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Editorial Open Access

Perspectives of Bioremediation through Mushroom Cultivation

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Editorial

With the sublime and ultimate aim of improving scientific research, OMICS, an international resource for both scientists and professionals in related field, is dedicated to increase the depth of basic and advanced research across disciplines. Besides publishing high quality peer-reviewed papers covering novel aspects and methods in Science OMICS Publishing Group is using online manuscript submission, review and tracking systems for quality and quick review processing enabling any article to be published in short time. The impact and visibility of the journal is magnified owing to its worldwide access for the readers across the globe while the same enhances indexing, retrieval power and eliminates the need for permissions to reproduce and distribute content. New additional features of this journal includes- DOI-CrossRef, Digital Article, audio version, user friendly / feasible website translation to more than 50 languages and social networking for each published article. Focusing on different aspects of waste remediation and biodegradation techniques to improve the quality of environment the Journal of Bioremediation and Biodegradation is one of the leading journals with high impact factor by the above group thus making it apt to promote awareness and unveil the hidden aspect of bioremediation through mushroom cultivation. Mushroom cultivation is considered to be a good aspect to remediate industrial and agro-industrial wastes. "What are the prospects of mushroom cultivation"- is needed to spread rapidly in the society and is the main aim of present article.

Mushroom farms as disposal sites - have been observed unanimously by the environmentalists, municipal bodies and other communities while researchers are gravitated in testing and using agricultural as well as industrial waste products as substrate for mushroom cultivation [1-5] and left over substrate, after harvesting carpophores (fruiting bodies), as compost [6]. The productivity or biological efficiency of mushroom and waste remediation from the environment has turned out to be of primary concern. This being the one, the other side reveals the influence of waste characteristics on mushroom substrate and subsequently on spent mushroom compost (SMC).

Spent mushroom compost is generated as waste after the harvesting of mushroom crop. Recently, it is proposed to call it as "post mushroom substrate" because it is not really spent and has many uses. The composition of spent mushroom substrate varies depending on the type of mushroom to be cultivated and substrate used. It is proved as an excellent source of humus, although much of its nitrogen content has been used up by the growing mushrooms. It remains, however, a good source of general nutrients (N, P, K plus a full range of trace elements) which make it well suited for supporting plant growth. The abundance and striking physical as well as chemical attributes of spent mushroom substrate can be proved as better alternate to some other mixture of organic waste used for manufacturing compost. The spent mushroom compost is presently transported to local area farms, dumped, and tilled in, thus, relieving pressure to reduce the quantity of organic material sent to landfill sites by utilizing it in agricultural field as nutrient rich organic material which further reduces the cost of landfill tax posed by government. It is widely accepted as good quality compost [7,8], especially, in developing countries where soils are progressively losing organic matter due to intensive cultivation and climatic conditions. Now, the question is- Is it safe to use spent mushroom compost in agricultural field?

The basic properties of compost, developed by using spent mushroom substrate, depend on the characteristics of substrate used for mushroom cultivation. Considerable research has been done on the biochemical analysis of substrate and its effect on agricultural land and soil microbes reported [9,10]. The high concentration of soluble salts and phosphorous may restrict its implementation in agricultural field, though, spent mushroom compost has been used without due consideration of environment and soil quality.

A worst scenario is the use of agricultural and industrial waste for mushroom cultivation as these wastes possess various toxicants and genotoxicants, source being chemicals, dyes, toxic compounds in industrial wastes while pesticides, nematicide, fungicides and chemical fertilizers in agricultural wastes. If chemicals substances reach threshold, they may be enter from spent mushroom substrate to compost. Besides consideration of solid waste remediation through mushroom cultivation, the analysis of pre- and post- cultivation physico-chemical and toxicological characteristics of waste is also required as the former (only) is insufficient.

Mushrooms are found to possess two basic abilities i.e. biodegradation and bioaccumulation, for the bioremediation of waste. Biodegradation ability of mushrooms is due to the presence of many enzymes involved in the degradation of pollutants and solid waste residues [11] though the extent and safe level is unknown. Moreover, mushrooms are known for the bioaccumulation of pollutants or heavy metals from the habitat in which they are growing. Mushroom possesses a very effective mechanism that enables them to take up some trace elements from the substrate. A number of authors have focused on the heavy metal accumulation ability of mushroom [12,13]. The research is also focused on the toxicity and genotoxicity of mushroom [14] developed from industrial waste substrate while the toxicological analysis of substrate and compost remains unplumbed territory so far. This situation is ringing an alarming bell that, in the absence of detailed investigation of compost, the toxicants leaches out from the compost and enters soil and further in food chain.

The imperfection of mushroom compost is an undeniable fact. Before finalizing a new component, the research regarding the quality and toxicity of compost is must otherwise both environment and humans may have to pay the price.

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