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DIVERSITY AND ECONOMIC VALUE OF MEDICINAL MUSHROOM OF CHATTISHGARH

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ABSTRACT

India has a very rich assemblage of traditional healing systems. Traditional aboriginals knew the medicinal value of edible and wild mushrooms. In India mushroom are boon for progress in the field of food and medicine and in developing countries generating employment. Mushroom in twentieth century are well known to people, mushrooms and toadstools belong to the kingdom fungi are nutritive, low-calorie food with good quality proteins, vitamins, minerals and an important source of drugs source of potent new pharmaceutical products. The immense socio-cultural diversity makes it an ideal storehouse of traditional medicinal knowledge. The only safe way to distinguish between edible and poisonous species is to learn to identify them accurately. The aim of the present study was brings into light the species diversity of fungal flora as well as socio-economic value as non edible, edible and mushroom medicines in different agro-climatic zones of Bilaspur & Raipur India.

KEYWORDS: Mushroom, Diversity, Fungal flora, Ethno-medicinal

Mushroom have become attractive as a functional food and as a source for the development of drugs and nutraceuticals (Lakhanpal and Rana, 2005) responsible with their antioxidant, antitumor and antimicrobial properties (Jones and Janardhaanan, 2000). Besides their pharmacological features, mushrooms are becoming more important in our diet due to their nutritional value, related to high protein and low fat (Agahar-Murugkar and Subbulakshmi, 2005). Fungi use as medicine, food and fodder. There are so many types of fungi are present in Chhattisgarh. Mushroom cultivation is very popular in Chhattisgarh. Mushroom can provide us balancing diet compounds in sufficient quantities for human nutrition. Fungi can account for 25% or more of the root mass of forest, thus a major below-ground structural component of the forest ecosystem. Mushroom has provided us medicinal compounds for human scientific studies have confirmed that substances extracted from mushrooms can reduce blood pressure, blood cholesterol and blood sugar level as well as inhibition of platelet aggregation. Ganoderma species are famous tonic in Chinese medicines. They are widely distributed in India. The total number of edible and medicinal fungi is over 2300 species (Marshall and Nair, 2009). Cultivated mushrooms have become popular, and over 200 genera of macrofungi are useful for the people in the world. Biochemical compositions of mushroom may be like meat and contain B complex, vitamins, minerals, and protein, and also special volatiles (Matilla, Caglarimak, 2009).

MEDICINAL MUSHROOM

Medicinal mushroom are mushroom or extracts used or studied as possible treatments for disease. Bahl (1983) reported that mushroom cure epilepsy, wounds, skin diseases, heart ailments, cholesterol reduction, stress, insomnia, asthma, allergies and diabetes, rheumatoid arthritis, cholera besides intermittent fevers, diaphoretic, diarrhea, dysentery, cold, anesthesia, liver disease, gall bladder disease and used as vermicides. Some mushroom materials, including polysaccharides, glycoprotein's and proteoglycans, modulate immune system responses and inhibit tumor growth in preliminary research, whereas other isolates show potential cardiovascular, antiviral, antibacterial, anti-parasitic, anti-inflammatory anti-diabetic, antifungal, antitumor, hepatoprotective, hypolipedemic, antithrombotic, anticancer, psychotropic and hypotensive properties (Wasser and Weis 1999).

SOME MEDICINAL SPECIES OF MUSHROOM

Ganoderma lucidum

Ganoderma lucidum is the most popular medicinal mushroom of the world. It is also known as Reishi. Traditionally it has been used widely in the treatment of hepatopathy, nephirits, bronchitis, chronic hepatitis, hypertention, arthritis, insomnia, asthma and gastric ulcer. It also has anti-tumor, cardiovascular respiratory and anti-hepatotoxic properties (Stamets 2000). It is used to cure cardiovascular disease and contains several major constituents which may lower blood pressure as well as decrease LDC cholesterol.

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These constituents also help reduce blood platelets from sticking together-an important factor in lowering the risk for coronary artery disease. It has been used for a wide range of health benefits from preventive measures and maintenance of health to the management and treatment of chronic as well as acute human aliments (Rai 1997). It is also used by Indian tribal's for treating joint pain (Harsh et al.1993).

Morchella esculenta

Morchella esculenta is an edible morel mushroom, locally known as Guchhi. It is used in medicine and health care system by the traditional societies and also used in clinically. It has antitumor, anti-oxidative, anti-inflammatory, antibacterial, antifungal activities.

Coprinus comatus

This fungus is commonly known as shaggy ink cap, lawyer's wig or shaggy mane. Various bioactive functions have *Coprinus comatus*, such as hypoglycemic, consumption of *C. comats* can help regulate blood glucose concentration. It has immunomodulation, hypolipidemic, antitumor and antibacterial effects (Bailey et al. 1984; Fan et al. 2006). It has antioxidant properties also.

Agaricus subrufescens

Agaricus subrufescens is a medicinal mushroom associated with Brazil and Japan. Research and small clinical studies demonstrated *Agaricus subrufescens* extracts have anti-hyperglycemic and anticancer activities (Ewart et al. 1975). Brefeldin A and blazein were isolated from Agaricus subrufescens.

Phallus indusiatus

Medicinal use of *Phallus indusiatus* was first noted during the Tang Dynasty. *Phallus indusiatus* extracts promote NFG-synthesis and have anti-inflammatory activity in vitro. *Phallus indusiatus* isolates include 5-(hydroxymethyl)-2-furfural, the antibiotic albaflavenone, dictyophorines, and dictyoquinazols.

MEDICINAL UTILLITIES OF MUSHROOM

Antimicrobial

Antibiotics retapamulin, tiamulin, and valnemulin are derivatives of the mushroom isolate pleuromutilin. Plectasin, austrocortilutein, austrocrotirubin, coprinol, oudemansin A,strobilurin, illudin, pterulone, and sparasssol, are antibiotic isolate from mushrooms.(Ramesh and Pattar, 2010). Qureshi et al. (2010) have studied that the antimicrobial atvityof various solvent extracts (40µg/ml) of *Ganoderma lucidum* was tested against six pathogenic species of bacteria.

Anticancer

Some countries have approved Beta-glucan mushroom extrats lentinan, polysaccharide-K, and polysaccharide peptide as immunologic adjuvants. There is some evidence of this use having effectiveness in prolonging and improving the quality of life for patients with certain cancers, although the Memorrial Sloan-Kettering Cancer Center observes that "Well designed, large scale studies are needed to establish the role of lentinan as a useful adjunct to cancer treatment". Screening of plant extracts for anticancer activity began at NCI in 1956 **(Peuzuto, 1997).**

Anti-diabetic

Many mushroom isolates act as DPP-4 inhibitors, alpha-glucosidase inhibitors, and alpha amylase inhibitors in vitro. Ternatin is a mushroom isolate that suppresses hyperglycemia.

Nutrients and phytochemicals

Only fungi and animals can synthesize vitamin D. Mushroom have been verified creating D_2 (ergocalciferol), D_4 (22-dihydroergocalciferol), and vitamin D_1 (Lumestrol+D_2). Mushroom are a rare source of ergothioneine, contain ACE inhibiter peptides, and a source of prebiotic dietary fiber. Mushroom also contain a variety of chemicals like lovastatin, cordycepin, inotilone, quercinol, antcin B, antrodioxolanone, and benzocamphorin F having preliminary research evidence for anti-inflammatory activity. Mushrooms are a rare source of ergothioneine. Mushroom also contain a variety of phytochemicals such as cordycepin, inotilone, quercinol, antcin B, antrodioxolanone, and benzocamphorin F having preliminary research evidence for anti-inflammatory activity.

ECONOMIC VALUE

Mushroom has many economic importances. It is used in medicine and also used in food. In food there are two types, some are edible and some are non edible.

Edible mushroom

Edible mushroom are the fleshy and edible fruit bodies of several species of macrofungi (fungi which bear fruiting structures that are lato be seen with the nacked

eye.) Edibility may be defined by criteria that include absence of poisonous effect on humans and desirable taste and aroma. Mushrooms are used extensively in cooking, in many cuisines (notably Chinese, Korean, European, Japanese and Indian). Mushroom is called Khumb in Hindi. They are known as the "meat" of the vegetable world (Mohan et al 2006). Edible mushrooms are consumed by humans as comestibles for their nutritional value and they are occasionally consumed for their supposed medicinal value. Mushroom consumed by those practicing folk medicine are known as medicinal mushroom. Edible mushroom include many fungal species that are either harvested wild or cultivated.

Some Edible Species

Agaricus bisporus- The most popular of these, *Agaricus bisporus*, is considered safe for most people to eat because it is grown in controlled, sterilized environments. Several varieties of *A. bisporus* are grown commercially, including whites, crimini, and Portobello (Dhar and Sharma, 2009).

Oyster Mushroom – Oyster mushroom derive their name from oyster, owing to the similarity in appearance. Oyster mushroom (Pleurotus species) is excellently edible and nutritious, rank among of the most widely cultivated mushroom in the world (Chang, 1999). Potent antioxidant compounds in oyster mushrooms have sent scientists researching their potential benefits for treating HIV disease. A part from this, these mushrooms is contenders for protecting against cancers and facilitating healthy cholesterol levels in the body (Rai 1997).

Auricularia auriacula- judae- It is an edible mushroom. It is specially grow in Chhattisgarh in rainy season and it distribution is in Raipur. It is found on dead branches of mango, cluster apple, subabool, gulmohar. Auricularia auriacula-judae is known as the Jews car, wood ear, and jelly ear or by a number of other common species, is a species of edible Auriculariales fungus found worldwide. It has a soft, jelly-like texture. The nutritional content of 100g (3.5 oz) of dried fungus includes 370kcal, 10.6g of protein, 0.2g of fat, 65g of carbohydrate, 5.8g ash, and 0.03%mg of carotene (Shing et al. 2009).

Shiitake- The Shiitake (Lentinula edodes) is an edible mushroom native to East Asia, Which is cultivated and Consumed in many Asian countries. It is also considered a medicinal mushroom in some forms of traditional medicine (Shing et al. 2006).

Maitake- This is an edible mushroom**.** Appear rippling and fan- shaped, without caps. They are also called "Hen of the woods." This is a main dish ingredient, or used in side dishes and soups. The nutritional content of calories-26, carbohydrate (% dally value) 5.9 (2%). It dosage for adults-take 1 teaspoon two to three times a day in water or in juice (Chang 1999).

NON-EDIBLE SPECIES

Non edible mushroom is wild or poisons mushroom. Mushroom poisoning (also known as mycetism) refers to harmful effect from ingestion of toxic substance present in a mushroom. Many mushroom species produce secondary metabolites that can be toxic, mind-altering, antibiotic, antiviral, or bioluminescent. Although there are only a small number of deadly species, several others can cause particularly severe and unpleasant symptoms (Kapoor 2004). Toxicity likely plays a role in protecting the functions of the basidiocarp: the mycelium has expended considerable energy and protoplasmic material to develop a structure to efficiently distribute its spores. Harmful effect of mushroom these symptoms can vary from slight gastrointestinal discomfort do death. The toxins present are secondary metabolites produced in specific biochemical pathway in the fungal cells. Mushroom poisoning is usually the result of ingestion of wild mushroom after misidentification of a toxic mushroom as an edible species. The most common reason for this misidentification is close resemblance in terms of color and general morphology of the toxic mushroom species with edible species. (Berger and Guss 2005).

POISONOUS MUSHROOMS

Some species of mushrooms are known as toxic and in some countries many cases of mushroom poisoning are reported every year. A wide variety of toxic mushrooms belong to different genus that will be discussed bellow.

Amanita

The family Amanitaceae (genus Amanita) is well known as having many toxic species. Amatoxins are present in species of Amanita genus such as: *Amantia phalloides, A.virosa, A. verna, A. ocreata, A. bisporigera*. Toxins found in Amantia genus belong to the family of phallotoxin that includes phalloin, phalloidin, phallish, phallacidin, phallacin and phallisacin. Virotoxin is also found in the genus and are closed related the phallotoxins.

Psilocybe

Psilocybe is an intoxicant mushroom. The symptoms of their intoxicant occur in 30 minutes after ingestion of fresh or dried mushroom and start with anxiety, nausea, vertigo and asthenia, neurosensorial symptoms consists of visual problems, disorientation, motor incoordination and sympathomimetic symptoms consist of mydriasis, tachycardia and hypertension. Recovery is completely 4 to 12 hours after ingestion (Plaa and Hewitt 1982).

Cortinarius

Cortinarius is a non edible mushroom and it has some intoxicants properties. C. speciosissimus and C. orellanus are nephrotoxic due to the presence of the cyclopeptide orellanine whose metabolites are supposed to be most active. The symptoms of orellanine intoxication may appear between 2-20 days after ingestion. Initially people can experience nausea, vomiting and abdominal pain. This is followed by intense thirst, chills, polyuria or oliguria and possibly anuria.

DIVERSITY OF FUNGAL FLORA

Fungi are cosmopolitan organism that colonize and remain in various natural environments that include from the ground to the oral human cavity. However, its distribution variety according to the various regions in the world, Weather and local specific environment (Sellart et al. 2007). Some fungus can survive the intense uv and cosmic radiation encountered during space travel. It includes extreme environments such as desert or areas with high salt Concentration or ionizing radiation, as well as in deep sea sediments. The number of fungi recorded in India exceeds 27,000 species, the largest biotic community after insects. The true fungi belong to kingdom Eukaryota which has four phyla, 103 orders, 484 families and 4979 genera. The number of fungal genera reported from the world and that from India between 1905 and 1995.

RESULTS AND DISCUSSION

The present study is an attempt to deal with the medicinal importance of edible and wild mushroom. Diversity of mushroom has a wide range in India. Mushroom has highly vitamin, protein, calories, nutrition and importance source of medicine. Mushroom found in many countries of India. It also found in many district in Chhattisgarh. Nitha et al. (2007) confirmed its antitumor activity against both ascites and solid tumors. Negi (2006) discussed the nutritional value and medicinal use of *Morchella* species. Antimicrobial activity of *C. comatus* was reported by and antioxidative properties were reported by Wei and van. *Agaricus subrufescens* has been documented as a traditional treatment for diabetes by Gray and Flat (1998) Amanita species shows the toxic effects are caused by phallotoxin and amatoxin (Tegzes and Puschner 2002)(Table 1).

Table 1: Shows Economic value of fleshy Mushroom of Chhattisgarh

S No	Mushroom Species*	Habit and habitat	Distribution	Mushroom type
1	*Agrocybe erebia*	Sporophore in groups on ground	Bilaspur	Non-edible
2	*Auricularia spp.*	On dead branches of mango, custard apple, subabool, gulmohar.	Raipur	Edible
3	*Coriolus*	On dead wood	Narayanpur	Medicinal therapeutic Value
4	*Hypoxylon fragifrome*	Normally gregarious on rooting beech, grow on weed, crust like stromata.	Gariabandh forest	Non-edible
5	*Amanita spp.*	Sporophore occurs on the soil under shrubs	Baster forest	Poisonous
6	*Ganoderma lucidum*	Sporophores grows solitary	All forest area of Chhattisgarh	Non-edible
7	*Ganoderma tsugae*	Sporophore grows solitary or in groups	Ambikapur, Baster, Bilaspur	Non-edibla
8	*Lentinus spp.*	Sporophore in bunches on dead wood log.	Korea	Edible
9	*Marasmius oreades*	Sporophore gregarious in grass land.	Bastar forest	Edible
10	*Russula mairei*	Under shrubs or mixed forest	Achanakmar, Barnawapara	Non-edible
11	*Lepista nuda*	In humus rich ground under broad leaves shrubs	Achanakmar, Bilaspur	Edible
12	*Phallorina spp.*	Sporophore solitary or in groups on soil under the trees	Guru Ghasidas University, Bilaspur.	Edible

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