Inhibition on tyrosinase activity and melanoma cell growth by bovine colostrum hydrolysates

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ABSTRACT
In recent years, there is an increasing interest in finding natural tyrosinase inhibitors from animals, plants and microorganisms. The tyrosinase inhibitors should have broad applications, especially, in food, medicinal and cosmetics products in relation to hyperpigmentation. This research used the bovine colostrums collected on the first to fifth days postpartum and normal milk to prepare skimmed colostrums and skimmed normal milk, and used two different enzymes, Alcalase and α-Chymotrypsin, to hydrolyze the samples, followed by investigating the inhibition of the hydrolysates on tyrosinase activity, and finally selected day 2 colostrums and normal milk hydrolysates for cell experiments, including melanoma cell viability, tyrosinase activity and melanin content in melanoma cells. The results are as follows: 1. The inhibitory effect of the Alcalase hydrolysates on tyrosinase activity was more profound than that of the α-Chymotrypsin hydrolysates. At a concentration of 5 mg/mL day 2 colostrum hydrolysates had the highest inhibition rate, 23.99%; at a concentration of 10 mg/mL day 2 colostrum hydrolysates also had the highest inhibition rate, 32.96%; at a concentration of 15 mg/mL both day 2 colostrum and normal milk hydrolysates had the inhibition rate of 37.48 and 35.59%, respectively. Overall the day 2 colostrum hydrolysate obtained by Alcalase hydrolysis for 4 hrs had the highest inhibitory activity on tyrosinase. The inhibitory activity of normal milk hydrolysates on tyrosinase increased with increasing hydrolysis time. 2. In the results of melanoma cell viability the hydrolysates of day 2 colostrums and normal milk could decrease the cell viability, and the cell viability decreased with increasing the hydrolysate concentration. 3. In the results of tyrosinase activity in melanoma cells the inhibitory effect of the Alcalase hydrolysates on tyrosinase activity was more profound than that of the α-Chymotrypsin hydrolysates. The inhibition rate of the Alcalase hydrolysate of day 2 colostrums at a concentration of 7.5 mg/mL was 54.01%. 4. In the results of melanin content in cells, both Alcalase and α-Chymotrypsin hydrolysates had comparable ability to reduce the melanin content in cells, and both colostrum and normal milk hydrolysates also had a ability to reduce the cellular melanin content.

Keywords: bovine colostrums, hydrolysis, tyrosinase, melanoma cell (B16-F10)


