

TAL 797 – Seminário

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Enzymatic hydrolysis for the production of bioactive peptides

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Level: (X) MS () DS

Bioactive peptides are amino acid sequences derived from protein hydrolysis that exhibit various biological activities. Their production, typically achieved through enzymatic hydrolysis, involves the cleavage of peptide bonds by specific enzymes, generating fragments with potential bioactive and functional properties. The choice of enzyme and processing conditions directly influences the peptide profile and its biological activity. The first study focused on preparing whey protein hydrolysates using three enzymes: pepsin, trypsin, and papain. The evidence from this study indicates that enzymatic hydrolysis can be precisely adjusted to obtain hydrolysates with specific functionalities and antioxidant properties. The degree of hydrolysis was determined at different reaction times for each of the enzymes. Among the three enzymes employed, whey proteins hydrolyzed with papain after 3 h of reaction showed significantly higher degree of hydrolysis (DH) values than those hydrolyzed with trypsin and pepsin. The hydrolysis rates of trypsin, pepsin, and papain were $15 \pm 1.6\%$, $22 \pm 2.8\%$, and $33 \pm 3.7\%$, respectively. This study demonstrates that high efficiency in the enzymatic hydrolysis process can be achieved using papain at a relatively high reaction temperature of 70 °C. In total, 107 distinct peptide sequences were identified using LC-MS analysis. The second study aimed to assess the influence of enzymatic hydrolysis with Alcalase and Protamex on the technological functionalities and antioxidant capacity of whey protein hydrolysates to identify conditions that achieve the desired functionality. In this study, DH increased significantly within the first 10 min of reaction and continued to progress over time, reaching 25.65 ± 1.13 and $26.71\% \pm 1.37$ after 480 min of hydrolysis with Alcalase and Protamex, respectively. The hydrolysis process significantly enhanced the foaming and antioxidant properties. Overall, enzymatic hydrolysis has emerged as an efficient and versatile strategy for exploring whey protein hydrolysates, leading to the production of bioactive peptides with strong potential for application in functional foods and multiple health-promoting effects.

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