2.9 mg/g in the above mushroom samples, with the highest and lowest values in *Pleurotus ostreatus* (2.9 mg/g) and *Cantharellus cibarius* (0.8 mg/g), respectively. As expected, lipid content was the lowest compared to carbohydrates and proteins, ranging from 0.12–1.42 mg/g in all the above ten mushroom species. The highest lipid content was recorded in *Grifola frondosa* (1.42 mg/g) and the lowest value of lipid was observed in *Lactifluus hygrophoroides* (0.12 mg/g). It was also observed that both the cultivated mushroom samples (*Agaricus bisporus* and *Pleurotus ostreatus*) have lower lipid contents as compared to wild mushroom forms. Ash values in the mushrooms under study was ranging from 4–14.5 %, with highest ash value in *Cantharellus cibarius* (14.5 %) and lowest value in wild sample of *Pleurotus ostreatus* (4 %) (Table 1).

It was also observed that the nutritional composition i.e. carbohydrates, proteins, lipid and ash contents was different in cultivated and the wild forms of *Pleurotus ostreatus*.

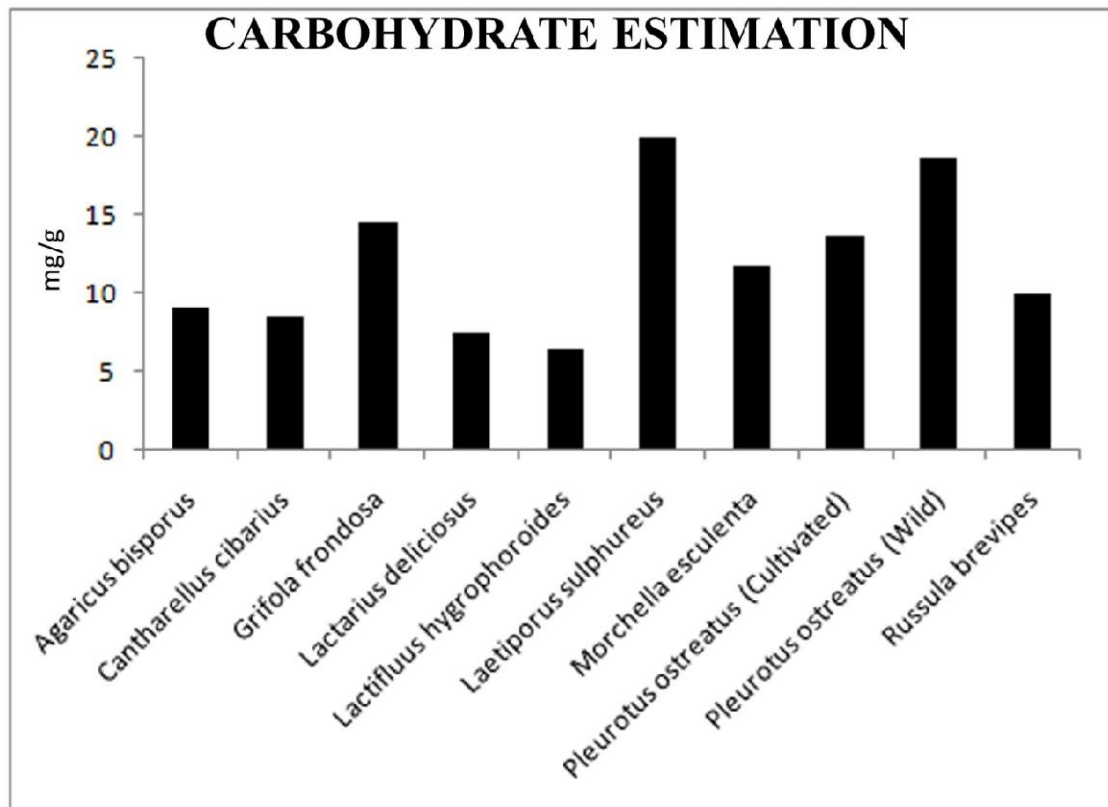


Fig. 1. Carbohydrate contents (in mg/g) of ten species.



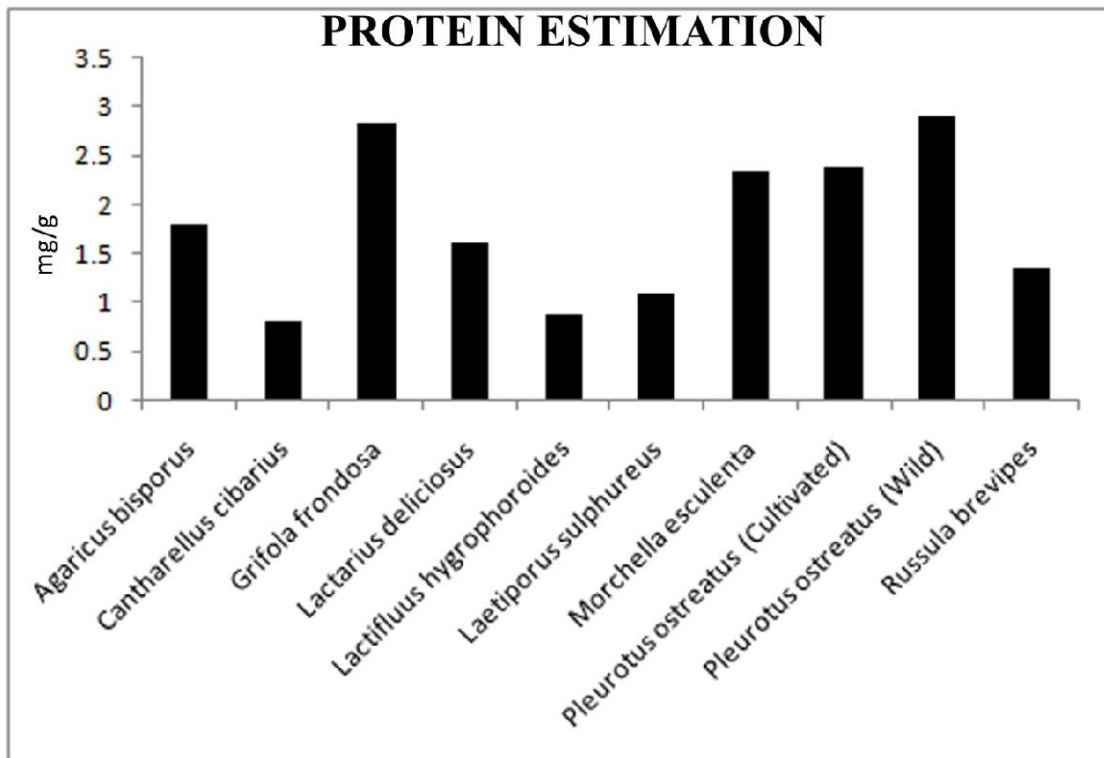


Fig. 2. Protein contents (in mg/g) in ten species.

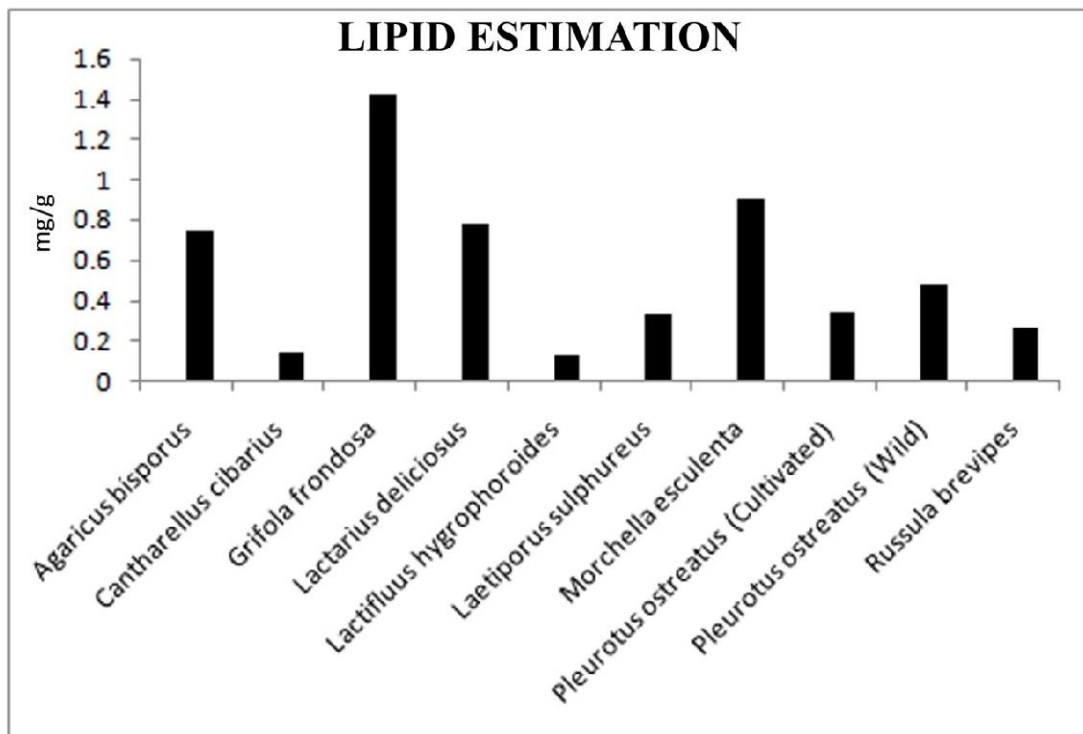


Fig. 3. Lipid contents (in mg/g) of ten species.

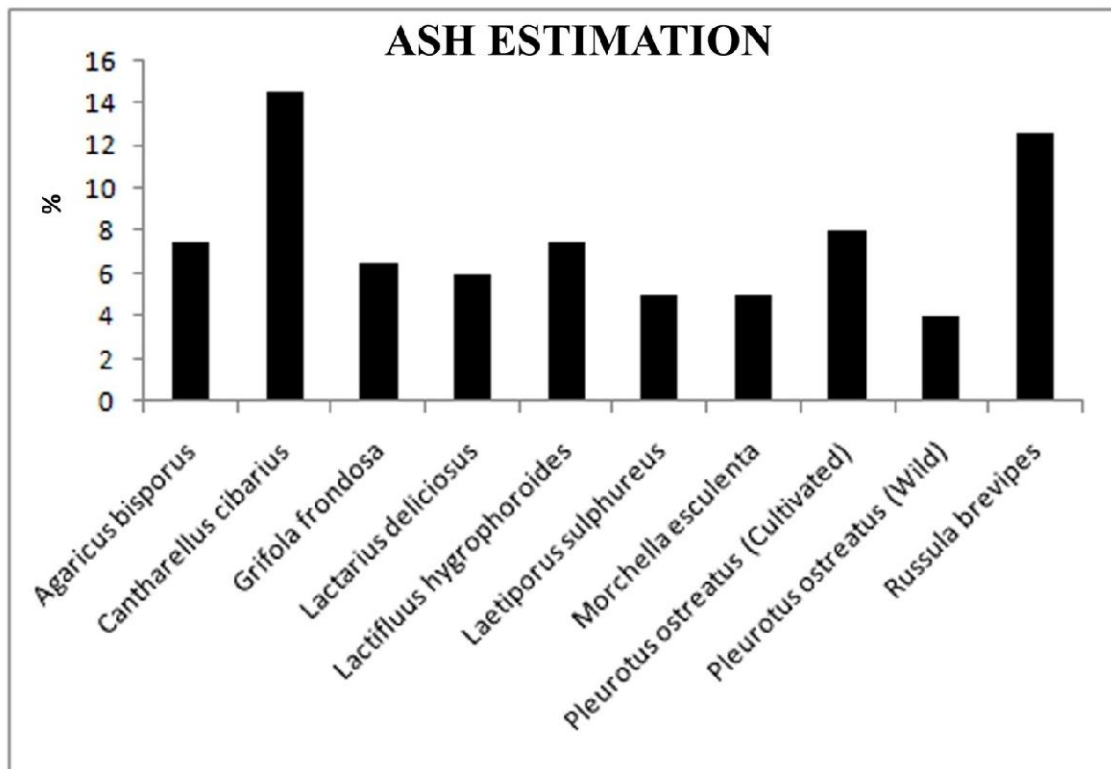


Fig. 4. Ash contents (in %) of ten species.

### 15. New observations:

#### Novel species:

- *Lactifluus rajendrae*
- *Hygrocybe rajendrae*
- *Gliophorus flavoviridis*
- *Craterellus parvogriseus*

#### New records:

- *Sparassis latifolia*
- *Hypomyces lateritius*
- *Amanita caesareoides*
- *Amanita princeps*

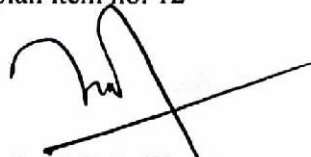
### 16. Innovations:

The Uttarakhand Himalaya has not been explored thoroughly for the edible, non edible, mycorrhizal and medicinal mushrooms. This is a pioneer work for the exploration of wild edible mushrooms of this region. Hope the final results would be very much interesting

and encouraging. Investigations from Uttarakhand Himalaya may result into several novelties or new records.

**17. Research work which remains to be done under the project referring to objectives to be covered: As in work plan item no. 12**

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