
Psychedelic Mushrooms- Genus Psilocybe: Past and Present Scenario

Geetanjali

Deptt. of Botany, Dev Samaj College for Women, Ferozpur City, Punjab, India

Abstract

Shrooms or magic mushrooms have been used since the ancient times by various cultural groups like Aztecs, Mixes, Mixtecs, Nahua and Zapotecs etc. for the psychoactive purposes. Various carvings, murals statues and sculptures found in caves in Algeria and other parts of the world depict the mushrooms as an integral part of the human race. Teonana'catl (Flesh of God) as these were better known in ancient times were consumed during various religious rituals. Various species of genus Psilocybe have been reported to possess psychedelic properties. Psilocybe, a saprophytic mushroom is found worldwide especially in Neotropics. Ingestion of Psilocybe leads to trance with hallucinogenic effects. Psychedelic properties of Psilocybe have been attributed to two active principles Psilocybin and Psilocin. Use of psychedelic mushrooms was prohibited by the Catholic preachers. However, classic ethnomycological studies began in west and other parts of the world by R. Gordon Wasson, who is regarded as pioneer in partaking rituals involving sacred mushrooms in 1955 in Mexico. He rediscovered their medico religious uses and called them 'Entheogens' to popularize shrooms around the world. Psilocybe was banned in 1970s in United Nations and was classified as class A drug in UN Convention on Psychotropics. Status of genus Psilocybe as shrooms is still a controversial issue, however, after a gap of almost thirty years, genus Psilocybe has made a comeback and the research on its psychoactive properties is catching the interest of the scientists worldwide.

Key Words :- Entheogens, Hallucinogenic, Psychedelic, Psilocybe, Teonana'catl, Psilocybin, Psilocin, Shrooms

Introduction

Over the ages human beings have a symbiotic association with large number of plants. Not only the plants have supplied mankind with the basic needs for food and shelter, but also served in other ways which are though not that much common, yet very significant ones. Plants which are traditionally used for psychoactive actions, i.e. expanding the human consciousness into spiritual state leading to mystic world fall under such category. Almost every indigenous culture used these plants in one form or other. The study of such plants is called 'Entheobotany' or 'Ethnobotany'. Term 'Ethnomycology' was coined by Garrod Wasson for the branch that mainly deals with the anthropogenic use of various fungi especially mushrooms^[1]. A variety of mushrooms possess psychedelic properties, thus have deep roots embedded in various rituals and religious ceremonies of various cultures all over the globe. Psychedelic drugs are categorized as 'Entheogens' means "the realization of God within one's own consciousness" or "the generation of God within". Many plants have been used for improving consciousness or awareness of the self thus easing the path to spiritual world^[2,3]. A vast number of books, articles have been written all over the world after

several investigations on the Psychedelic plants. Most of these studies indicate the use of such substances by religious practitioners and spiritual leaders all over the world. The insight exhibited by these spiritual leaders was most probably due to the knowledge, understanding and experience of pharmacopoeia of certain plants and their active principles. Different tribes used a variety of entheogens for experiencing the God within oneself and the enjoying charm of mystic world.

Mushrooms have been part of human culture as far back as the earliest recorded history. Hallucinogenic mushrooms containing Psilocybin have been probably existed longer than human race. Through out the history, a large number of murals, pictures, carvings, statues and sculptures [Fig.1,2] have been seen depicting the significant role of fungi in the lives of ancient tribes. Ancient paintings of mushroom-ed humanoids dating back to 5000BC-7000BC have been discovered in the caves of Tassili plateau of Northern Algeria. Central and South American cultures built temples to the mushroom gods and carved mushroom stones as early as 1000BC-500AD [Fig.3]. Though the purpose of such creations is not clear, yet supposed to be from some religious point of view. The Aztecs used a hallucinogenic substance called "Teonana'catl" means God's flesh, which they believed were magic mushrooms. These were consumed by various cultural tribes in different parts of the world during different religious ceremonies for trance, illusionary vision, believed to be path to meet God^[4]. The authority, social power held by Shamans led to number of controversies regarding the use of psychedelic substances. It resulted in a campaign leading to demonization and ill reputation of Shamanism as something evil. Thus the sacramental use of entheogens was considered as something bad or evil^[5]. In the recent past, investigations into psychedelic activity of mushrooms has caught spark among the research communities all over the world.

Magic mushrooms or Shrooms as these are commonly called, belong to genus *Psilocybe* falling under family Hymenogasteraceae of order Agaricales. The name *Psilocybe* has been derived from Greek words meaning Bare headed because of its detachable pellicle i.e. loose skin over the cap^[6,7]. Psychedelic properties of *Psilocybe* are attributed to two main active principles- Psilocybin and Psilocin. Ingestion of *Psilocybe* leads to hallucinogenic effect, resulting into trance^[8] due to presence of these alkaloids in it.

Geographical Distribution and Habitat

Genus *Psilocybe* is cosmopolitan, distributed in almost all parts of the world, including Asia, Europe and America^[9,10,11]. Neotropical biome shows maximum species diversity of genus *Psilocybe*. Worldwide approximately 100 psychedelic species of *Psilocybe* have been recorded [Fig.4] *P. azurescense*, *P. cubensis*, *P. semilanceata* and *P. yungensis* are some of the important species. *P. semilanceata* is most widely distributed and most potent species of the genus *Psilocybe*. All species are saprophytic growing on a variety of dead, decaying organic matter including cattle dung. From India, genus has been studied by various workers^[12,13]. Various species of the genus has been reported from the Punjab state as well^[14,15].

Description of genus *Psilocybe*

Psilocybe is a typical gill fungi with 'little brown mushroom' morphology. It is characterized by small to medium sized, yellowish brown fructifications with a typical hygrophanus cap and a thin stipe [Fig.5]. The colour of stipe changes to blue when some injury is caused. The degree of blue reaction indicates the Psilocin content, i.e. more is the content darker is the blue colour. The colour of spore prints vary from lilac-brown to purplish brown. [Fig.6]. Distinct microscopic features include presence of pileipellis with hyphae running parallel to the surface of pileus, forming cutis, absence of chrysocystidia. Spores are smooth, ellipsoid to rhomboid in outline with an apical germ pore^[16,17].

Psychedelic Effects of *Psilocybe* and its Mode of Action

Ingestion of *Psilocybe* leads to trance, hallucinogenic effect. Alkaloids responsible for psychedelic effects are Psilocin and Psilocybin. [Fig.7]. Psilocin is closely identical to Serotonin-a neurotransmitter responsible for happiness and mood swings^[18]. It mimics Serotonin by building 5-HT receptors and produce similar type of effects on CNS. Thus, Psilocin shows an agonistic effect to Serotonin and lead to 'Euphoria'. Earlier it was thought to possess antagonism but research indicate the agonistic nature of Psilocin ^[19]. Though Psilocin is primarily responsible for the psychoactivity, yet unstable because it is lost upon drying or heating. Thus, Psilocybin is indirectly responsible for the psychedelic properties of *Psilocybe*. Psilocybin is a Tryptophan derivative. Tryptophan the only amino acid with indole-Amino ring, on decarboxylation changes into Tryptamine. The latter changes into another psychedelic substances called DMT. Psilocin is formed from it after hydroxylation and two methylations. Phosphorylation of Psilocybin forms Psilocybin, stable active principle.

Ethnographical Details

Psychoactive mushrooms have been reported to being used by a number of culture groups and tribes like Aztecs, Mixe, Mixtec, Nahua and Zapotecs etc. Psychoactive species of *Psilocybe* have a long history of use among the native people of Mesoamerica for religious communion, divine and healing properties from the pre- Columbian era till date^[20]. 'Piltzintecuhtli' was one of the gods being worshipped by Mixtec people [8]. He was considered as considered as god for hallucinogenic plants especially divine mushrooms. The Vienna Codex (Codex Vindobonensis) depicts the ritual use of mushrooms by the Mixtec gods, showing Piltzintecuhtli and seven other gods holding mushrooms in their hands [Fig.9].

Similarly, the Aztec people worshipped 'Xochipilli' –the Prince of Flowers as 'God of Sacred Psychoactive Plants'. He was referred as the divine patron of 'The Flowery Dream' as Aztecs called the ritual hallucinogen trance. Aztecs used a large number of plants including *Psilocybe* for psychoactive purposes. Magic mushrooms or Teonana'catl as these were called were served along with honey during various religious ceremonies. With Cortez's defeat of Aztecs in 1521, use of various non-alcoholic intoxicants including mushrooms was suppressed. Spanish settlers prohibited the consumption of mushrooms due to their catholic beliefs, thus Teonana'catl was driven underground. In 16th century, Bernardino de Sahaun a

Spanish priest wrote about hallucinogenic mushrooms in "Florentine Codex". According to Sahagun, small, black mushroom ingested by Aztec were referred as Teonana'catl-God's flesh. Though the term did not appear to be used by modern Indians or Shamans in Mesoamerica^[21].

By 20th century, use of mushrooms for psychoactive purposes was supposed to have vanished completely. Psychedelic revolution was kick started by R. Gordon Wasson, father of Ethnomycology in 1955. He along with his wife Valentina became the pioneers from West in partaking in rituals in Mexico and experiencing the ultimate under the hallucinogenic effect of magic mushrooms. He popularized the psychedelic actions of mushrooms and even published an article in 'Life' magazine in 1957. Psychoactive mushrooms brought by Wasson from Mexico was identified by Roger Heim in 1956 as *Psilocybe*. Later on, in 1958 Albert Hoffmann reported Psilocybin and Psilocin as two chief psychoactive compounds in *Psilocybe*. There are some controversies over the subject whether or not these 'Shrooms' belong to genus *Psilocybe*. However, Roger Heim identified three species of *Psilocybe* believed to be used in various rituals and religious ceremonies as *P. carulescens*, *P. mexicana* and *P. zapotecorum* ^[22,23,24] similar to mushrooms that comprised of Teonana'catl group of sacred mushrooms including *P. cubensis* ^[25].

Present Scenario

Magic mushrooms after Wasson became popular bohemian drug choice Craze spread ton both the atlantic and Pacific regions. In Tasmania sale of LSD collapsed due to easy availability of magic mushrooms in local markets. However, use of *Psilocybe* was banned in 1970s except for medical research purposes. In United Nations, Psilocybin and Psilocin were categorized under schedule I drugs during the 'Convention on Psychotropic Substances' in 1971. However UN treaties do not apply to cultivation, preparation or international transport of thee mushrooms. In Japan Psilocybin and Psilocin containing mushrooms are categorized as narcotic plants by law in 2003. *Psilocybe* is included in the list of plants published by Spanish Health ministry in 2004, whose sale is forbidden or restricted due to toxicity. Recently after a gap of almost thirty years, research on psychedelic mushrooms have gained momentum^[26,27]. Most of the *Psilocybin* species reported from India especially Punjab have been regarded as harmless, though some of the strains contain enough Psilocybin to be rewarded with the euphemistic label 'active'. However, to produce psychoactive action larger amounts are required ^[28].

Conclusion

A long holy history of psychedelic mushrooms is still a controversial issue. Some of the historians believe that none of this type of evidence in the form of paintings, murals or statues has anything to do with the psychedelic use of mushrooms. They argue people see what they want to see only. However, there are still reports of confirmed use of sacred mushrooms by indigenous populations all over the world. Popularization of Entheogens by Wasson, Timothy Leary and others have no doubt has led to exploring the use of psychedelic mushrooms. Even today sacred mushrooms are regarded as Entheogens by certain cultural groups, propelling them on the religious path leading to the spirit world. However, harmful effects of *Psilocybe* is another major point of concern. Though majority of

the species are reported to be harmless in small quantities, yet consumption of these may have lethal effects. Thus, safety issues are to be taken into consideration of major concern [29]. Considering the international platform for the sale of magic mushrooms, a DNA based approach in being implemented in some forensic laboratories for identification purposes. Yet, there is much more to explore the psychoactivity of genus *Psilocybe* in future as well.

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Figures 1-9:



Fig. 1 : Rock art showing use of mushrooms



Rock art at Selva Pascuala in Spain appears to depict a row of mushrooms. Credit: Juan Francisco Ruiz López

Fig. 2



Various Mushroom Stones (approx. 1 ft tall - 1000 B.C. to 500 A.D.)
Images from *Plants of the Gods* by Schultes & Hofmann

Fig. 3: Carved mushroom gods



Fig. 4: Showing Geographical distribution of *Psilocybin* species



Fig. 5 : Showing morphology of *Psilocybe*



Fig. 6

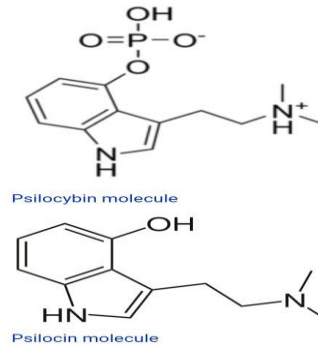


Fig. 7: Chemical Structure of Active principles



Fig. 8



Fig. 9.