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MUSHROOMS: TRADITIONAL NOTIONS AND MODERN INSIGHTS

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ABSTRACT

Mushrooms are incredible organisms that have captivated humans for centuries. They come in all shapes, sizes, colours and can be found in various habitats around the world. Mushrooms are the organisms belonging to the fungi kingdom. While some mushrooms are edible and used in cooking, others are toxic and should be avoided. Alongside the long history of mushroom as food source, there is an equally long history of beliefs of their curative properties both in traditional medicine system and western world orient. In *Ayurveda*, Mushrooms are explained in *Nigantus* under the name *Chatraka*. *Nigantus* also to some extent gives information about various types of mushrooms along with potential health benefits and harm. It is said that mushrooms have an earthy taste like the soil itself and can keep one calm. Many mushrooms are included in daily diet due to their potential health benefits as they are believed to enhance immune function. Here an attempt is made to study the fungi mushroom through classical and current knowledge.

KEYWORDS: Saprophytes, *Chatraka*, *Nigantu*, Mushroom, Nutrition.

INTRODUCTION

Saprophytes are living organisms which survive and feed on dead and decayed remains of other species. They break down complex organic materials into simpler forms and release essential nutrients back to environment. Moulds, mushrooms, yeast, penicillium and mucor are some of the examples of saprophytic fungi.[1]

One such saprophytic fungi is Mushroom. Mushrooms are one of the early known fungi to the mankind. They are widely distributed in tropical and temperate regions. They are attractive in colour, design, and shape. Many mushrooms are edible and have medicinal properties but are deadly poisonous also. Some mushrooms produce hallucinogens on consumed. Mushrooms have received greater attention as food for a healthy life.[2]

The association of humans with mushroom is ancient dating back to centuries. Before the evolution of modern medicine, humans were dependent on nature for the treatment of their ailments as well as for other healthcare needs. In this regard, the use of medicinal plants is well established.[3] Medicinals use of mushrooms have been suggested in the early records of Materia medica and other books. The use and health benefits of mushroom were mentioned in ancient texts of Greek and Roman writers as well as in traditional Chinese medicine and even in *Ayurveda*.[4]

Ayurveda has scientific and holistic approach in health management. *Ayurveda* has given importance to the use of variety of food substances like vegetables, fruits, grains, and meat in day-to-day consumption and in the prevention of disease to maintain long and healthy life.

In the classical *Nigantus* of *Ayurveda* the mushrooms are explained as *Chatraka* under *Shakha varga*. They are said to aggravate all *dosha*. *Ayurveda* categorizes mushroom as *tamasika ahara* and considers them as medicines for enhancing vigour.[5]

Mushrooms have a unique life cycle. They start as spores, which are tiny reproductive cells that are released into the air. When conditions are right, these spores germinate and form mycelium, a network of thread like structures that grow underground or within their food source. Eventually, the mycelium develops into the fruiting body we commonly recognise as mushrooms.[6]

Mushrooms also play an important role in ecosystem. They help decompose organic matter, recycle nutrients, and form symbiotic relationships with plants, providing them with nutrients in exchange for sugars.[7]

OBJECTIVE

To explore the diversity of mushroom through Traditional notions and Modern insights.

MATERIAL AND METHODS

- Detailed literature regarding Chatraka is collected from Nigantus.
- Information on mushrooms is collected from various books, journals and current modern magazines.

RESULT

Traditional notions on Mushrooms

From the ancient classical text books, we can anticipate an idea of mushroom's nature, but specifications about species identification and taxonomic classification is unclear.

Chatraka has been mentioned in *Nigantus* like *Bhavaprakasha Nighantu* and *kaiyyadeva Nighantu*.

1) According to *Bhavapraksha Nighantu*[8]

- *Chatraka* is mentioned under *samswedaja shakha*.
- It is derived from the Basonym – *chatramiva kaayati iti*, meaning - it resembles an umbrella.
- Synonyms mentioned are - *bhumichatram, shileendrakam.*
- It is told that *Chatraka* grows from *kshithi* (earth), *gomaya* (cowdung), *kashta* (waste pieces of wood) and *vruksha* (trees).
- *Guna karma – sheetala*, *doshakaraka*, *picchila*, *guru*, causes *Vamana*, *atisara*, *jwara* and *khaphaja vyadhis*.
- The *Chatraka* which are white, grown in a clean place or on wood, bamboo and cowdung do not aggravate the *doshas*, while others are not good varieties.
- There are various types of *Chatraka* mentioned out of which some are poisonous. It is mentioned by the author that it cannot be concluded only based on textual knowledge about the venemosity of *chatraka* instead it can be found out only by experience. Till the type of *chatraka* is confirmed of its venemosity it is not advisable for using it.
- *Nirvisha chatraka lakshana* – small, 5 to 10 cm wide at head portion, devoid of bad smell, white or pink colour, which grows on stem of other plants, grass or in wastelands, which has lines below the hood are probably considered as non-poisonous.
- *Savisha chatraka lakshana* – it is brittle, head portion is shiny, thin, born in trenches, eaten by worms, appearance of bluish color on breaking, having bad odour, tastes sour

and bitter, bowl shaped hood, on cooking it becomes shiny and yellow in colour, grown under shade and having taste like that of milk is considred as poisonous.

2) According to *Kaiyyadeva Nighantu*[9]

- It is mentioned in *Oushadi varga.*
- Synonyms – *sarpachatra, bhumikanda, bhumispota, chatraka, prutivispota, shileendra, kavaka*
- *Guna karma* of *Chatraka* types is explained as follows:

i) *Bhukanda - madhura rasa, shukrajanaka, balakaaraka, ruksha, sheetala, guru, malabhedaka, durjara, komala, rochaka, atyanta tridoshakaraka.*

ii) *Kshudraka* and *Purishaja bhukanda – kashaya rasa, katu vipaka*

- Other than the above said *chatraka*, various other types can be found. They are having *guru guna*, causes rhinitis and is *tridoshakara*.

They are

a. *Krishna chatraka – madhura rasa, madhura vipaka, guru* and *sheeta ushna guna, kaphavardaka* and *sarvadoshakaraka.*

b. Shwetha chatraka – It has *guru vipaka*

c. Raktha chatraka – It is *swalpa doshakaraka.*

Morden insights on Mushrooms

Fungi are the 2nd largest group of organisms. It is estimated that 15 lakh fungi are present in the world. Only 1.1 lakh have been studied out of which 14000 are mushrooms. Out of these, only 3000 have been considered as edible ones.[10]

Unlike higher plants, mushrooms are devoid of chlorophyll. In the absence of chlorophyll, they cannot produce their own food and depend on other plants for the same. Mushrooms obtain nutrients from organic materials like manure, dung, dead wood, straws etc.[11]

They are classified into different groups based on their physical characteristics such as the presence or absence of gills, spore colour and overall structure. Some common classification includes agaricus, boletes, chanterelles and more. Each group has its own unique features and uses.

Mushrooms are roughly divided into following categories[12,13,14]

1) Edible, non-edible and poisonous mushrooms
2) Medicinal and industrial mushrooms
3) Wild and cultivated mushrooms
4) Miscellaneous

Some of the popular edible mushroom varieties are listed as follows

Agaricus bisporus	Portobello mushroom	This is large, mature version of the common white button mushroom.
Lentinula edodes	Shiitake mushroom	These mushrooms have a distance umami flavour.
Agaricus bisporus	Cremini mushroom	Also known as brown mushrooms. Have deeper flavour and firmer texture.
Morchella sps.	Morel mushroom	They are highly prized for their unique appearance and rich, nutty flavour.
Cantharellus sps.	Chanterelle mushroom	Golden, trumpet shaped mushroom known for their vibrant colour and fruity aroma.

Some of the varieties of non-edible mushrooms

Amanita muscaria	Fly agaric	This mushroom has a bright red cap with white spots. It contains psychoactive compounds and is known for its hallucinogenic properties.
Psilocybe cubensis	Magic mushrooms	This species of mushroom is known for its hallucinogenic properties due to the presence of psilocybin.
Coprinopsis atramentaria	Inky cap mushroom	These mushrooms have a unique characteristic where they dissolve into an inky black liquid as they mature. They are not typically consumed due to their unappetizing texture.
Hydnellum peckii	Bleeding tooth fungus	It has dark red or purple appearance and appears to bleed a red liquid when touched.
Phallus impudicus	Stinkhorn mushroom	This mushroom is known for its foul odour resembling rotting flesh. It attracts flies which help spread its spores.

Some examples of poison inducing mushrooms are as follows

Amanita phalloides	Death cap	Despite its innocuous appearance, this mushroom is highly toxic and can be deadly if ingested. It is considered as one of the most poisonous mushrooms in the world.
Amanita virosa	Destroying angel	It resembles the edible white button mushroom but is highly toxic. It contains toxins that can cause severe liver damage.
Amanita muscaria	Fly agaric	While not usually fatal, this mushroom contains toxins that can cause hallucinations and other unpleasant symptoms.
Gyromitra esculenta	False morel	This mushroom contains toxins that can cause severe illness.
Amanita pantherina	Panther cap	This mushroom contains toxins that can cause gastrointestinal distress and other symptoms.

Mushrooms with proven medicinal value

Ganoderma lucidum	Reishi mushroom	They are believed to have immune-boosting properties. They are often used to promote overall wellbeing and vitality.
Inonotus obliquus	Chaga mushroom	They are rich in antioxidants and are known for their potential anti-inflammatory and immune boosting effects. They are often used to promote general wellness
Hericium erinaceus	Lion's mane mushroom	They are believed to have cognitive benefits and are often used to support brain health and to improve focus and memory.
Cordyceps sinensis	Cordyceps mushroom	They are believed to have energy-boosting and adaptogenic properties and are often used enhance athletic performance and combat fatigue.
Trametes versicolor	Turkey tail mushroom	It is believed to have immune-boosting and antioxidant properties. It is often used to support overall wellness and strengthen the immune system
Psilocybe indica	Magic mushroom	Researchers suggest that this type of mushroom has antidepressant, anti-anxiety effects and can be used in various mental health conditions.

Mushrooms present in the wild

Boletus edulis	Porcini mushroom	They are often found in coniferous forests.
Morchella sps	Morel mushroom	They have honeycomb-like appearance. They can be found in forests.
Laetiporus sulphureus	Chicken of the woods mushroom	This mushroom has vibrant orange or yellow colours. It is typically found on decaying logs or tree trunks.
Grifola frondose	Hen of the woods mushroom	It has frilly appearance. It can be found growing at the base of trees, especially oaks.
Ganoderma lucidum	Reishi mushroom	They are often grown on logs, particularly on oak or maple.

Health benefits of mushroom[15,16]

- Nutrition – Mushrooms are low in calories but high in nutrients. They are a great source of vitamins like Vitamin D, vitamin B, vitamin C, minerals like Potassium, Copper, Selenium, and fibres.
- Immune boosting properties – Some mushrooms like shiitake and maitake contain compounds that have been shown to enhance immune function. These mushrooms are rich in beta – glucans, which can stimulate the activity of immune cells and help strengthen the body's defences against infections.
- Antioxidant power – Mushrooms are packed with antioxidants including selenium and ergothioneine which help neutralize harmful free radicles in the body and reduce

oxidative stress. These antioxidants help protect cells from damage caused by free radicles and reduce inflammation in the body.

- Gut health support – Certain types of mushrooms such as lion's mane and reishi have been linked to improve the health gut. The fibre content in mushrooms along with prebiotic properties can support a healthy gut microbiome and aid in digestion.
- Anti-inflammatory effects – Mushrooms like cordyceps contain compounds that have been shown to reduce inflammation in the body. These mushrooms contain antioxidants and other bioactive compounds that can help combat inflammation and promote overall wellbeing.
- Heart health – some varieties of mushrooms have been shown to help lower cholesterol levels and promote heart health.
- Brain health – Lion's mane mushrooms have been linked to improve cognitive function and may have neuroprotective effects.
- Cancer fighting potential – Certain varieties of mushrooms such as shiitake, maitake and reishi contain compounds like polysaccharides, beta glucans and other bioactive compounds that may help inhibit the growth of tumour, enhance immune function, and even induce cancer cell death.

DISCUSSION

Saprophytes can be classified as decomposers as they feed on dead and decaying organic matter.

Optimal growth of these saprophytes facilitates the presence of favourable environment and balances the eco system.

One such saprophytes mushroom is a fungal fruiting body which produces and disseminates spores. Since it is a fungus, it does not have chlorophyll and cannot produce its own food. It depends on other living or dead organism for nutrition.[17]

There are more than 14,000 types of mushrooms recorded in the current era out of which many are edible whilst some wild types are deadly poisonous.

Mushrooms marked by traditional knowledge[18]

- Species found on fodder plants are generally considered edible.
- Species which can be peeled off easily are edible.

- Species which turn black on touching or after peeling them are said to be edible.
- Species which are having rich, brilliant colours are poisonous.
- Species with more curved pileus and annulus are also said to be poisonous

According to the references of scriptures it is identified that *chatraka* is *Agaricus campestris*.

Edible mushrooms are the ones that are consumed by the humans a food or delicacy. They have desirable taste and aroma. They contain low fat, high proteins, carbohydrates, vitamin E, vitamin B, and bioactive compounds like lentinan and lovastatin.

These mushrooms have a sweet taste and does not sting or burn the tongue. They do not stain green or blue after cutting. The caps of such mushrooms have no scale. Poisonous mushrooms contain toxic compounds like muscarine, ibotenic acid, phallotoxin, gyromitrin, arabitol and ergomitrin. They emit bad odour and are bitter in taste.[19]

CONCLUSION

Mushroom and components present in mushroom have been reported to have a myriad of positive health benefits. Currently, they have received great attention as one of the diets to lead a healthy life. Mushrooms having low lipid and sugar content and being fibrous in nature are recommended as food in various health conditions.

In ayurveda mushrooms are called *chatraka* and are mentioned for the treatment of fatigue and low sperm count. It has the action of *vatapitta shamaka* and *kapha vardhaka*. There are some varieties of chatraka which is *tridoshakara*. Hence care should be taken to select the proper variety of mushroom.

Mushrooms have been used for centuries in traditional medicines and is said to have potential therapeutic properties. Understanding their chemical constituents and their effects on human body can help in developing new medicines as natural remedies.

Mushroom species have extensive potential to be developed as functional food considering their high nutritional value. Mushrooms can also act as a source of biologically active compounds having medicinal importance. The isolated compounds from mushrooms are useful for the prevention and treatment of various health conditions.

Despite all the above attributes, very few mushrooms have been studied and many more await study. Hence there is urgent need to explore these fungi in terms of benefits to a healthy life.

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