

# Handbook on Mushroom Cultivation and Processing (with Dehydration, Preservation and Canning)

**Author:** NIIR Board of Consultants and Engineers

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## About the Book

Mushrooms are the health food of the world. These are that fast growing basidiomycetous fungi which produce fleshy fruit bodies. They are rich in proteins, vitamins and minerals, so they are consumed as energy rich food. Mushroom has been attracting attention of mankind since ancient times and use of mushroom, as food is as old as human civilization. Mushrooms are superior to many vegetables and beans in their nutritive value. It is very rich in protein, vitamins and minerals. Fresh mushrooms contain about 85% water and 3.2% protein. But dried mushrooms water content is low and protein level is high as 34 to 44% and the fat content is less than 0.3%. There are about 100 species of edible mushrooms all over the world. But only three of them are cultivated in India which are *Agaricus bisporus*, *Volvariella volvacea* and *pleurotus sajor caju*. Unfortunately, it is realized that mushrooms did not receive universal acceptance over the years since a number of naturally growing mushrooms are poisonous. Now the situation has been changed because the cultivated edible mushrooms are totally safe for human consumption. Mushroom cultivation fits in very well with sustainable farming and has several advantages: it uses agricultural waste products, a high production per surface area can be obtained, after picking; the spent substrate is still a good soil conditioner. They have less carbohydrate so they are believed to be suitable for diabetic patients. Fresh mushrooms have very limited life and hence they need to be consumed within few hours. But processing and canning increases their shelf life to few months. Osmotic dehydration is one of the important methods of processing mushroom which involves drying technology of mushroom. Mushrooms are very popular in most of the developed countries and they are becoming popular in many developing countries like India. Applications and market for mushrooms is growing rapidly in India because of their nice aroma, nutritious values, subtle flavour and many special tastes. Mushroom cultivation has been declared as a major thrust area by Government of India. Mushroom dish is a common item in all the big hotels. Mushroom production has increased many folds during the recent past. Mushrooms have found a definite place in the food consumption habits of common masses and there is a constant demand for it throughout the year.

Some of the fundamentals of the book are nutritive value of edible mushrooms, medicinal value of mushrooms, advantages of mushrooms, symptoms of mushroom poisoning, morphology of common edible mushrooms, classification of fungi a brief survey, chemical composition, anti nutritional factors and shelf life of oyster mushroom, osmotic dehydration characteristics of button mushrooms, mushroom cultivation, cultivation of white button mushroom (*agaricus bisporus*), factors determining the amount of spawn needed, fungicides for mushroom diseases insecticides for mushroom pests etc.

The present book contains cultivation, processing, dehydration, preservation and canning of various species of mushrooms. It is resourceful book for agriculturists, researchers, agriculture universities, consultants etc.

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 Krombholziella Aurantiaca  
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 Krombholziella Rufescens  
 (Konr.) Sut.  
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 Brown Birch Boletus  
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 Paxillus involutus  
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 Gomphidius Roseus  
 (Fr.) P. Karst.  
 Gomphidius Glutinosus  
 (Schaeff. ex Fr.) Fr.  
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 (Schaeff. ex Fr.) O.K. Miller  
 Ivory Wax Cap  
 Hygrophorus eburneus (Bull. ex Fr.) Fr.  
 Goat Moth Wax Cap  
 Hygrophorus Cossus (Sow. ex Fr.) Fr.  
 Pinewood Wax Cap  
 Hygrophorus Hypothejus (Fr.) Fr.  
 Hygrophorus marzuolus  
 (Fr.) Bres.  
 Camarophyllus Pratensis  
 (Pers. ex Fr.) Kumm.  
 Hygrocybe nigrescens  
 (Quel.) Kuhner  
 Hygrocybe punicea  
 (Fr.) Kumm.



Omphalina epichysium  
 (Pres. ex Fr.) Quel.  
 Gerronema chrysophyllum  
 (Fr. ) Sing.  
 Laccaria amethystina  
 (Huds. ex Hook) Cooke  
 Laccaria laccata  
 (Scop. ex Fr.) Cooke  
 Clitocybe odora  
 (Bull. ex Fr.) Kumm.  
 Clitocybe clavipes  
 (Pers. ex Fr.) Kumm.  
 Clitocybe geotropa  
 (Bull. ex St. Amans) Quel.  
 Clitocybe maxima  
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 Common Funnel Cap  
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 Clitocybe cerussata  
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 Clitocybe candicans  
 (Pers. ex Fr.) Kumm.  
 Clitocybe brumalis  
 (Fr. ex Fr.) Kumm.  
 Lepista nebularis  
 (Batsch ex Fr.) Harmaja  
 Wood Blewitt, Bluettes, Blue Leg  
 Lepista nuda (Bull. ex Fr.) W. G. Smith  
 Blewitt, Bluettes, Blue Leg  
 Lepista saeva (Fr.) P. D. Orton  
 Tricholomopsis rutilans  
 (Schaeff. ex Fr.) Sing.  
 Tricholoma caligatum  
 (Viv.) Ricken  
 Tricholoma colossus  
 (Fr.) Quel.  
 Tricholoma Fulvum  
 (DC. ex Fr.) Sacc.  
 Tricholoma Vaccinum  
 (Pers. ex Fr.) Kumm.  
 Tricholoma Portentosum  
 (Fr.) Quel.  
 Tricholoma flavovirens  
 (Pers. ex Fr.) Lund.  
 Tricholoma sejunctum  
 (Sow. ex Fr.) Quel.  
 Sulphurous Tricholoma  
 Tricholoma Sulphureum (Bull. ex Fr.) Kumm.  
 Tricholoma Columbeta  
 (Fr.) Kumm.  
 Tricholoma Terreum



(Schaeff. ex Fr.) Kumm.  
 Honey Fungus, Honey Agaric, Shoestring Mushroom  
*Armillaria mellea* (Vahl. ex Fr.) Kumm.  
*Lyophyllum connatum*  
 (Schum. ex Fr.) Sing  
*Lyophyllum fumosum*  
 (Pers. ex Fr.) Orton  
*Tephrocybe atrata*  
 (Fr. ex Fr.) Donk  
 St. George's Mushroom  
*Calocybe gambosa* (Fr.) Donk  
 Giant Clitocybe  
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*Melanoleuca brevipes*  
 (Bull. ex Fr.) Pat.  
*Catathelasma imperiale*  
 (Fr.) Sing.  
 Wood Woolly-foot  
*Collybia Peronata* (Bolt. ex Fr.) Kumm.  
 Russet Shank  
*Collybia Dryophila* (Bull. ex Fr.) Quel.  
 Greasy Tough Shank  
*Collybia butyracea* (Bull. ex Fr.) Quel.  
 Spotted Tough Shank  
*Collybia maculata* (Alb. et Schw. ex Fr.) Kumm.  
*Hohenbuehelia Petaloides*  
 (Bull. ex Fr.) Schulz.  
*Megacollybia Platyphylla*  
 (Pers. ex Fr.) Kotl. et Pouz.  
 Slimy Beech Tuft  
*Oudemansiella mucida* (Schrad ex Fr.) Hoehn.  
 Rooting Shank  
*Oudemansiella radicata* (Relhan ex Fr.) Sing.  
*Strobilurus Esculentus*  
 (Wulf. ex Fr.) Sing.  
 Little Wheel Toadstool  
*Marasmius rotula* (Scop. ex Fr.) Fr.  
*Marasmius scorodonius* (Fr.) Fr.  
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*Marasmius oreades* (Bolt. ex Fr.) Fr.  
 Lilac *Mycena*  
*Mycena pura* (Pers. ex Fr.) Kumm.  
*Mycena rosea*  
 (Bull.) ex Sacc. et Dalla Costa  
*Mycena fagetorum*  
 (Fr.) Gill.  
*Xeromphalina campanella*  
 (Batsch ex Fr.) R. Maire  
 Velvet Shank, Winter Fungus  
*Flammulina velutipes* (Curt. ex Fr.) Sing.  
 The Miller



Clitopilus prunulus (Scop. ex Fr.) Kumm.  
 Nolanea verna  
 (Lundell) Kotl. et Pouz.  
 Livid Entoloma  
 Entoloma lividum (Bull. ex St. Amans) Quel.  
 Entoloma nidorosum  
 (Fr.) Quel.  
 Entoloma hirtipes  
 (Schum. ex Fr.) Moser  
 Volvariella speciosa  
 (Fr.) Sing.  
 Pluteus cervinus  
 (Schaeff. ex Fr.) Kumm.  
 Grisette  
 Amanita vaginata (Bull. ex Fr.) Vitt  
 Amanita umbrinolutea Secr.  
 Fly Agaric  
 Amanita muscaria (L. ex Fr.) Hook  
 Amanita regalis  
 (Fr.) Michael  
 Caesarâ€™s Mushroom, Imperial Mushroom  
 Amanita caesarea (Scop. ex Fr.) Grev.  
 Panther Cap  
 Amanita pantherina (DC. ex Fr.) Krombh.  
 Amanita gemmata  
 (Fr.) Gill.  
 Death Cap  
 Amanita phalloides (Fr.) Link  
 Destroying Angel  
 Amanita virosa (Fr.) Bertillon  
 False Death Cap  
 Amanita citrina (Schaeff) ex Roques  
 Amanita porphyrea  
 (Alb. et Schw. ex Fr.) Schummel  
 Amanita spissa (Fr.) Opiz  
 Blusher  
 Amanita rubescens (Pers. ex Fr.) S. F. Gray  
 Agaricus brunnescens Peck  
 Red-staining Agaric Wood Mushroom  
 Agaricus silvaticus (Schaeff. ex Krombh) Kumm.  
 Common Field Agaric, Meadow Mushroom  
 Agaricus campestris L. ex Fr.  
 Agaricus augustus Fr.  
 Agaricus abruptibulbus Peck  
 Horse Agaric, Horse Mushroom  
 Agaricus arvensis Schaeff. ex Fr.  
 Yellow Stainer  
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 Lepiota cristata  
 (Alb. et Schw. ex Fr.) Kumm.  
 Lepiota clypeolaria



(Bull. ex Fr.) Kumm.  
 Parasol Mushroom  
 Macrolepiota procera (Scop ex Fr.) Sing.  
 Shaggy Parasol  
 Macrolepiota rhacodes (Vitt.) Sing  
 Macrolepiota excoriata  
 (Schaeff. ex Fr.) Acker-Sch.  
 Cystoderma amianthinum  
 (Scop. ex Fr.) Maubl  
 Cystoderma cinnabarinum  
 (Alb. et Schw. ex Fr.) Maubl  
 Shaggy Mane, Shaggy Cap, Lawyer's Wig  
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 Common Ink Cap  
 Coprinus atramentarius (Bull. ex Fr.) Fr.  
 Glistening Ink Cap  
 Coprinus micaceus (Bull. ex Fr.) Fr.  
 Panaeolus papilionaceus  
 (Bull ex Fr.) Quel.  
 Psathyrella candolleana  
 (Fr. ex Fr.) R. Maire  
 Psathyrella velutina  
 (Pers. ex S. F. Gray) Sing.  
 Yellow Cow-pat Toadstool  
 Bolbitius vitellinus (Pers. ex Fr.) Fr.  
 Agrocybe dura  
 (Bolt. ex Fr.) Sing.  
 Agrocybe praecox  
 (Pers. ex Fr.) Sing.  
 Stropharia rugosoannulata  
 Farlow in Murrill  
 Verdigris Agaric  
 Stropharia aeruginosa (Curt. ex Fr.) Quel.  
 Stropharia albonitens  
 (Fr.) P. Karst.  
 Brick Red Hypholoma, Bricktop, Bricktop Mushroom  
 Hypholoma sublateritium (Fr.) Quel.  
 Sulphur Tuft  
 Hypholoma fasciculare (Huds. ex Fr.) Kumm.  
 Hypholoma capnoides  
 (Fr. ex Fr.) Kumm.  
 Psilocybe semilanceata  
 (Fr. ex Weinm) Kumm.  
 Pholiota destruens  
 (Brond) Gill.  
 Shaggy Pholiota  
 Pholiota squarrosa (Pers. ex Fr.) Kumm.  
 Pholiota carbonaria  
 (Fr.) Sing.  
  
 Gymnopilus spectabilis



(Fr.) Sing  
 Gymnopilus sapineus  
 (Fr.) R. Maire  
 Kuehneromyces mutabilis  
 (Schaeff. ex Fr.) Sing. et Smith  
 Tubaria conspersa  
 (Pers. ex Fr.) Fayod  
 Crepidotus variabilis  
 (Pers. ex Fr.) Kumm.  
 Inocybe patouillardii Bres  
 Inocybe fastigiata  
 (Schaeff. ex Fr.) Quel.  
 Inocybe argillacea  
 (Pers. ex Pers.) Sing.  
 Inocybe lacera  
 (Fr.) Kumm.  
 Hebeloma radicosum  
 (Bull. ex Fr.) Ricken  
 Jewâ€™s Ear, Judasâ€™ Ear  
 Hirneola auricula-judae (Bull. ex St. Amans) Berk.  
 Yellow Brain Fungus, Witches Butter  
 Tremella mesenterica Retz. ex Hook.  
 Yellow Chanterelle Pixie Stool  
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 Cantharellus tubaeformis  
 Bull. ex Fr.  
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 Lentinus Lepideus  
 (Fr. ex Fr.) Fr.

## 25. GLOSSARY OF BASIC MYCOLOGICAL TERMS

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**NIIR PROJECT CONSULTANCY SERVICES**, 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** [npcs.india@gmail.com](mailto:npcs.india@gmail.com) **Website:** [NIIR.org](http://NIIR.org)