

Enzymatic hydrolysis by commercial proteases of Brewers' spent grain proteins

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Valorisation of by-products is an innovative concept in the field of residues management contributing to a sustainable development. Brewer's spent grain (BSG) is an abundant, protein-rich coproduct from the beer industry. Its use is still limited, being basically used as animal feed. It has received little attention as a marketable commodity, and its disposal is often an environmental problem. Nevertheless, it can be of value as a raw material. The industrial production of protein hydrolysates by commercial proteases is a field to explore.

In the present study protein hydrolysates were enzymatically produced from BSG. To that end, BSG protein concentrate (BPC), prepared by alkaline extraction of BSG and subsequent acid precipitation, was enzymatically hydrolyzed with commercial Alcalase and Protamex® over a broad pH range (pH 5-10).

Activity profiling of commercial Alcalase and Protamex® (a mix of Alcalase and Neutrase) as a function of pH and protease concentration were determined at 37°C using BSG proteins as substrate (Fig.1 a, b, respectively).

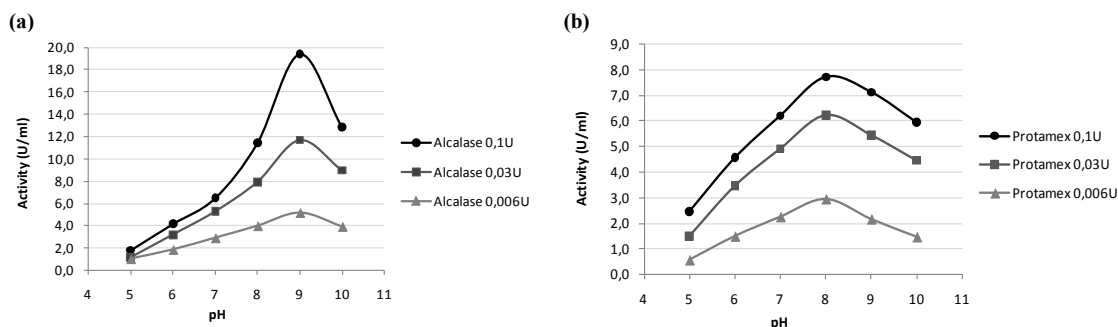


Figure 1 – Activity profile of Alcalase (a) and Protamex® (b) as a function of pH and protease concentration.

Concerning to hydrolysis of BSG proteins the optimum pH for Alcalase is 9 and for Protamex® is 8. At optimum pH, higher activity is observed for Alcalase than for Protamex®. As expected, higher proteolytic activity is obtained for higher protease concentrations. Alcalase activity between pH 5 and 7 was similar, when protease concentration increased, however, a significant increase of activity was observed at pH 9. These results suggest that the use of alkaline pH (8 – 9) increases the extent of hydrolysis of BSG proteins.