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MORPHOLOGICAL CHARACTERIZATION OF EDIBLE MUSHROOMS FROM DIFFERENT FOREST REGIONS OF MALNAD KARNATAKA, INDIA

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ABSTRACT :

A few eatable plump growths develop wild in Western Ghats region of Malnad Karnataka timberland during the stormy season on dead and rotting plant or creature remains. Neighbourhood clans gather various mushrooms and eat during blustery season. The conventional recognizable proof learning among the clans are pursued from age to age. The bio-assorted variety in the mushrooms is least reported in India. The germplasm gathering of such mushrooms is poor. These beefy parasites are clearly nontoxic as these have been close human utilization since vestige. Anyway there are just couple of types of beefy organisms which have been acknowledged as sheltered sustenance by the enlightened world, while numerous plump parasites have not yet perceived. Field overview was led for gathering of different palatable plump organisms from various territories of the Malnad Karnataka woodland. The gathered eatable plump growths were contemplated for their plainly visible detail partening the propensity, environment, morphology and other phenotypic parameter noted in crisp structure.

KEY WORDS: *Palatable beefy organisms, Gathering recognizable proof, Morphology.*

INTRODUCTION

The extension is boundless and this is high time to study, gather, ration, record and distinguishes the biodiversity as a rule and contagious assorted variety specifically as nobody knows when and how some these significant structures may be lost for eternity. A methodical investigation of the palatable beefy organisms will investigate the likelihood for the logical development of the growths in the inborn zone for their wholesome security. This might be additionally useful in the upliftment of the woodland occupants and clans' relying upon backwoods produces. Ethno mycology alludes to the connection among Man and growths. Human relationship with mushroom growths is from the days of yore as wild mushrooms are gotten and eaten by humankind since vestige. A huge number of years back, fructifications of higher growths have been utilized as a wellspring of nourishment because of their appealing flavor and taste (Rai, 1997). Mushrooms are effective degraders of dialect celluloses; henceforth they assume a fundamental job in biodegradation. A few mushrooms have pharmaceutical esteem, for example, antimicrobial, anticancer, cell reinforcements and so on, (Chadha and Sharma, 1995).

Mushrooms develop during blustery season when climatic conditions are cool and damp. Decent variety of mushroom species changes as indicated by the environment and their natural surroundings. Shimoga district is in the core of Western Ghats, which is one of the problem areas of biodiversity in India. This area goes under south-eastern transitional zone and gets a normal yearly precipitation of 2869 mm (Bhat *et al.,* 2012) making a perfect living space for blossoming assortment of mushrooms. Characterizing the number and sorts of growths on earth has been a point of exchange and a few examinations have concentrated on identifying the world parasitic assorted variety (Crous *et al.,* 2006). Just a small amount of all out parasitic riches has been exposed to logical examination and mycologists keep on unwinding the unexplored and shrouded riches. 33 % of parasitic decent variety of the globe exists in India and of this lone 50 % are described up until now (Manoharachary *et al.,* 2005).

Mushrooms are vaporous and vanish inside multi day. Hence, documentation of mushrooms needs consistent overview during suitable season. Mushrooms can be distinguished dependent on their morphological and sub-atomic characters. The Phenotypic characters incorporate the shape, measure, surface, shading and scent of the fruiting body. Atomic apparatuses, for example, 18S rRNA/ITS (Internal deciphered spacer) area can be utilized to distinguish mushrooms at any stage (Rajarathnam and Thiagarajan, 2012). A few wild parasites were archived somewhere else and distinguished utilizing ITS arrangement (Oyetayo, 2012). In this investigation, we report atomic portrayal of 11 mushrooms archived from Shimoga district of Western Ghats.

MATERIALS AND METHODS

Collection and Documentation of Mushrooms

Field review was made to report the wild mushrooms in woodland zone of Shimoga locale (Shimoga, Siddapura, Agumbe and Theerthahalli) of Karnataka from June to September 2013. The study was done with the assistance of data given by ancestral networks like Adivasis, Halakkivokkals and Siddis in the region during the visits as they knew about mushroom types and period of their appearance. The mushroom tests were gathered in paper packs and field notes like date, climate condition, bounty, natural surroundings and phenotypic characters were recorded. Field study was directed for accumulation of different plump growths from various regions of the Gorakhpur, Vindhyachal, Chunar, and Varanasi. The gathered beefy growths were considered for their plainly visible detail partening the propensity, habitat, morphology and other phenotypic parameter noted in new structure. Standard techniques for gathering, conservation, perceptible and tiny perceptions were recorded. Shading terms and documentations are from Maerz and Paul 1930. portions of every gathering was safeguarded as wet structure in FAA arrangement in glass jostles and dried examples in the mushroom bring forth research facility Institute of Agricultural Sciences, Dharwad. Precious stone of 1, 4-dichlorobenzene were utilized to secure dried examples against creepy crawly invasion. Some gathered eatable plump growths were likewise refined and kept up for additionally considered.

MOLECULAR CHARACTERIZATION

Genomic DNA Isolation

Absolute genomic DNA from top tissue was separated utilizing CTAB technique (Sambrook *et al.,* 1989). The DNA acquired was put away in Tris-EDTA (10:1) cushion at - 20°C. The DNA fixation was estimated utilizing nano drop (Eppendorff) and after that PCR enhancement was done in 40 µl response blend containing 4.0µl of 10 X PCR Taq. Cushion, 4.0 µl of 10 mMdNTP's blend, 2.0 µl of ITS ground works (ITS1-5'TCCGTAGGTGAACCTGCGG3' and ITS4-5'TCCTCCGCTTATTGATATGC 3', 0.6 µl of Taq. DNA polymerase, 2.0 µl of Template DNA (~50 mg) and 27.4 µl of sterile refined water.

PCR amplification and elution

The PCR response was done in a Thermal Cycler (Applied Biosystems). Customized as introductory denaturation at 96°C for 3 min, 40 cycles of denaturation of 94°C for 1 min, strengthening at 60°C for 30 sec and expansion at 72°C for 1 min and last augmentation at 72°C for 10 min. The intensified items were

isolated by agarose gel electrophoresis. The gel was imagined under UV light and archived utilizing Alpha Innotech Gel documentation unit. The enhanced item was eluted utilizing Gene JET™ Gel Extraction Kit (Thermo Scientific) after maker convention. The eluted item was cloned into pTZ57R/T cloning vector utilizing Ins T/A clone PCR item cloning pack [MBI, Fermentas Life Sciences, USA (#K1214)] subsequent to deciding the proper vector: embed proportions (Sambrook *et al.,* 1989). The ligation response was performed in a 10µl response volume at 16°C medium-term. The ligated item was changed in to *E. coli* (DH5a) cells utilizing warmth stun technique (Sambrook *et al.,* 1989) and plated on Luria Berton (LB) agar medium containing anti-microbial (ampicillin, 100 µg/ml). The recombinant clones were at first screened by blue white choice, trailed by settlement PCR utilizing M13 forward and switch preliminaries (Sambrook *et al.,* 1989). The changed settlement was increased in LB juices containing 100µl ampicillin for medium-term and the recombinant plasmid was segregated utilizing Gen Elute TMHP Plasmid Mini Prep Kit (Sigma, USA) following the fabricates convention. The confined plasmid was sequenced at Sci Genome Labs Private Ltd. Kerala, INDIA utilizing M13 forward and switches preliminaries.

Sequence analysis and homology search

Succession results were broke down with Vec Screen online programming from NCBI for expelling the vector pollution. Forward and switch preliminary successions were checked against one another by producing the invert supplement of the "turn around" grouping utilizing Fast PCR Professional (Experimental test variant 5. 0. 83) and adjusting it to the "forward" grouping with the assistance of CLUSTAL W Multiple Sequence Alignment Program utilizing the online programming SDSC Biology Workbench (San Diego Supercomputer Center). The full length quality homology search was performed with shoot program of National Center for Biotechnology Information (NCBI) (http://www.ncbi.nlm.nih.gov/BLAST) (Altschul *et al.,* 1990).

RESULTS AND DISCUSSION

Mushrooms have been utilized as nourishment and prescription by the old Egyptian, Greek, Roman and Chinese civic establishments. The assorted variety of growths and their normal excellence possess prime spot in the natural world and India has been a support for these animal types. To comprehend the event, bounty, area or living space and edibility of the mushrooms, customary information of the ancestral people was particularly fundamental, in this way, we looked for resident's learning and went with them during the overview for gathering of mushrooms. Field data of the mushroom species was recorded during gathering. At that point the examples were named as WGM-1, WGM-2, WGM-3, WGM-4, WGM-5, WGM-6, WGM-7, WGM-8, WGM-9, WGM-10 and WGM-11. The natural surroundings were shifted from soil to tree stump and leaf litter as it is an adaptability of the woods biological system which gives differentiated specialty to various sorts of mushrooms under same umbrella. Srivastava *et al.,* (2011) gathered mushrooms having a place with four types of Termitomyces specifically, *Termitomyce sheimii*, *Termitomyces clypeatus*, *Termitomyces mammiformis* and *Termitomyces microcarpus* from Gorakhpur woodland division and described by various morphological characteristics, for example, state of stipe, pileus, edge of natural product body, shade of organic product body, gills, substance, annulus, pseudorrhiza and spore print. Dwivedi *et al.,* (2012) revealed 52 mushroom species from Amarkantak Biosphere Reserve of Madhya Pradesh. Those mushrooms had a place with various genera out of which just 14 mushroom tests were distinguished up to species level.

Sub-atomic devices give progressively exact strategies to recognizable proof of the two prokaryotes and eukaryotes. The eleven mushrooms were distinguished up to species level by utilizing ITS area grouping. PCR enhancement of genomic DNA of the 11 mushrooms in this examination yielded intensified item sizes changing from 455 bp to 773 bp which were relating to practically full length quality succession of ITS. The succession homology of the 11 species went from 83-99 % when lined up with the arrangements present in NCBI Gen Bank. WGM-1 has 98 % homology with *Lentinus squrossulus,* WGM-2 has 99 % homology with *Pleurotus salmoneostramenius*. WGM-3 has 99 % homology with *Termitomyces* sp. WGM-4 demonstrated 97 % homology with *Termitomyces* sp. WGM-5 demonstrated 90 % homology with *Leucoagaricus*

purpureolilacinus, WGM-6 with 83 % homology with *Triholosporum porphyrophyllum*, WGM-7 with 99 % homology for *Agrocybe pediades*, WGM-8 with 99 % homology for *Leucocoprinus birnbaumii*, WGM-9 indicated 99 % homology with Pedoscy phapetalodes, WGM-10 had 89 % homology with *Xylaria* sp. what's more, WGM-11 had 99 % homology with *Antrodia serialis*.

The ITS district/18S rRNA quality arrangement are the most generally utilized systems in sub-atomic phylogenetics of mushroom as these groupings are saved independent of life history and development (Rajaratnam and Thiagarajan, 2012). An eatable mushroom from the Theerthahalli backwoods region of Western Ghats of Shimoga area of Karnataka was distinguished utilizing ITS locale of ribosomal DNA arrangements as *Termitomyces* sp. (Earanna *et al.,* 2013). Our examination reported the wealth of the 11 mushroom greenery from the Western Ghats locale (Shimoga) of Karnataka.

A sum of 778 types of macrofungi having a place with 43 families, 101 genera were counted of which 242 species were distinguished to variety level and 73 were recognized to species level. In damp deciduous woods, aggregate of 280 genera having a place with 41 families and 19 requests were recorded, of which 87.5 % has a place with basidiomycetes (15 orders and 34 families), 11.4 % ascomycetes (4 requests and 7 families), 1.1 % myxomycetes with single family and 68 % of the all out families were observed to be disseminated with under 5 genera. Among the gathered species, *Schizophyllum* sp. was the denser (D=16.48), copious (Ab=164.8) and recurrence (F=0.1). In semi evergreen backwoods, macrofungi with 14 orders, 33 families and 263 genera were distinguished including 96.2 % basidiomycetes (12 requests and 30 families) and 3.8 % ascomycetes (2 requests and 3 families). The *Laccaria* sp. was observed to be denser (D=15.36), plentiful (Ab=256) and recurrence (F=0.06). The Shannon decent variety record and Simpson list, in wet deciduous backwoods were determined to be 5.42 and 0.011 individually. In semi evergreen backwoods, the Shannon decent variety record was 5.57 and the Simpson file was 1.12, which shows the exceptionally high species lavishness and strength of the investigation site.

CONCLUSION

Species decent variety of macrofungi is identified with the specific natural surroundings and environment. Our examination uncovered, gasteromycetes that are adjusted to dry conditions demonstrated to be progressively differing in soggy deciduous timberland. In comparison with the two woods there were no records of family Clavicipetaceae, Geoglossaceae, Hymenochaetaceae, Phallaceae, Pyrenomycetaceae, Schizophyllaceae, Stemonotidaceae and Tuberaceae in semi evergreen backwoods however demonstrating high species wealth, plenitude and strength of species dispersed more than 33 families. Generally speaking macrofungal assorted variety is by all accounts higher in semi-evergreen timberland with higher rises than middle of the road heights of soggy deciduous backwoods. Growing of macrofungi uncovered a great deal of assorted variety. Among the accumulations, the family Tricholomataceae was observed to be prevailing in both the timberlands. We found that natural components like light, temp and RH to enormously impact the development and improvement of macrofungi. For *Dictyophora cinnabarina* a moderate temp of 21^0C was observed to be important for gleba to break (Syed Abrar *et al.,* 2007). Wind was another factor that aided in the spore dispersal in macrofungal assorted variety. Due to a moderate breeze speed the total province of *Coprinus plicatilis* was bothered and there was no sign of its existence. The shading change from light dark colored to olive darker was found in *Clitocybe rivulosa* because of waterlogged condition. The *Lepiota* sp. become just well on the leaf litter that has been deteriorated beforehand by other organisms, for example, *Marasmius* sp. *Stereum ostrea* was included a cooperative association with green growth. Among the gathered examples there were toxic mushrooms like Chlorophyllum and restorative significant species like *Pleurotus, Cordyceps, Ganoderma* and *Phellinus*. Two types of myxomycetes, *Stemonitis axifera* and *Stemonitis splendens* were observed to be least various (Keller and Snell 2002). It likewise included eatable species like *Agaricus, Pleurotus* and *Auricularia* and lasting species like *Ganoderma, Daedeolopsis, Microporus, Xylaria, Polyporus* and *Phellinus*.

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