EDIBLE AND MEDICINAL MUSHROOMS FOR SUB-HEALTH INTERVENTION AND PREVENTION OF LIFESTYLE DISEASES

TECHNOLOGY TRENDS

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Abstract
Mushrooms are growing in importance as numerous nutritional and therapeutic benefits are noted in them. Mushroom cultivation can be a zero-waste activity whereby lignocellulosic agro-residues are converted to food, feed for animals and fertilizers for plants. Mushrooms as functional food can help in the intervention of subhealth states in humans and may prevent the full-blown consequences of life-threatening diseases. The discovery of mushrooms for human well-being hinges on the traditional knowledge of mushrooms used as food and medicine by the indigenous people of a nation. Wild medicinal and culinary mushrooms have been successfully tamed, domesticated and brought to commercial scale. The mushroom industry has grown from a cottage industry to supplement the income of a household to medium and mega-sized industrial ventures. Mushrooms produced are not only food but are raw material for development of functional food (nutraceuticals) and dietary supplements (nutraceuticals) for health and quality of life of humans.

Introduction
Humankind is plagued by a number of diseases many of which are life-threatening. The aging population are prone to many diseases including neurodegenerative diseases — Alzheimer and dementia; cardiovascular diseases; cancer and diabetes that affect the kidney and the eyes. These days not only are the aged prone to diseases but also very young individuals are reported to die from cardiac arrests, diabetes and cancer. What is perplexing is that a number of these diseases are a result of our lifestyle — the food we eat and the habits — smoking and consuming alcoholic drinks contribute to the onset of these diseases. Further, the exposure to the polluted environment contributed by industrialization can cause a number of human illnesses. Although many drugs are available, the quality of life is jeopardized in many cases. To add to the burden is the rising cost of health care. The strategy now is subhealth intervention and prevention rather than cure of life-threatening diseases by reverting to traditional knowledge as a source of chemopreventive food and nutraceuticals. Further, the quality of life of those who are ill and on lifelong therapeutic drugs may be enhanced by using functional molecules from plants and fungi, too. A number of these natural resources are used and curative claims can be obtained from ethnobotanical and ethnomycological studies.

The fungi and, in particular, the mushroom have components that can contribute to human wellness and mitigate threats and assaults that render the human body vulnerable to several life threatening diseases including cardiovascular ailments, cancer, metabolic disorders (diabetes) and neurodegenerative disorders. Mushrooms have been used as medicines by humans for 5000 years or more (Halpern, 2007). Mushrooms — an unexploited resource of numerous bioactive components including polysaccharides, terpenes, flavonoids, alkaloids, nucleotides, lipids, vitamins, protein, amino acid and minerals can have many beneficial effects on human systems (Wasser & Wels, 1999). It was found that mushrooms and their extracts can benefit the central nervous system, heart and liver. They can be exploited for their chemopreventive activities against many of the life threatening or debilitating diseases such as metabolic syndromes — diabetes (Kanagasabapathy et al., 2012); cardiovascular diseases and neurodegenerative diseases (Wong et al., 2012). The main culprits triggering these human ailments are reactive oxygen species and inflammation. These two factors are responsible for subhealth states leading to pre-disease conditions and poor quality of life.

Mushrooms packed with a wide array of bioactive components are excellent antioxidants and anti-inflammatory agents. Secondary metabolites of mushroom that may have therapeutic potentials are alkaloids, antibiotics, lectins, lactones and terpenoids (Wasser, 2010). Primary metabolites such as enzymes — glucose oxidase, superoxide dismutase, peroxidases and laccases may prevent oxidative stress (Wasser, 2010, Chang and Wasser, 2012). Further, humans have learnt to tame these mushrooms