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THERAPEUTIC PROCESS OF WASTEWATER BY USING MUSHROOM SUBSTRATES

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ABSTRACT

The pollution is increasing very fast in all sense like soil, air, water. The water pollution increases day by day due to incrementing urbanization, industrialization, population magnification etc. and it affects the ecosystem. The degradation of environment results in unpropitious effect on living organisms and agriculture. The goal of the study is to remediate the wastewater by used mushrooms substrates by checking its physio-chemical parameters afore and after the treatment. Mushroom has been utilized as a product for consumption since a long time due to their richness in protein. Mushrooms are withal kenned as mycoremediation implement because of their utilization in remediation of variants of pollutants. Microfiltration is the process of utilizing fungal mycelium as an active biological filter for abstracting pollutants from wastewater. Mushroom cultivation process, management & industrial setup is quite essential aspect to reduce impact on environment and access the situation of cultivation in various conditions leads to sustainable and productive solutions in this field.

Keywords: Mushroom, Mycoremediation, Mycelium, Microfiltration

I. INTRODUCTION

The large-scale application of synthetic compounds in industrial and agricultural sectors has contaminated the natural environment that further led to exacerbating the pollution-related problems in the ecosystem and human health. The rapid industrialization and anthropogenic activities of the present era have further increased environmental contamination with various organic chemicals and inorganic metals, including compounds like pesticides, industrial dyes, petroleum hydrocarbons, pharmaceutical waste and heavy metals. Hence, an effective strategy needs to be developed in order to eliminate pollutants from the environment. Slow sand filtration is a technology that has been used for potable water filtration for loads of years. it's miles a technique nicely-perfect for small, rural groups since it does now not require a high degree of operator talent or attention. As its name implies, slow sand filtration is used to filter water at very slow prices. the standard filtration price is at the least fifty instances slower than for rapid price filtration. Because of this gradual fee of filtration, a big land area is required for the filtration basins. No chemical addition is required for correct filtration operation. Particle elimination is finished mainly via biological tactics that provide treatment.

II. REVIEW OF LITERATURE

Research papers published recently in various international and national journals have been reviewed. Only those papers published in squint reviewed journals have been considered in this literature review. Focus is on cultivation of mushroom and its growth, production, waste generation and treatment, which includes (a) cultivation of mushroom (b) yield performance of mushroom (c) Various effects on environment (d) EIA consideration (e) Industrial waste management. So some are the literatures have taken with considering above core points are as under:

Alka Singh et.al (2018)

describes mushrooms are unusually nutritious products, also it produces the waste materials of the cellulose and lignin. The author has been studied on the Oyster mushrooms with various substrates such as beans, moonbeams, soybeans, straw of wheat, maize stalk and residue of tree parts mainly leaves. We can utilize the any substrate for the production purpose but this paper is related with the efficiency of substrate given at the time of production. Amongst all the result is in favor of wheat straw as it gives better result as compare to other substrates. The minimum yield was shown in maize stalk and some leaves.

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Tanmay Kotasthane (2021)

has worked on Edible mushrooms for morphology and yield performance. Oyster mushroom, milky mushroom and straw mushroom were studied for spawn runs, pin head formation and fruiting bodies. A mixture of sugarcane bagasse, coconut coir, sorghum and maize stalks, dust was used as the substrate. The highest yield was observed for Pleurotus sajor-caju (800.16 g) on a mixture of jowar and maize stalk, followed by P. ostriatus (675.14 g). Good yield of C. indica on straw (500 g). V.volvacea has good yield (550.18 g). These mushrooms may be further explored for their medicinal properties.

III. MATERIALS AND METHODS

(a) Materials :

(1) Soil(Different Types Of Soil)
(2) Culture
(3) Potato - Dextrose Agar Medium (PDA)
(4) Potato -Dextrose Yeast Agar Medium (PDYA)
(5) Malt Extract Agar Medium (MEA)
(6) Compost Extract Agar Medium (CEA)
-Malt Peptone Grain Agar Medium (MPGA)
(7) Water (Treated , Untreated)
(8) Microbes
(9) Spawns
(10) Straw (Different Crops)
(11) Substrates

(b) Methodology:

IV. COLLECTION OF DATA

As discussed in the objectives will collect the data from the mushrooms production house, such as type of soil used in the culture, media, type of mushrooms production, quantity and quality of mushrooms, mushroom samples from various industries. Also to make comparisons of many parameters with the different production industries places at various locations.

V. FIELD EVALUATIONS

On the field will observe the each and every process of mushrooms in its production. For this need to visit two or many locations of mushrooms for the comparative study, and can analyze the different factors with the findings of negative & positive impacts of mushrooms production on the surrounding environment. The reuse or recycling of waste is done on site or not if so then what are the further effects that will look after.

VI. EXPERIMENTAL SETUP

For the method of composting and casting we require some apparatus for testing variant parameters. In this mushrooms production the mainly we will test the soil, culture, temperature, humidity, moisture, biological, chemical etc parameters for further study and comparisons so we need some set up for doing this test as under:

SR NO	NAME OF EQUIPMENT	MEASURING PARAMETERS	INSTRUMENTs
1	Soil testing Machine	Moisture Content	
2	Soil testing kit	Type of soil	

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3	Water testing kit	Water parameter as PH, Temp, turbidity etc	
4	Humidity-Temp tester	Counts humidity and temperature both	
5	Microbial counter	Counts microbes, bacterial colony etc	

List of chemicals for the production and testing purposes are to be required as under:

- Formaldehyde
- Gypsum
- Urea
- DAP or SSP
- MOP

Substrate/organic matter

Disinfectant

Pleurotus Ostreatus Mushroom Production

Button Mushroom Cultivation At Balaji Firm, Nagpur

Pleurotus Ostreatus Mushroom Cultivation At My Place, Ujjain

Pleurotus Ostreatus Mushroom Cultivation At My Place, Ujjain

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VII. METHODS FOR FILTERATION

1. Study area-

The sewage treatment plant (STP) ofUjjain , Madhya Pradesh discharged its water afterthe chlorination process in the fields for irrigation purposes. But, this water is not as much suitable for irrigation because foams are occur in the water due to presence of biodegradable surfactants (e.g. household detergents) from industrial and municipal waste water, excess production of extracellular polymeric substances (EPS) by activated sludge under nutrient condition. So, our aim of study is to check the physico-chemical parameters of the STP water and then remediate it by mycoremediation to make the water suitable for agricultural purposes. In our present study, we remediate the waste water of STP by two methods: Firstly, by Mushroom Extract (M.E.) Secondly, by Microfiltration.

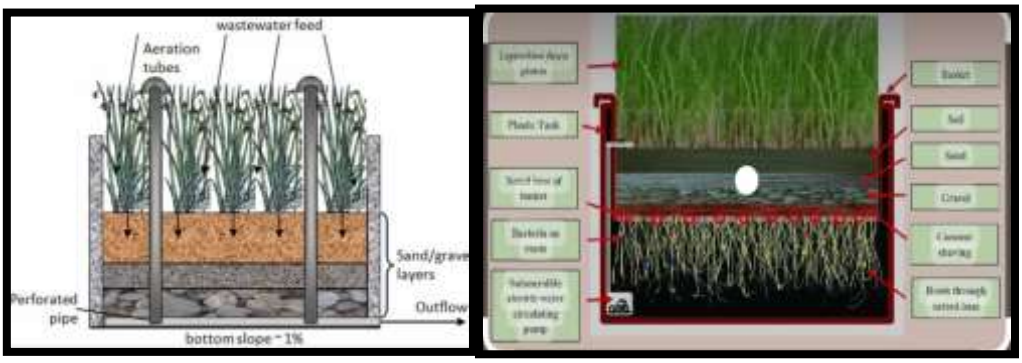
2. Collection of wastewater sample –

The waste water samples were collected from the mounds of the fields in which STP water get discharged for irrigation purposes which are located at Gau Ghat, Hari Phatak , Ujjain , Madhya Pradesh These samples were used for testing the physico-chemical parameters and for the remediation of wastewater by mushroom extract and by mycofiltration in suitable conditions. The testing of samples was carried out at Environmental Engineering Lab, MIT, Ujjain.

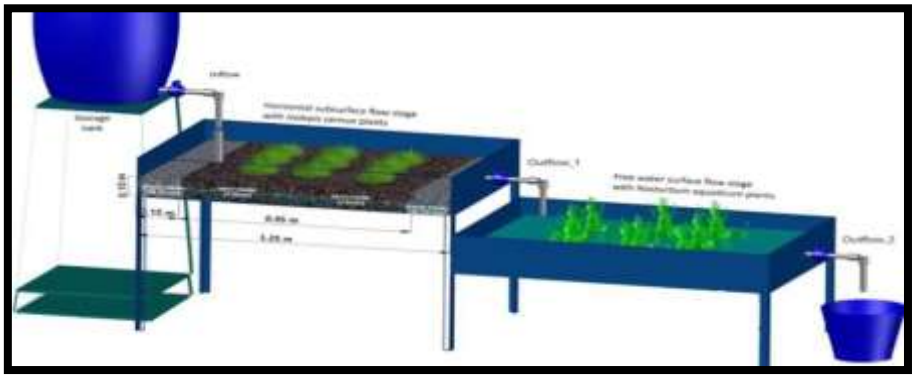
3. Work In Progress-

Analysis of physico-chemical parameters of untreated water, treated by mushroom extract and by mycofiltration Physico-chemical parameters study is very important to get an exact idea about the quality of water and we can compare the results of untreated wastewater with treated water. As the experiment is under process so results are not available. The samples will treat for upcoming months from October 22 to November 22 and December 22. Then data will be taken for three months and the output will be compared by the treated and untreated samples from STP, Ujjain.

VIII. FURTHER STUDY WILL BE CARRIED OUT



Wastewater Feed And Growing Of Species Experimental Set Up Will Be Based On Above Process Shown In Fig



SET-UP –II FOR FILTERATION OF WASTEWATER BY USING MUSHROOM

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IX. CONCLUSION

We have been observed behavior of mushrooms growth under various circumstances and condition for maximum yield to be identified, also the identification, prediction and evaluation of the economic, environmental and social impact on development of mushrooms cultivation activities. With the help of this we can promote environmentally sound and sustainable development through the identification of appropriate favorable alternative conditions for higher growth under diff scenario's and waste management measures. Further we will prepare a eco friendly and the EIA module for wastewater treatment by means of SMS(Spent mushroom Substrate) which will help it to enhance environmental factor.

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