A NOVEL AND COST EFFECTIVE APPROACH OF CULTIVATION OF HIGH VALUED MEDICINAL MUSHROOM “SNOW FLAKE CORDYCEPS” ON A NOVEL SUBSTRATE

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INTRODUCTION: There are more than 700 species of entomopathogenic fungi in the world (Kang et al, 2010). *Isaria sp.* (*Paecilomyces sp.*) under ascomycota family, also called as “Snow flake Cordyceps”, are one of the most rare and expensive medicinal mushroom that are entomopathogenic in nature which are known to grow on various insect host, mostly of Lepidopterian species. It is mainly found in mountainous areas of Korea, China and Japan. It is a medicinal mushroom which is being consumed since ancient times. It also been officially classified as a drug in Chinese Pharmacopeia since 1964 and has been approved by traditional Chinese Medicine which has been used since thousands of years in ancient China. It has various medicinal properties such as anti-inflammatory, anti-oxidant, anti-aging, anti-tumour, anti-cancer anti-microbial, larvicidal, anti-diabetic, anti-fatigue, neuroprotective. The medicinal properties are due to various bioactives such as adenoside, exopolysachride, beta glucans, cordycepic acid etc..

It often grows parasitically on Lepidoptera larvae and pupa of insects and other arthropods. The spores of the fungi comes in contact with the insect or larvae and forms germinate by forming germ tube which releases enzymes like cutinase, chitinase and protease to digest outer structure of the insects or larvae and enter the host and infect the body of the host (Tuli et al., 2013).

Naturally it grows in higher altitudes and has longer life cycle thus making it seasonal and hence it is very rare and expensive. This Project relates to cultivation of the medicinal mushroom under controlled condition to mimic its natural condition on various novel host/substrate.

APPLICATIONS:

NUTRACEUTICAL: Important components that are present: Rich in Protein, fat and polysaccharides Vitamins like B1,
B2, B12 and K Bioactives such as Cordycepic acid, Beta Glucans, adenosine etc.

**MEDICINAL:**
It is known to have potential health effect related to anti-diabetes, lipid lowering activity, cholesterol reducing activity, anti-cancer, immune-activator, anti-oxidant, anti-inflammatory, antidepressant, antidiabetic, hepatoprotective and as energy booster.

**COSMECEUTICAL:**
It has properties like anti-wrinkle, antioxidant, anti-aging, skin whitening properties.

**PHARMACEUTICAL:**
Bioactives such as, Cordycepic acid, adenosine and EPS (extracellular polysaccharides), Beta glucans etc. can be extracted and purified.

**OBJECTIVE:**

**OBJECTIVE I:**
Identification and selection of novel substrate/host suitable for cultivation of mushroom.

**OBJECTIVE II:**
Evaluation of its growth on different substrate/host under controlled parameters and standardization.

**METHODOLOGY I:**
1. Procurement of culture and its routine maintenance by subculture on solid agar media such as PDA, SDAY, YGA etc and the standardization of the suitable media, temperature and time required on the basis of the radial growth of fungi.
2. Seed culture preparation by static fermentation/shake flask fermentation and standardization of parameters like temperature, rpm and time required for the fermentation.
3. Identification and analysis of the nutritional content (protein fat fiber content) of substrate/host for selection of suitable host such as pupa of silkworm and substrate like

**METHODOLOGY II:**
1. Study of the cultivation of mushroom on suitable host/substrate by solid/liquid fermentation.
2. Standardization of parameters required for its growth under controlled cultivation.
3. Microscopic studies for formation of spores of the mushroom under 40 X observation using lacto phenol cotton blue stain to determine the maturity of the mushroom.
4. Harvesting and processing of the mushroom such as drying and grinding in powder form.

**OBSERVATION & RESULT:**
Best radial growth of the fungi were observed in PDA within 7-10 days incubated at 23-25 degree C. Better fermentation were found by Shake flask fermentation in 5-6 days at 25-26 degree C at 150-180 rpm which was observed by mycelium growth and pellet formation. Suitable host selected was pupa of silkworm which was selected on the basis of rate of infection.
CONCLUSION:

The natural mushroom is rare as its growth is confined to very less area mainly in high altitude mountains like the Himalayas, Tibetan plateau in China and the mountains of Korea and Japan and it has longer life cycle of one year. Hence, its price has skyrocketed as the supply doesn’t meet the demand. This project focuses on cultivating the mushroom in 2.5 months thus making it available in all season. This Project relates to cultivate mushroom in low cost as compared to the natural ones.
FUTURE WORK:
Scope of identification nutritionally rich novel host or substrate as per its requirement of Carbon and Nitrogen ratio for its growth. and further Cultivation of mushroom.

Analysis of Extracts from dried and powdered Isaria sp. culture using standard methods like HPLC, GC-MS, LC-MS etc.,

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