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Área do trabalho: Indústria de produtos de origem animal e ciência dos alimentos

Antioxidant potential of goat casein hydrolyzed by protease produced by *Mucor guilliermondii* URM 5848

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Dairy goat farming represents a branch with high exploration potential and requires greater incentives, mainly because it stands out as an activity with high socioeconomic impact for rural producers in Brazil. In this sense, one of the strategies that can promote the valorization of goat's milk and its derivatives is the development of functional foods based on the release of bioactive peptides through enzymatic hydrolysis. Bioactive peptides derived from casein have diverse biological activities and support various physiological functions of organisms. These peptides can be encoded in different types of proteins of animal origin, such as milk, and released by enzymatic hydrolysis (in vitro), from proteolytic enzymes from different sources, such as microbial sources. The present work aimed to evaluate the antioxidant potential of peptides released from goat casein by proteases produced by the filamentous fungus *Mucor guilliermondii* URM 5848. Initially, raw milk was collected from a dairy herd of Saanen goats and immediately stored at 4°C. The milk was skimmed by centrifugation (2100 x g for 30 min) and the total casein was obtained by isoelectric precipitation at pH 4.2 with 1 M HCl. For casein hydrolysis, a purified protease produced by the filamentous fungus *Mucor guilliermondii* URM 5848, was used. Hydrolysis occurred at 40°C with an enzyme: substrate ratio of 1:15, over time (1, 3, 5, 8, 12 and 24 hours). Subsequently, the assays were centrifuged at 5000 x g at 4°C and the supernatant used to obtain a pool of peptides between 3 and 10 kDa, using Amicon Ultra-15 (Merck Millipore). The antioxidant activity was determined with the ABTS^{•+} cation radical, according to Re et al. (1999). Another free radical used to evaluate the potential antioxidant activity was DPPH. The evaluation of DPPH scavenging activity was carried out according to the methodology described by Li et al. (2013). All activities were carried out in triplicate. Statistical analyzes were performed using IBM SPSS software v.25, using analysis of variance (ANOVA), followed by Tukey's test to compare the means (p <0.05). Regarding the ABTS^{•+} radical, the hydrolyzed tests over time showed antioxidant activity that varied between 23.94 ± 0.61% (1 hour) and 88.50 ± 0.29% (24 hours). There was no statistically significant difference between the 8- and 12-hour hydrolysis tests, being 79.72 ± 0.36% and 82.63 ± 0.65%, respectively. The potential antioxidant activity for the DPPH radical was lower. The hydrolyzed tests over time showed antioxidant activity that varied between 18.43 ± 0.19% (1 hour) and 24.75 ± 0.04% (24 hours). There was no statistically significant difference between the 8- and 12-hour hydrolysis tests, being 22.54 ± 0.12% and 22.68 ± 0.23%, respectively. From the results obtained, it is observed that the study of hydrolysis over time was essential to evaluate the best hydrolysis conditions to obtain peptides with antioxidant activity. Furthermore, the peptides obtained from goat casein can be widely explored by the food industry, for the manufacture of functional dairy products, based on goat's milk, thus strengthening dairy goat farming in Brazil.

Keywords: functional foods, bioactive peptides, antioxidants