微膠囊化牛初乳蛋白質水解物之抗氧化安定性

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摘 要

本研究以母牛分娩後第二天之牛初乳為材料，製備成脫脂全乳、酪蛋白及乳清後，除進行三者之抗氧化性分析，並使用豬小腸粗酵素液，分別以不同酵素/基質比(10~60 %)進行水解，探討牛初乳之脫脂全乳、酪蛋白與乳清經酵素水解後之抗氧化性。另外本研究亦利用Acryl-EZE、Surelease、幾丁聚醣、阿拉伯膠與β-環狀糊精等五種包覆材質，分別以三種不同包覆比例(9:1、8:2、7:3)進行微膠囊化包覆，並模擬胃腸道消化試驗，探討不同包覆材質與不同包覆比例對脫脂全乳、酪蛋白與乳清及其水解物微膠囊化後經胃腸道酵素消化之抗氧化性。 研究結果顯示 1.在脫脂全乳、酪蛋白與乳清(濃度為10 mg/mL)之抗氧化性結果方面，(a)亞鐵離子螯合能力大小順序為:酪蛋白＞乳清＞脫脂全乳;三者之亞鐵離子螯合能力皆高於60 %；(b) Trolox當量抗氧化能力(TEAC)大小順序為:乳清＞酪蛋白＞脫脂全乳，三者之TEAC皆高於10 m mole Trolox；(c)清除超氧陰離子能力在樣品濃度1 mg/mL時之大小順序為:脫脂全乳＞酪蛋白＞乳清。 2.在以不同酵素/基質比(E/S 10~60 %)水解酪蛋白與乳清之結果方面，酪蛋白與乳清以E/S 60 %水解12和18 h可分別得到最大水解率29.16和23.55 %。 3.以E/S 30 %水解牛初乳蛋白(濃度為10 mg/mL)所得之抗氧化性方面，(a)亞鐵離子螯合能力大小順序為:酪蛋白水解物＞乳清水解物＞脫脂全乳水解物，酪蛋白與乳清水解24 h後可得到最大亞鐵離子螯合能力，分別為85.17和71.99 %。經由酵素水解後之酪蛋白與乳清其亞鐵離子螯合能力都有顯著的提升，而且隨著濃度的增加，亞鐵離子螯合能力亦隨之提高；(b) TEAC大小順序為:乳清水解物＞酪蛋白水解物＞脫脂全乳水解物，酪蛋白水解物及乳清水解物以E/S 60 %水解24 h後，可得到最大TEAC值，分別為13.39和13.46 m mol Trolox，且脫脂全乳、酪蛋白與乳清水解物之TEAC皆有隨著水解率及濃度的增加而升高的趨勢；(c)三種樣品水解物之清除超氧陰離子能力皆隨著水解之升高而呈現顯著下降的趨勢。 4.以微膠囊包覆之牛初乳蛋白及其水解物，經模擬胃腸道消化試驗後，進行抗氧化分析，實驗結果顯示，(a)包覆膠體以阿拉伯膠最適合，而β-環狀糊精最差，(b)包覆比例以包覆物 : 被包覆物為7 : 3較佳。

關鍵詞 : 牛初乳 ; 酪蛋白 ; 乳清 ; 酵素水解 ; 抗氧化性 ; 微膠囊化

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