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## MUSHROOMS IN CUBA EASTERN REGION: A LOOK THROUGH THE IMMUNOLOGICAL WINDOW OF THE BIOTECHNOLOGY'S GARDEN

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### Abstract

Mushroom science in Cuba allows the valorization of agricultural by-products, such as coffee pulp into functional foods/nutraceuticals for human consumption to address objectives of sustainability and biotechnological development. Much research work done in Cuban eastern region has been performed in the *Pleurotus* genus, one of the most popular *Basidiomycetes* edible mushrooms which cultivation has increased greatly throughout the world during the last few decades. *Pleurotus* species, like many edible and medicinal mushrooms, are a good source of immunomodulators and substances considered as “host defense potentiators” (HDPs) as judged by their immunostimulating properties. In this context, dietetic supplements with a high therapeutic potential acting on the immune system and formulated from refined or partially refined mushroom extracts, or from dried mycelia/fruited bodies biomass are referred as “mushroom immunocuticals”. The present study examined the synergy exerted by the vast structural diversity of biomolecules found in *Pleurotus* crude extracts, powders and other preparations on immune responses in both immunocompetent and immunodeficient (irradiated, cyclophosphamide-treated and malnourished) Balb/c mice. *Pleurotus* derived-products could potentiate the host defense mechanisms *in vivo* and should be promising for further pharmacological studies. The effects on cell immunity are especially valuable in the prophylaxis of tumors, immunodeficiencies and as co-adjuvant in chemotherapy. The results also demonstrate that not only mushrooms but also their mycelia may be an interesting renewable resource for nutraceuticals production. Through this immunological “window” we are assisting to a revolution in mushroom science characterized by the diversity of natural compounds found in mushroom (both chemical and biological diversity) and on the other hand by the possibilities given by the abundance of specific molecular targets. Therefore, attempts to “domesticate” the immune system for the benefit of man, in addition to specific vaccines and antibodies, would find in mushrooms new and unlimited possibilities of exogenous molecules. In sum, mushroom science in Cuba opens new opportunities for developing functional foods/nutraceuticals. An extended knowledge of the immunoenhancing activity of *Pleurotus* nutraceuticals would be useful in understanding their potential applications for immunonutrition and immunotherapy. Two important challenges for Cuban researchers involved in mushroom science are: (i) the evaluation of both nutritional and immunopharmacological potentialities of wild mushroom strains and (ii) the developing of new therapies and/or clinical assays based on mushrooms derived preparations alone or combined with traditional therapies. To accomplish these goals in present and future investigations we have to keep in mind the optimization of technologies/ production techniques as well as total quality assurance.

**Key words:** *Pleurotus*; edible and medicinal mushrooms; biotechnology; functional foods; nutraceuticals; immunomodulating activity

**Subject:** Science and Biotechnology of Medicinal Mushrooms or Medicinal values and pharmacology of medicinal mushrooms

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