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Low fat Cheddar cheese made using polymerized whey protein concentrate and adjunct culture

Cheese products are considered as high protein and high energy foods and dairy industry is now seeking for low fat alternatives. The objective of this study was to use polymerized whey protein concentrate (PWPC) as a fat replacer and *Lactobacillus helveticus* JL-77 as adjunct culture to formulate low-fat Cheddar cheese. Five cheeses were manufactured: FFC (cheese made with full fat milk), LFC (cheese made with 1.8% (wt/vol) fat content milk), LFC-A (cheese made with low fat milk plus adjunct culture), LFC-PWPC (cheese made with low fat milk plus PWPC), LFC-PWPC-A (cheese made with low fat milk plus adjunct culture and PWPC). The commercial starter culture R-704 was used for making all cheeses. The cheese samples were analyzed for chemical, microbiological properties, protein hydrolysis, texture, rheological properties, free amino acids (FAA), volatile compounds, microstructure and sensory characteristics. The results showed that there were no significant differences in yield among FFC, LFC-PWPC and LFC-PWPC-A ($p > 0.05$). Compared with FFC, LFC and LFC-A, the other two cheeses retained higher levels of moisture. Hardness and stickiness of cheeses increased during ripening while cohesiveness, springiness and chewiness decreased. FAA were highest level in LFC-A (5.86 ± 0.031 mg/g) due to the peptidase activity of the adjunct culture. The microstructure of cheeses was different due to the breakdown of caseins in different degrees. Principal component analysis showed that LFC-A and LFC-PWPC-A had similar sensory attributes. Results indicated that polymerized whey protein concentrate might be suitable for low fat Cheddar cheese making.

Biography

Tiehua Zhang is a Professor in Jilin University. He has completed his PhD and Post-doctoral studies at Jilin University. He visited the University of Vermont as a Visiting Scholar in 2011. He is an Associate Dean of College of Food Science and Engineering. He has published more than 50 papers academic journals.

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