The Obscure Fungi of Peppara: An Ethnomycological Exploration and Conservation Implications

Meenu R. Mridula*, Suju Skaria

Department of Botany, Mar Ivanios College (Autonomous), Thiruvananthapuram – 695015

***Corresponding Author**

DOI: https://dx.doi.org/10.51584/IJRIAS.2025.101100031

Received: 25 November 2025; Accepted: 01 December 2025; Published: 08 December 2025

ABSTRACT

Ethnomycology, a specialized branch of ethnobotany, explores the dynamic relationships between humans and fungi, with particular emphasis on their roles in traditional and alternative medicine, food, rituals, and ecological stewardship. Among indigenous communities, fungi have long held a place not only as a food source but also as potent agents in folk healing systems, natural therapies, and preventive care. Despite their cultural and medicinal importance, these knowledge systems remain under-documented and increasingly vulnerable to erosion due to modernization, loss of oral traditions, and habitat degradation. This study investigates the ethnomycological practices of the Kani settlement at Chemmankala in the Peppara Forest Range of Kerala, with a focus on fungal diversity, classification, and utilization. Field surveys and semi-structured interviews were conducted with local informants to document fungal species, collection methods, preparation techniques, and perceived therapeutic and nutritional benefits. Particular attention was paid to fungi traditionally used in healing practices, wound care, immunity boosting, and dietary regulation. Specimens were collected and identified through both morphological and microscopic analyses, and their ethnomedical applications cross-referenced with existing scientific literature and pharmacological databases. The findings reveal a rich tapestry of culinary, medicinal, and ecological uses of fungi among the Kani people and underscore deeply rooted traditional conservation ethics that promote sustainable harvesting and habitat care. This study not only contributes to the ethnomycological literature but also reinforces the urgent need to preserve indigenous medical knowledge systems, support biocultural diversity, and promote the integration of traditional health wisdom into broader frameworks of alternative medicine and holistic health.

Keywords: Ethnomycology, Kani tribe, macrofungi, traditional knowledge, Peppara Wildlife Sanctuary

INTRODUCTION

Ethnomycology provides valuable insights into fungal diversity, sustainable harvesting practices, and potential biotechnological applications [1] . As a sub-discipline of ethnobotany, it explores the intricate cultural, medicinal, ecological, and nutritional relationships between humans and fungi, many of which are deeply embedded in indigenous traditions [2]. Despite the vital role fungi play in forest ecosystems and traditional medicine, much of the local knowledge surrounding them remains undocumented, especially in the Global South [3]. As modernization, environmental degradation, and cultural assimilation continue to impact indigenous communities, such ethnomycological knowledge faces the risk of being lost [4]. The Kani tribe, indigenous to the Western Ghats, is one such community whose traditional knowledge of fungi is both rich and fragile [5] . Primarily inhabiting the forests of Thiruvananthapuram district in Kerala and parts of Tamil Nadu—specifically Tirunelveli and Kanyakumari districts—the Kani people represent a small demographic, with an estimated population of 16,181 individuals in Kerala, amounting to only 0.046% of the state's total population [6]. This minimal representation makes their ecological knowledge highly susceptible to loss, as the disappearance of even a few elders could lead to irreversible gaps in oral traditions. Traditionally a nomadic community, the Kani have adapted to settled life while retaining close ties with the forest. Their livelihoods include seasonal collection of forest produce, handicrafts, and cultivation of crops such as tapioca, banana, millets, pepper, coconut, rubber, arecanut, and cashew nut [7] . In earlier times, their social structure was led by a tribal chief known as the Moottukani, but this traditional leadership model has largely diminished under the influence of modernization [8] . As younger generations increasingly move away from traditional practices, the accumulated knowledge on fungi, medicinal plants, and sustainable harvesting methods is at significant risk of erosion [9]. Peppara Wildlife Sanctuary, part of the Agasthyamalai Biosphere Reserve—a globally recognized biodiversity hotspot—serves as the ecological backdrop for this study [10]. Spanning an area of 53 sq. km, the sanctuary includes diverse habitats such as tropical evergreen forests, riparian zones, Myristica swamp forests, and grasslands, all of which offer a favorable environment for fungal growth and diversity [11]. It is administratively divided into core, buffer, and tourism zones, with all 13 tribal settlements, including Chemmankala, located in the buffer zone. Chemmankala, comprising around 15 Kani families, was established as a resettlement colony following the construction of the Peppara Dam in 1983 [6].

Within this richly biodiverse and culturally layered landscape, the Kani community at Chemmankala continues to practice traditional fungal harvesting and usage. Their ethnomycological knowledge—transmitted orally across generations—includes species identification, sustainable collection techniques, preparation methods, and applications in health and nutrition [5]. However, the combined pressures of environmental change, cultural transition, and population dispersal pose a significant threat to the survival of this knowledge. This study, therefore, seeks to document and safeguard the ethnomycological traditions of the Kani people. By aligning indigenous perspectives with ecological and conservation research, it contributes to a broader understanding of human-fungal relationships and reinforces the value of traditional knowledge in sustainable forest management and biodiversity conservation [12]

MATERIALS AND METHODS

This study was conducted in Chemmankala (GPS readings N08°39′35.9″ E077°09′34.1″) Fig. 1,.

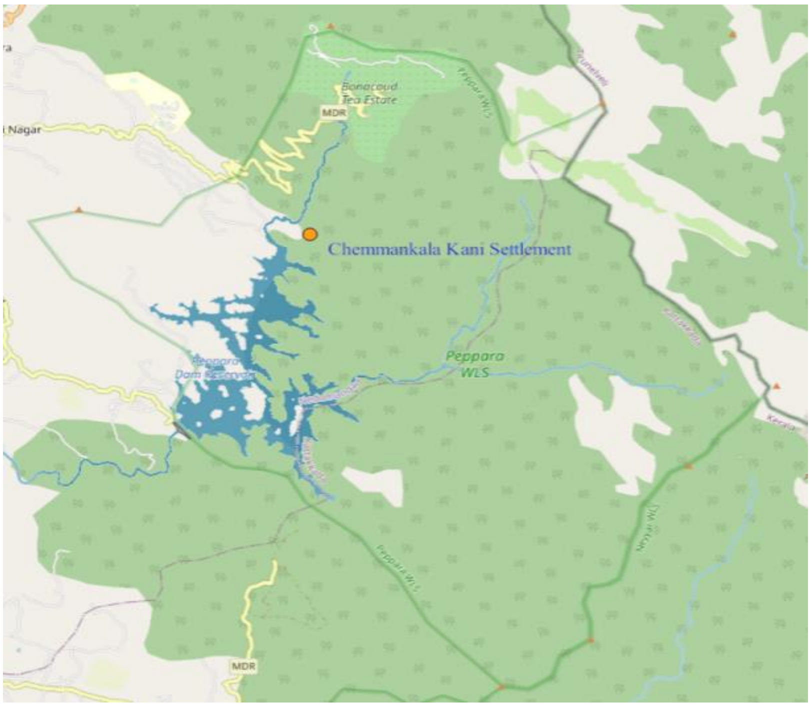

Fig. 1 Map showing the settlement in Thodayar section of Peppara Forest range

A tribal settlement in the Thodayar section of the Peppara Forest Range, selected for its rich biodiversity and the presence of an indigenous community of 15 families facing the risk of displacement due to modernization [6]. Field surveys were carried out in November, during the Thulaam–Vrischikam period of the Malayalam calendar, which corresponds with favorable post-monsoon conditions ideal for wild mushroom emergence [13]. Multiple field visits were undertaken, and data were collected through semi-structured interviews and participatory observation, with the support of key local informants such as Biju and Mohanan Kani. Information documented included vernacular names, collection and preparation methods, and the nutritional, medicinal, and cultural significance of wild fungi within the community . Mushrooms were photographed in situ to document natural morphology and habitat [1] . Specimens were carefully harvested, tagged, and transported in polythene bags to the laboratory. Macroscopic features such as cap structure, gill attachment, color changes, and substrate association were recorded in detail [14]. Specimens were oven-dried at 45°C and stored with silica gel to preserve their structure for microscopic analyses [15]. Detailed morphological examination was conducted under the guidance and supervision of Dr. Lulu Das, Professor of Plant Pathology and Principal Investigator of the AICRP on Mushrooms at Kerala Agricultural University. Microscopic examination involved preparing free-hand sections of dried material (lamellae, pileal context, partial veil) and observation under an Olympus Microsystems at 100x magnification [16]. Features measured included spore, basidia, cystidia, and presence or absence of clamp connections. Identification was supported by comparisons with standard mycological references [17].

RESULTS

The collection includes both basidiomycetes and ascomycetes, with representatives found on decaying wood, termite mounds, and even herbivore dung, highlighting the ecological diversity of macrofungi associated with the Kani tribal region. Each species not only contributes to forest nutrient cycling but also holds cultural significance through traditional ethnomycological uses. Features such as basidiospore shape, size, color, and ornamentation were observed using compound microscopy, along with the presence or absence of clamp connections, cystidia, and hyphal types (monomitic, dimitic, or trimitic). A total of eight macrofungal species were identified in this study, encompassing a diverse range of morpho-anatomical and ecological traits. These species belong to five fungal orders: Polyporales (*Abortiporus biennis*, *Microporus xanthopus*), Agaricales (*Psilocybe coprophila*, *Schizophyllum commune*, *Termitomyces microcarpus*), Hymenochaetales (*Phellinus rimosus*), Xylariales (*Daldinia concentrica*), and Auriculariales (*Auricularia auricula*) (Table 1. Fig. 2.)

Table 1: Taxonomic classification of macrofungal species documented from the Kani tribal region.

Scientific Name	**Phylum**	**Class**	**Order**	**Family**	**Genus**
Psilocybe coprophila	Basidiomycota	Agaricomycetes	Agaricales	Hymenogastraceae	*Psilocybe*
Schizophyllum commune	Basidiomycota	Agaricomycetes	Agaricales	Schizophyllaceae	*Schizophyllum*
Termitomyces microcarpus	Basidiomycota	Agaricomycetes	Agaricales	Lyophyllaceae	*Termitomyces*
Auricularia auricula	Basidiomycota	Agaricomycetes	Auriculariales	Auriculariaceae	*Auricularia*
Phellinus rimosus	Basidiomycota	Agaricomycetes	Hymenochaetales	Hymenochaetaceae	*Phellinus*
Abortiporus biennis	Basidiomycota	Agaricomycetes	Polyporales	Polyporaceae	*Abortiporus*
Microporus xanthopus	Basidiomycota	Agaricomycetes	Polyporales	Polyporaceae	*Microporus*
Daldinia concentrica	Ascomycota	Sordariomycetes	Xylariales	Xylariaceae	*Daldinia*

Figure 2: Macrofungi identified in the study 1. *Psilocybe coprophila* 2. *Schizophyllum commune* 3. *Termitomyces microcarpus* 4. *Auricularia auricula* 5. *Phellinus rimosus* 6. *Abortiporus biennis* 7. *Microporus xanthopus* 8. *Daldinia concentrica*

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue XI November 2025

Schizophyllum commune exhibited characteristic split gill lamellae with hyaline, curved basidiospores, while *Microporus xanthopus* showed trimitic hyphal systems with thick-walled skeletal hyphae. *Auricularia auricula* was distinguished by its gelatinous basidiomata, long cylindrical basidia, and allantoid spores. The identification of *Daldinia concentrica* was supported by the presence of carbonaceous stromata and dark, ellipsoid ascospores with a distinct germ slit (Table 2).

Table 2: Diagnostic characters and microscopic features of macrofungal species recorded in the study.

Species	Identifying Characters	Spore Profile & Microscopy
Phellinus rimosus	Woody perennial basidiocarp with cracked, zonate, dark brown surface. Found on hardwoods.	**Spores**: Ellipsoid to subglobose, 4–6 × 3–4 µm, brown, thick-walled. **Basidia**: Not prominent; often replaced by basidioles. **Cystidia**: Absent. **Clamp**: Present.
Daldinia concentrica	Globose stromata, black outer surface, internal concentric rings.	**Spores**: Ellipsoid to fusiform, 12–18 × 6–8 µm, smooth, dark brown, with straight germ slit. **Basidia**: Not applicable (ascomycete). **Asci**: 8-spored. **Clamp**: Absent.
Abortiporus biennis	Irregular, polyporoid, pinkish to tan cap, pores labyrinthine or radial.	**Spores**: Ellipsoid, 4.74–5.54 × 2.74–3.40 µm. **Basidia**: Clavate, 4-spored, ~25 × 7 µm. **Cystidia**: Rare, fusoid to ventricose. **Clamp**: Present.
Psilocybe coprophila	Small brown cap, on dung; hygrophanous, lacks veil.	**Spores**: Ellipsoid, 11–14 × 7–8 µm, dark purplish-brown, germ pore present. **Basidia**: 4-spored, clavate, ~20 × 8 µm. **Cystidia**: Cheilocystidia lageniform. **Clamp**: Present.
Schizophyllum commune	Fan-shaped, whitish-grey, split gills (schizohymenium).	**Spores**: Cylindric to curved, 4–6.5 × 1.5–2 µm, hyaline, inamyloid. **Basidia**: 4-spored, curved. **Cystidia**: Absent. **Clamp**: Present.
Auricularia auricula	Ear-like, gelatinous basidiocarps, rubbery, translucent brown.	**Spores**: Allantoid, 15–22 × 5–7 µm. **Basidia**: Long, tubular, 65–85 × 4–5.5 µm, transversely septate. **Cystidia**: Absent. **Clamp**: Present.
Termitomyces microcarpus	Greyish-brown umbonate pileus; white free gills; long pseudorrhiza; associated with termites.	**Spores**: Ellipsoid to ovoid, (6.5-)6.5–8.4 × (4.1-)4.1–5.4 µm; Q = 1.32–1.82, smooth, hyaline, thin-walled. **Basidia**: Clavate, 4-spored, 19–22 × 7–9 µm. **Cystidia**: Few, clavate to pedunculate. **Clamp**: Absent.
Microporus xanthopus	Zonate cap, bright yellow stipe base, leathery texture, central stipe.	**Spores**: Ellipsoid, 3.5–4 × 2–2.5 µm. **Basidia**: Narrowly clavate, 4-spored. **Cystidia**: Absent. **Clamp**: Present.

Psilocybe coprophila, commonly known as the dung-loving *Psilocybe*, is a small brown mushroom that grows exclusively on herbivore dung, including that of wild elephants. It has a convex, smooth cap that darkens as it matures. The gills are attached, becoming darker with spore maturation. The fungus aids in dung decomposition, enriching the soil. The Kani community uses *Psilocybe coprophila* as an ingredient in the preparation of traditional hair oil. *Schizophyllum commune*, known as the split gill fungus, is widely distributed and grows on deadwood. It has small, fan-shaped fruiting bodies with a white to grayish fuzzy surface. Its

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue XI November 2025

defining feature is the split gills, which allow it to survive desiccation. Although not widely consumed, members of the Kani tribe roast and eat *Schizophyllum commune* when other food resources are scarce. *Termitomyces microcarpus* is a fragile mushroom that forms tight clusters, with immature fruiting bodies resembling grains of rice, hence its local name "Ari Kumil" (Rice Mushroom). It grows in association with termite mounds. This is an edible species highly valued by the Kani community for its taste and nutritional benefits. *Auricularia auricula* is commonly known as the wood ear mushroom. It has a moist, brown, ear-shaped fruiting body and grows on decaying wood. It is gelatinous and flexible, with a rubbery texture. This fungus is used as food by members of the Kani community. It is carefully wrapped in *Ochlandra* leaves, seasoned with salt, and roasted over embers before consumption. *Phellinus rimosus* is a wood-decay fungus that causes white rot in hardwood trees, primarily found on the trunks of older jackfruit trees (*Artocarpus heterophyllus*, Family Moraceae). The fruiting body (basidiocarp) is perennial, hoof-shaped, and yellowish-brown, darkening and developing cracks with age. The pore surface is brown, with small, round pores. This fungus plays a crucial role in decomposing dead wood and recycling nutrients in forest ecosystems. The Kani community uses it as a medicinal treatment for mumps. The matured basidiocarp is detached, ground into a fine paste with water, and applied over the chin and cheeks. The community reports significant relief from this remedy. *Abortiporus biennis* is a saprobic fungus commonly found on deadwood and tree stumps. It has two distinct forms: a typical polypore with a brown cap and white pore surface that bruises reddish-brown, and an irregular, deformed form consisting of a mass of white pores exuding a reddish juice. The flesh is tough, and when squeezed, it releases pinkish juice. The dried basidiocarps of *Abortiporus biennis* are used by the Kani community as incense to repel mosquitoes. The basidiocarp of *Microporus xanthopus* is stipitate, typically small to medium-sized, with a fan-shaped to semicircular cap measuring 3–8 cm in width. The upper surface of the cap is zonate, displaying concentric bands in shades of brown, reddish-brown, or ochre, with a velvety to finely tomentose texture. The most distinguishing feature is its bright yellow to orange-yellow stipe, which is centrally or eccentrically attached and often solid. The pore surface on the underside is white to cream-colored, turning slightly brownish with age or bruising. The pores are small, round to angular, typically 5–7 per mm. *Daldinia concentrica* produces hard, rounded black fruiting bodies resembling lumps of coal. When sliced open, it reveals concentric rings of gray and black, marking seasonal growth. It grows on decaying tree trunks, particularly in deciduous forests. The fruiting body has a firm texture and is capable of smoldering slowly, making it useful as natural tinder for fire-starting. Members of the Kani tribe use it to treat burns. The fungus is placed on affected areas to provide a cooling effect and alleviate discomfort.

DISCUSSION

Tribal societies across the world depend extensively on forest ecosystems for sustenance, health, and culture [18]. India, with its expansive forest cover and one of the largest tribal populations globally—comprising nearly 8% of the country's total population—hosts an extraordinary wealth of ethnobotanical knowledge [19,20]. The potential for ethnobotanical and ethnomycological research in India is vast, enriched by fieldwork in diverse ecological zones. Pioneering contributions to Indian ethnobotanical research include the works of Jain in Madhya Pradesh [21, 22, 23] , Goel et al. in Bihar [24] , Gupta in Himachal Pradesh [25], and Ayyanar & Ignacimuthu in Tamil Nadu [26]. In Kerala, serious documentation began with Manilal's seminal work [27], which recorded 26 primitive rice varieties used by tribal groups in the Malabar region. The discovery of *Trichopus zeylanicus*—a plant revered by the Kani tribe for its rejuvenating properties—and its subsequent study by Pushpangadan et al. [5] highlighted the pharmacological promise of tribal knowledge systems.

Within this ethnobotanical context, wild mushrooms represent a unique intersection of food, medicine, and cultural practice. In a landmark study, seven ethnomycologically significant mushroom species belonging to the Division Basidiomycota were identified: three with medicinal uses, three as food sources, and one employed as incense for mosquito repulsion [28, 17]. Of particular note is *Phellinus rimosus*, traditionally used to treat mumps—a use first documented by Ganeshlg [29], who noted that "the basidiocarp of this mushroom has been reported to be used by some tribes in Kerala (India) for curing mumps." Modern scientific studies have since validated several bioactivities of *P. rimosus*, including its hepatoprotective [30], antioxidant [31], antitumor [32], and antimicrobial [33] properties.

Another notable species is *Daldinia concentrica*, which contains squalene—a compound widely used in cosmetic formulations for its rapid skin absorption and compatibility with vitamins and other oils [34]. Known

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume X Issue XI November 2025

locally as *Thee Kumil*, it is traditionally applied to burns by the Kani tribe for its soothing, cooling effect. The presence of bioactive compounds such as flavonoids, tannins, and alkaloids, known for their roles in wound healing, lends scientific credibility to this indigenous practice [35].

Recent ethnomycological fieldwork conducted among a small Kani community of just 15 families in Chemmankala has revealed a range of novel and lesser-known fungal uses. These findings not only affirm the sophistication of local ecological knowledge but also expand the current scientific understanding of these species. *Phellinus rimosus* continues to be topically applied as a paste for mumps, while *Abortiporus biennis*, locally known as *Kuchi Kumil*, is burned as incense to repel mosquitoes—pointing to a promising area for further research on the role of fungal volatiles as natural insect repellents [36].

One particularly striking observation was the use of *Psilocybe coprophila* in hair oil preparations. While the genus *Psilocybe* is better known for its psychotropic compounds [37], its role in traditional hair care regimes is hitherto undocumented and represents a novel contribution to ethnomycological literature. Similarly, the inclusion of *Schizophyllum commune* in the diet—roasted and consumed despite its tough, leathery texture—challenges prevailing assumptions about its edibility. Given its known immunomodulatory and nutritional potential [38], the consumption practice suggests refined local knowledge regarding preparation techniques that enhance both palatability and health benefits.

Other species such as *Auricularia auricula*, known locally as *Chaevi Kumil*, are roasted before consumption—a practice consistent with its high polysaccharide content and value as a functional food [39]. *Termitomyces microcarpus*, a prized edible mushroom in many indigenous food systems, also features prominently in the community’s diet. This aligns with ethnomedicinal reports of its antimicrobial and immune-boosting properties from other tribal contexts [40].

The clear resonance between traditional Kani ecological knowledge and modern scientific insights underlines the complexity and value of indigenous knowledge systems. However, this reservoir of biocultural heritage faces growing threats from deforestation, urbanization, and shifting socio-economic priorities. With younger generations displaying limited interest in ancestral practices, the continuity of such knowledge is at risk.

Thus, there is an urgent need to document, validate, and ethically integrate indigenous knowledge into modern science—not merely for cultural preservation, but also for unlocking new avenues in pharmacology, food science, and sustainable development. The ethnomycological discoveries from this microcommunity underscore the depth of India’s tribal knowledge base. The novel applications of fungi in hair care, along with unique dietary inclusions such as *Schizophyllum commune*, illustrate the untapped potential that lies in focused, community-specific fieldwork. Future studies should include multi-seasonal surveys (pre-monsoon, monsoon, post-monsoon, and dry periods) to develop a more comprehensive understanding of the fungal diversity utilized by the Kani community.Additionally, phytochemical screening, antimicrobial assays, antioxidant evaluations, and bioactive compound profiling will help scientifically validate the traditional medicinal uses of the recorded fungal species.

REFERENCES

1. Boa E. Wild edible fungi: A global overview of their use and importance to people. FAO Non-Wood Forest Products No. 17. Rome: Food and Agriculture Organization; 2004.
2. Money NP. Mushroom. Oxford: Oxford University Press; 2011.
3. Pradhan P, Nayak A, Dutta S. Ethnomycology: An overview. J Mycopathol Res. 2016;54(1):95–100.
4. Berkes F, Colding J, Folke C. Rediscovery of traditional ecological knowledge as adaptive management. Ecol Appl. 2000;10(5):1251–62.
5. Pushpangadan P, Dan VM. Ethnomedicobotany of the primitive tribes of Kerala. J Econ Taxon Bot. 1984;5(2):233–46.
6. Kerala Forest Department. Management Plan for Peppara Wildlife Sanctuary 2018–2028. Thiruvananthapuram: Government of Kerala; 2018.
7. Anuradha RV. Sharing with the Kanis. A case study from Kerala, India. InSubmitted to the Secretariat of the Convention on Biological Diversity 1998 May.

8. Bijoy CR. The Adivasis of India – A history of discrimination, conflict, and resistance. PUCL Bull. 2003 Jun.
9. Gadgil M, Berkes F, Folke C. Indigenous knowledge for biodiversity conservation. Ambio. 1993;22(2–3):151–6.
10. Nayar TS. Hotspots of biodiversity in Kerala: Conservation perspectives. Palode: Tropical Botanic Garden and Research Institute; 1996.
11. Mohanan C. Macrofungi of Kerala. Peechi: Kerala Forest Research Institute; 2011.
12. Nair NC, Mohanan C, Manoharan S. Diversity of fungi in the Western Ghats of India. Curr Sci. 2004;87(5):654–7.
13. Nair PV. Medicinal knowledge and health practices of the Kani tribal community: A study from Southern Kerala. J Hum Ecol. 2011;33(3):185–92.
14. Schumacher T. Thomas Læssøe & Jens H. Petersen-Fungi of Temperate Europe, Vol 1-2. AGARICA. 2019 May 1;39:82-3.
15. Das I, Arora A. Alternate microwave and convective hot air application for rapid mushroom drying. Journal of Food Engineering. 2018 Apr 1;223:208-19.
16. Largent DL, Benedict RG. Studies in Rhodophylloid Fungi I. Generic Concepts. Madroño. 1971 Jan 1;21(1):32-9.
17. Karun NC, Sridhar KR. Edible wild mushrooms of the Western Ghats: Data on the ethnic knowledge. Data in Brief. 2017 Oct 1;14:320-8.
18. Martin GJ. Ethnobotany: A methods manual. London: Earthscan; 2004.
19. Jain SK. Glimpses of Indian ethnobotany. New Delhi: Oxford & IBH Publishing; 1981.
20. Ramakrishnan PS. Conserving the sacred for biodiversity management. New Delhi: Oxford & IBH Publishing; 2007.
21. Jain SK. The role of a botanist in folklore research. Folklore. 1964;5:145–50.
22. Jain SK. Medicinal plant-lore of the tribals of Bastar. Econ Bot. 1965;19(3):236–50.
23. Jain SK. Methods and approaches in ethnobotany. Lucknow: Society of Ethnobotanists; 1979.
24. Goel AK, Jain AK, Goel DP. Ethnobotanical notes on the Oraon tribe of Bihar. Indian J For. 1984;7(1):56–62.
25. Gupta R. Indigenous knowledge of the Gaddi tribe on medicinal plants of Himachal Himalaya. J Econ Taxon Bot. 2000;24(3):711–18.
26. Ayyanar M, Ignacimuthu S. Traditional knowledge of Kani tribals in Kouthalai of Tirunelveli hills, Tamil Nadu, India. J Ethnopharmacol. 2005;102(2):246–55.
27. Manilal KS. Botanical history of Kerala. Peechi: Kerala Forest Research Institute; 1981. Pushpangadan P, Rajasekharan S, Ratheeshkumar PK, Jawahar CR. Arogyapacha (Trichopus zeylanicus Gaertn.): The ginseng of Kani tribes of Agasthyar Hills (Kerala) for the enhancement of stamina. Anc Sci Life. 1988;8(1):13–19.
28. Sawhasan A, Mathew J, Lalitha K. Mycological studies of selected macrofungi from the Southern Western Ghats, India. Mycosphere. 2011;2(5):507–20.
29. Ganeshlg V. Ethnomycological studies in Kerala. J Econ Taxon Bot. 1988;12:435–38.
30. Ajith TA, Janardanan KK, Subramanian P. Hepatoprotective and antioxidant activities of Phellinus rimosus (Berk.) Pilat. J Ethnopharmacol. 2006;107(2):151–56.
31. Lekshmi PC, Ajith TA, Janardhanan KK. Antioxidant activity of Phellinus rimosus. Indian J Exp Biol. 2004;42(3):303–07.
32. Lekshmi PC, Ajith TA, Janardhanan KK. Antitumor activity of Phellinus rimosus. Phytother Res. 2005;19(6):500–03.
33. Ajith TA, Janardanan KK. Antibacterial and antifungal activities of Phellinus rimosus (Berk) Pilat. Indian J Exp Biol. 2003;41(1):1036–39.
34. Environmental Working Group. Skin Deep Cosmetics Database: Squalene . Available from: https://www.ewg.org/skindeep/
35. Cowan MM. Plant products as antimicrobial agents. Clin Microbiol Rev. 1999;12(4):564–82.
36. Nakamura M, Hatanaka T, Nakashima T. Volatile organic compounds as potential mosquito repellents. J Chem Ecol. 2006;32(6):1239–46.
37. Stamets P. Psilocybin mushrooms of the world: An identification guide. Berkeley: Ten Speed Press; 1996.

38. Ooi VEC, Liu F. A review of pharmacological activities of mushroom polysaccharides. Int J Med Mushrooms. 1999;1(3):195–206.
39. Ng TB, Liu F, Wang ZT. Polysaccharide-protein complexes from mushrooms: A review on their isolation process, structural characteristics and bioactivities. Life Sci. 2002;71(16):1831–43.
40. Acharya K, Mukherjee S, Mitra P, Rai M. Pharmacognostic standardization of Termitomyces microcarpus R. Heim. Int J Pharmacogn Phytochem Res. 2012;4(2):92–95.