

## Extraction, Characterization, and Applicability of Rich $\beta$ -Glucan Fractions from Fungal Biomass

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**Abstract :** Mushroom production has enormously increased in recent years, not only as food products but also for applications in pharmaceuticals, nutraceuticals, and cosmetics. Consequently, interest in its chemical composition, nutritional value, and therapeutic properties has also increased. Fungi are rich in bioactive compounds such as polysaccharides, polyphenols, glycopeptides, and ergosterol, of great medicinal value, but within polysaccharides,  $\beta$ -glucans are the most prominent molecules. They are formed by D-glucose monomers, linked by  $\beta$ -glucosidic bonds  $\beta$ -(1,3) with side chains linked by  $\beta$ -(1,6) bonds. The number and position of the  $\beta$ -(1,6) branches strongly influence the arrangement of the tertiary structure, which, together with the molecular weight, determine the different attributed bioactivities (immunostimulating, anticancer, antimicrobial, prebiotic, etc.) and physico-chemical properties (solubility, bioaccessibility, viscosity or emulsifying). On the other hand, there is a growing interest in the study of fungi as an alternative source of chitin obtained from the by-products of the fungal industry. In this work, a cascade extraction process using aqueous neutral and alkaline treatments was carried out for *Grifola frondosa* and *Lentinula edodes*, and the compositional analysis and functional properties of each fraction were characterized. Interestingly, the first fraction obtained by using aqueous treatment at room temperature was the richest in polysaccharides, proteins, and polyphenols, thus obtaining a greater antioxidant capacity than in the other fractions. In contrast, the fractions obtained by alkaline treatments showed a higher degree of  $\beta$ -glucans purification compared to aqueous extractions but a lower extraction yield. Results revealed the different structural recalcitrance of  $\beta$ -glucans, preferentially linked to proteins or chitin depending on the fungus type, which had a direct impact on the functionalities and bioactivities of each fraction.

**Keywords :** fungi, mushroom,  $\beta$ -glucans, chitin

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