

EDITORIAL

Edible Mushrooms: As Functional Foods and Nutraceuticals

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Mushrooms are macro-fungi that grow naturally on soil, agro wastes, on and around trees and are easily picked by hand. They occur in various sizes and shapes and may be edible or poisonous. Majority of mushrooms are ectomycorrhizal fungi supporting the growth and development of many trees in natural forests. They accordingly contribute substantially to nutrient cycling and ecosystem sustainability. Mushrooms have historically been used by man for food and health benefits. Nutritionally, mushrooms are rich in protein, minerals like calcium, iron, magnesium, potassium, vitamins and have low fat and zero cholesterol. Mushrooms are picked from the wild by local inhabitants and used to prepare soups and stew. This method of sourcing for mushrooms is however fraught with the danger of eating a poisonous mushroom. Poisoning resulting from mushroom consumption necessitates the need for proper identification of mushrooms before consumption. There are many known edible mushrooms which can be eaten, so it is advisable to properly identify a mushroom before consumption; better still, it is advisable to consume the mushrooms that are well known and documented to be edible.

The reported health benefits of edible mushrooms include; lowering of cholesterol levels, boosting immunity, cancer inhibition, presence of antioxidants, reduction of blood pressure, and good source of vitamins with high level of riboflavin (vitamin B2), niacin, folates, and traces of vitamin B1, B12, C, D and E. Most importantly mushrooms are the only non-animal food source that contain vitamin D, thus they are the only natural vitamin D ingredients for vegetarians. Some edible mushrooms have been found to comprise important amounts of bioactive molecules. The content of biologically active metabolites may vary considerably in edible mushroom types. The bioactive components that are present in mushrooms are grouped into secondary metabolites (e.g., nucleotide analogs, sesquiterpenes, vitamins, sterol, alkaloids, terpenoids, lactones, polyphenols, etc.), glycoproteins and polysaccharides (e.g. β -glucans). In addition to its important nutritional value, several mushroom species are identified as sources of biologically active compounds.

Mushrooms can be cultivated from farm and industrial wastes generated daily and deposited in the environment. Such wastes include; sawdust, rice straw, cassava and yam peelings, corn straw/cob, oil palm fruit fiber, sugarcane bagasse and waste paper.¹ Exploitation of mushrooms for food and medicine is still at a relatively slow glowing stage in Africa compared to the western world and Asia. World production of edible and medicinal mushrooms stands at about 4 million tonnes per annum, and African countries contribute less than 2% of this value.² In order to bridge this gap, the University of Benin in 2012, established a research centre "the African

Centre for Mushroom Research and Technology Innovations (ACMRTI)", with a mandate to carry out research on cultivation of edible mushrooms, research on medicinal products from mushrooms and training of farmers and enthusiasts on mushroom cultivation, post-harvest storage and marketing.

Presently, the centre has developed low-cost methods of cultivating oyster, paddy straw and milky mushrooms (Figure 1). This would serve the function of delivering low-cost, quick return and sustainable mushroom production technologies especially to rural farmers. The steps involved in low cost process of oyster mushroom production are mixing sawdust, wheat bran and calcium carbonate together; pasteurization with heat, inoculation with mushroom spawn (seed), incubation and harvesting after six weeks. Starting a mini oyster mushroom cultivation farm with 20 bags (1.2 kg substrate weight per bag may require as little as 8,000 Naira (\$ 22.42) and the cropping period to harvest can be as low as 3 weeks. The centre is also conducting research on how to fortify local foods like bread, biscuits and garri with mushrooms in order to improve their nutrient qualities. The tropical region of the world is a hot-bed of undiscovered species. Hence there are many indigenous edible and medicinal mushrooms around us waiting to be domesticated. Therefore, the center is also involved in the sourcing and domestication of indigenous mushrooms that we collect from the wild and use for food and medicine, in the prevention and treatment of some degenerative diseases.

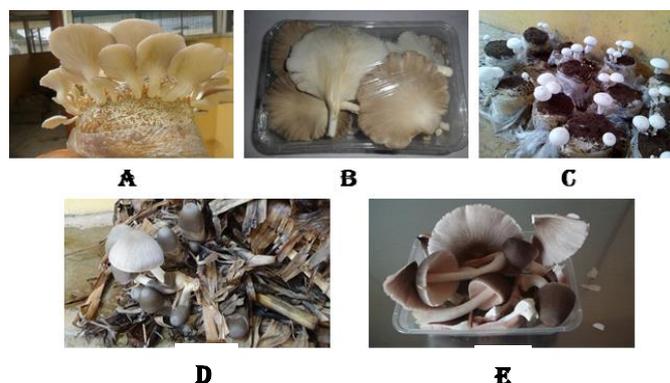


Figure 1: Various mushrooms cultivated at ACMRTI. **A:** Oyster mushroom (*Pleurotus ostreatus*) on sawdust, **B:** Oyster mushroom Packaged for sale, **C:** Milky mushroom (*Calocybe indica*) growing on composted sawdust and poultry waste, **D:** Paddy straw mushroom (*Volvariella volvaceae*) growing on dried banana leaves, **E:** Harvested Paddy straw mushroom

The addition of whole edible mushrooms into our diet may be effective and possibly enhance dietary supplements. Hence, mushrooms might be a great source of many different nutraceuticals and could be used directly in human diet and to promote health for the synergistic effects of all the bioactive components present. Nowadays, mushroom extracts are marketed as dietary supplements for their properties, mainly for the improvement of immune functioning system and antitumor activity. At the moment in our research center we are working on the nutritional value, post-harvest system (quality control and product safety) and commercial potential of most cultivated edible mushrooms in our locality.

References

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<https://doi.org/10.26538/tjnpr/v1i5.1>