



## REVIEW OF RESEARCH



VOLUME - 6 | ISSUE - 9 | JUNE - 2017

### TAPPING INTO THE EDIBLE MUSHROOM BIODIVERSITY OF CENTRAL WESTERN GHATS REGION OF KARNATAKA, SOUTH INDIA

**Dr. Ashok Chittaragi**

Department of P. G. Studies & Research in Applied Botany,  
Mycological Laboratories, Bio-Science Complex, Jnana Sahyadri,  
Kuvempu University, Shankaraghatta, Shivamogga (Dist),  
Karnataka, India.



#### ABSTRACT

Western Ghats are one of the biodiversity hotspots of the world which stretches parallel to west coast of India. Climatic conditions are friendly for foundation of differing mushroom vegetation. In this examination, five Jelly mushroom species were gathered during the rainstorm period of 2015 from the Western Ghats locale of Karnataka (India). Of the five Jelly parasites gathered, two species were distinguished as *Auricularia delicata* (darker strain) and *A. Delicate* (white strain) in light of phenotypic characters. The other three Jelly organisms were recognized utilizing Internal Transcribed Spacer (ITS) locale. The succession arrangement made with accessible information base in the National Center for Biotechnological Information (NCBI) demonstrated 89 %, 99 % and 96 % homology with *Auricularia polytricha*, *Tremella fuciformis* and *Dacryopinax spathularia* separately.

**KEYWORDS:** Jelly Mushroom, Western Ghats, ITS region.

#### INTRODUCTION

Western Ghats is a mountain extend that runs parallel toward the western bank of the peninsular India beginning from Maharashtra, Goa, Karnataka, Kerala and completion at Kanyakumari in Tamilnadu which covers around 1,60,000 square kilometers. Western Ghats is the one of the eight most sweltering hotspots regarding quantities of endemics and endemic species/region proportions for the two plants and vertebrates, and territory misfortune (Myers *et al.*, 2000). The district gets plentiful of its downpour from south-west rainstorm which makes wettest season from June to October. Yearly precipitation on Western Ghats midpoints 2500 mm. Not with standing, at Agumbe (place) precipitation surpasses 7600 mm (Dahanukar *et al.*, 2004). The focal Western Ghats of Karnataka, known as 'Sahyadri', speaks to a long mountain chain along the west bank of India and envelop the areas specifically Chikmagalur, Shimoga, Udupi, Dakshina Kannada, Uttara Kannada, Hassan and Coorg (Kumar *et al.*, 2014). Muggy climate and high precipitation during rainstorm is suitable air for the foundation of numerous sorts of mushroom verdure which incorporates eatable, restorative and toxic sorts.

Mushroom is entrancing plump fruiting body structure of an organism has a place with class Basidiomycetes and Ascomycetes (Arora, 1986). The species assorted variety of organisms and their common excellence possesses prime spot in the natural world and the Western Ghats of India is a support of

these animal types. Characterizing the quantity of growths on earth has been a point of dialog and a few investigations have concentrated on specifying the World contagious decent variety (Crous *et al.*, 2006). Just a small amount of absolute parasitic riches has been exposed to logical examination and mycologists keep on disentangling the unexplored and concealed riches. 33 % of parasitic decent variety of the globe exists in India and of this solitary 50 % are described up until now (Manoharachary *et al.*, 2005). This investigation reports five Jelly mushrooms from Western Ghats of Karnataka.

### DIVERSITY OF MACROFUNGI

In India Mushrooms have been widely considered in the Western nations while tropical nations like India are less investigated (Dwivedi *et al.*, 2012). In the nineteenth century some outside guests made stray accumulations of parasites from various pieces of India with which began the gathering and investigation of Indian growths. They used to send their accumulations to different European Laboratories for the investigation of characters and recognizable proof. Hooker and Thompson were the pioneers who begun a progressively extensive and efficient review of Indian growths. They made broad gathering of growths in India. Their gathering incorporated countless Agarics from the Eastern Himalayas which were portrayed at later time by Berkeley. Sulpis Kurz, at that point the keeper, Royal Botanic Garden, Calcutta, made comparative commitment, whose accumulations of growths from Bengal and Burma were portrayed by Currey. Exceptional notice might be made of the names of Cunningham (1875-97) who out of the blue started the examination of Indian organisms in India; accordingly they made a truly profitable change in the act of sending to another country the parasites gathered from India for the investigation and distinguishing proof. During the most recent decade of the nineteenth century Indian labourers began the investigation of organisms, among which was Kirtikar who gathered and concentrated Indian parasites, especially the beefy growths. Yet, it was Butler who, out of the blue, started, sorted out lastly made a custom of huge scale mycological and phyto pathological explores in India. The logical monograph, 'Organisms of India' composed by Butler and Bisby distributed in 1931 gives a rundown of Indian parasites and host list of pathogenic growths. In course of most recent three decades, Bose has dedicated his examination exercises on the Polyporaceae and other meaty organisms of Bengal and worked out the history and geological circulation of Bengal polypores and their high height event. Bose is one of the pioneers who scanned for anti-microbial in higher organisms.

### MATERIALS AND METHODS

The Jelly mushrooms were gathered from Western Ghats regions of Karnataka *viz.*, Hassan, Shimoga and Dakshina Kannada during the rainstorm 2015. Field data, for example, living space, plenitude and phenotypic characters like size, shape, shade of the fruiting body were recorded (Arora, 1986). The genomic DNA of mushrooms was separated from tissue by utilizing CTAB lysis cushion (Doyle and Doyle, 1987). Stipe (stem) tissue of mushroom (0.2 g) was ground into fine powder utilizing fluid nitrogen and the example was moved into 1.5 ml of extraction support and hatched at 65°C for 45 minutes. Equivalent volumes of Chloroform: Iso-amylalcohol (24:1 v/v) was included and blended by modifying by cylinders. These cylinders were centrifuged at 10000 rpm for 10 minutes. Clear supernatant was gathered by expelling jam layer at the top and DNA was encouraged by including chilled isopropanol. The pellet was washed with 70 % ethanol and broke up in Tris-EDTA support. The fixation and virtue were estimated by utilizing spectrometer (Eppendorf).

Enhancement of ITS locale was finished by utilizing ITS1 (Forward) 5'TCCGTAGGTGAAC CTGCGG3' and ITS4 (Reverse) 5'TCCTCCGCT TATTGATATGC3' preliminaries (Rajaratnam and Thiagarajan, 2012). Polymerase chain response was performed for 40µl response blend containing 4µl of 1x Taq support with MgCl<sub>2</sub>, 4µl of dNTPmix, 1µl each of forward and turn around ground works, 0.6µl of 3U Taq DNA polymerase, 1µl (50ng) of layout DNA and 28.4µl sterile water. Enhancement was completed with an underlying denaturation at 94°C for 4 minutes, trailed by 35 cycles of denaturation at 94°C for 1minute, toughening at 59°C for 30 seconds and augmentation at 72°C and a last expansion at 72°C for 10 minutes. Intensified item was isolated by 1% agarose gel electrophoresis and recorded utilizing gel documentation unit (Alpha

Innotech). The intensified band is secluded by utilizing Genjet Elution kit™ (Thermo Scientific). The purged PCR item was sequenced (Scigenom Pvt. Ltd., Kerala). The BLAST look for arrangement homology was performed with the grouping information accessible at National Center for Biotechnology Information (NCBI) for recognizable proof of the three mushrooms.

### NUTRITIONAL IMPORTANCE OF MUSHROOMS

Nourishment is one of the fundamental worries of the majority of the social orders of the world. Nourishment supply ought to be both an affordable and natural subject. Wellbeing and nourishment include adjusted and adequate useful sustenance parts. Adequate day by day calorie admission is the primary issue of creating nations. The general population can't supply a satisfactory admission of basic sustenance mixes, for example, proteins containing fundamental amino acids, nutrients, minerals and basic unsaturated fats. The creating nations need to give fundamental nourishment segments to sustenance. Eatable mushrooms have these fundamental mixes and practical substances. Mushrooms exist in different assortments. Macrofungi, for example, mushrooms, puffballs and morels are significant dietary segments in numerous nations of the world (Gbolagade *et al.*, 2006). In excess of 2000 types of mushrooms exist in nature, however less than 25 species are acknowledged as nourishment and just a couple of them (*Agaricus bisporus*, *Pleurotus* spp., *Lentinula edodes*, *Volvariella volvacea*, and so forth.) have achieved the dimension of a thing of business (Kalmış *et al.*, 2011). Healthy benefit of mushrooms depends to a great extent on the compound organization of the manure on which they are developing (Goyal *et al.*, 2006). Mushrooms are viewed as solid sustenance in light of their high and subjectively great protein content, low fat and cholesterol substance, minerals and nutrients. Auxiliary polysaccharides and proteins include the primary segments of dry issue, while the lipid substance is low. Chitin, glycogen, mannitol and trehalose are ordinary sugar constituents of macrofungi. The extent of basic amino acids is healthfully ideal, while the substance of n-3 unsaturated fat is irrelevant in it. Macrofungi have high vitality content, high extent of inedible fiber, explicit β-glucans, anti oxidative and season which incite the enthusiasm of the two scientists and shoppers (Kalac, 2009).

### RESULTS AND DISCUSSION

The white jam growth was gathered from woods of Sakaleshpur, Hassan locale and the dark colored parasite was from Dakshina Kannada area of Karnataka. Fruiting groups of the two Jam mushrooms was delicate, rubbery/coagulated; translucent. One strain was white in shading and the other was dim dark colored. The organic product body was sessile to sub stipitate and reniform to half circle estimating from 6 to 10 cm width. The pileus with translucent hairs at the dorsal side, hymenium prominently meruloid to porose reticulate with veins and pale hyaline cream shading. The mushroom develops gregariously on rotting wood. Pileus made up of thickly compacted gelatinised hyphae with cuticular hairs with adjusted tips. The basidia were barrel shaped  $42 \times 4 \mu\text{m}$  in size with 3 transverse septa. The spores are allantoids with 2 – 3 noticeable oil globules estimated  $11 \times 5 \mu\text{m}$ . In view of the above phenotypic characters both the strains of mushrooms were recognized as *Auricularia delicate* white and dark colored strains (Sarma *et al.*, 2010).

Fruiting body of the cloud ear fungus documented from Dkshina Kannada district of Karnataka was coagulated, horizontally connected to the dead wood. Stipe is short and the fruiting body was dim dark colored. Basidia round and hollow, hyaline, tri – septate, spores are hyaline, reniform to allantoid, measure was  $15 \times 4-5 \mu\text{m}$ . Pileus actually resembled creature's ear (Sarma *et al.*, 2010). Intensified result of ITS area sequenced and impact looked at NCBI Gen Bank indicated 89 % homology with *Auricularia polytricha*. In this way, the mushroom was distinguished as *A. polytricha*.

The natural product assortment of Snow parasite recorded from Shimoga region was thick, white and lustrous or translucent. Breadth of the fruiting body extended from 3.5 to 9.5 cm. The fruiting body was erect with stretched fronds. Hyphae are cinched and happen in a thick coagulated lattice. Haustorial cells emerge on the hyphae, basidia with diagonal to vertical septa. The spores are ellipsoid, smooth, estimated  $8 \times 6 \mu\text{m}$ . In view of these phenotypic characters the mushroom was distinguished as the sort *Tramella* (Moore

and O'Sullivan, 2014). Further the mushroom species was recognized by utilizing ITS area arrangement. The grouping of the organism when impact looked with NCBI Gen Bank indicated 99 % homology with *Tremella fuciformis*. Thus, the mushroom was affirmed as *T. fuciformis*. Thus, Spatula-formed yellow jam organism was gathered from Dkshina Kannada and distinguished. Spores of this growth were ellipsoid with smooth-surface and translucent. Normal size of the spore was 8 X 3 m, develop in groups. The ITS arrangement of 447 bp indicated 96 % homology with *Dacryopinax spathularia* of the class Dacrymyetes. The arrangements of the three mushrooms were submitted to NCBI Gen Bank and promotion numbers (*Auricularia polytricha* KU 703667; *T. fuciformis*. KU703666; *D. Spathularia* KU703668) were gotten.

There are provides details regarding documentation of mushrooms from backwoods of Western Ghats however constrains the record of Jelly growths (Pandey *et al.*, 2012). Usha *et al.*, (2014) detailed the event of *T. Fuciformis* from Kodagu district of Karnataka. *Tremella fuciformis* has both therapeutic and culinary employments. The polysaccharides and steroids it contains supposedly have antitumor and calming properties. The white jam parasite can be incorporated into pastries and added to soups and different dishes (Hall *et al.*, 2003) and the fruiting assemblages of *A. polytricha* are valuable adsorbent to expel emulsified oil from water (Yang *et al.*, 2014). Be that as it may, event of Jelly mushrooms were accounted for to be one percent of the all out mushrooms (Krishnappa *et al.*, 2014). In this manner, there is a need to investigate an ever increasing number of types of jam organisms, culture and moderate them for further examinations as mushrooms are intriguing animals in nature.

## CONCLUSION

Mushrooms are available in changed kinds of natural conditions and help in a few different ways during the time spent bioremediation. They assume boss job during the time spent disintegration and supplement cycling. Next to their commitment in keeping up the natural equalization they by and large have every one of the supplements in great amount which are fundamental for the human. Presently multi day's a large portion of the creating nations confronting the issue of hunger consequently mushroom can conquer this major issue. It is fascinating to take note of that mushrooms have been reasonably misused as drugs too. The creators wish to express gratitude toward Head, Department of Applied Botany Kuvempu University, Shimoga for giving essential laboratory specialities.

## ACKNOWLEDGMENTS

Authors are appreciative to the UGC, MRP, Govt. of India, New Delhi for money related help to complete this examination.

## REFERENCES

1. Ananda. K, Sridhar K. R., (2002). Diversity of Endophytic Fungi in the Roots of Mangrove Species on West Coast of India. *Can J Microbiol.* 48: 871-878.
2. Arora. D., (2008). Notes on Economic Mushrooms: Xiao Ren Ren: The Little People of Yunnan. *Econ Bot.* 62: 541-544.
3. Atri. N. S., Akaur. S. S., Saini., (2000). Taxonomic studies on *Agaricus* from Punjab Plains. *Indian J Mushroom.* 18: 6-14.
4. Berochers. A.T., Stem. J. S., Hackman. R. M., Keen. C. L., Gershwin. M. E., (1999). Mushrooms, Tumours and Immunity. *Proc Soc Exp Biol Med.* 221: 281-293.
5. Bilgrami. K. S., Jamaluddin,. Rizvi. M. A., (1979). The Fungi of India Part I (List and References). Today and Tomorrow's Printers and Publishers, New Delhi.
6. Bilgrami. K. S., Jamaluddin, Rizvi. M. A., (1981). The Fungi of India Part Ii (List and References). Today and Tomorrow's Printers and Publishers, New Delhi.
7. Bilgrami. K.S., Jamaluddin, Rizvi. M. A., (1991). The Fungi of India Part Iii (List and References). Today and Tomorrow's Printers and Publishers, New Delhi.



**Dr. Ashok Chittaragi**

Department of P. G. Studies & Research in Applied Botany, Mycological Laboratories,  
Bio-Science Complex, Jnana Sahyadri, Kuvempu University, Shankaraghatta, Shivamogga  
(Dist), Karnataka, India.