Mannoproteins and β-Glucan from *Saccharomyces Cerevisiae* Yeast-based Products: Isolation and Characterization of Their Properties

Oral Defence by PhD Candidate Jin Li

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Abstract

Large amounts of yeast cell walls and spent brewer's yeasts are generated as by-products by the yeast and brewery industry. These by-products are mainly used as animal feed ingredients. The structural and the compositional properties of these yeast by-products make them a potential source of value-added ingredients, mainly mannoproteins and β-glucan, which accounted for approximately 40% (w/w) and 60% (w/w) of yeast cell wall dry weight. However, the techno-functional and health promoting properties of mannoproteins and β-glucan are dependent on their molecular and structural properties; thus the isolation of these components with well-defined structures is a key step towards modulating their functional properties for specific applications. Selected isolation methods were evaluated for the recovery of mannoproteins and β-glucan. As compared to the conventional methods, the enzymatic approach, based on the use of Zymolyase®, exhibiting a high β-1,3-glucanase activity, resulted in the highest yield, mannoproteins content and mannan to protein ratio of mannoproteins. Two populations of mannoproteins (MP1/MP1' and MP2/MP2') with high and low molecular weight distributions were purified and characterized structurally by NMR. The techno-functional of the purified mannoproteins were studied for the first time. The study of the functional properties of mannoproteins as they are related to their structural properties provides a better understanding of their behaviors in food systems. On the other hand, the combination of hot water extraction step with protease treatment enhanced the opening of the network of the yeast cell wall and improved the isolation efficiency. The synergistic actions of selected proteases were explored and optimized to maximize the recovery yield of β-glucan.

About the Candidate

Jin Li holds a BS.C degree from Yantai University and a Masters degree from Northwest Agriculture and Forestry University majoring in Food Science from China. After her MSc, she joined Dr. Karboune's lab at McGill University to pursue her Ph.D. Her research focuses on generating value-added ingredients from yeast-based products and studying their techno-functional and structural properties.