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Energy and Protein Composition of Water Buffalo Milk and Liquid and Dried Whey Products: A Pilot Study to Evaluate Suitability as a Nutritional Supplement for use in Low-Resource Countries

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Keywords

Global Nutrition, Malnutrition, Protein Supplement, Milk Composition

Abstract

Background

In Lao PDR, 33.5% of children under five years of age are stunted, 26% are underweight and 8% are severely wasted. Nutritional rehabilitation of malnourished children often requires dietary energy and protein supplementation. Water buffalo (WB), native to Southeast Asia, produce milk with higher energy and protein concentrations than dairy cattle (DC). Whey, a byproduct of cheese production and a source of protein and energy, is currently discarded in Lao PDR after making cheese. Energy and macronutrient concentrations of WB milk and liquid/dried whey were analyzed and compared to DC milk and whey data to determine suitability as a locally-sourced nutritional supplement.

Methods

WB milk and whey samples were obtained before and after making feta and mozzarella cheese. Nutrient analysis was performed by Mahidol University, Bangkok, Thailand. Crude protein concentrations were analyzed using the Kjeldahl method and energy concentrations were estimated by back calculation.

Results

Mean energy (107 kcal/100g) and protein (4.5g/100g) concentrations of WB milk were 51.2% and 28.7% higher than DC milk, respectively. The energy content of whey derived from liquid feta and mozzarella cheese was 30.5% and 26.8% higher than DC milk whey, respectively. Concentrations of protein in dried WB whey from feta and mozzarella cheese production were similar to and 4.3% lower than DC whey, respectively. Both WB dried whey products provide more than 11 g protein/100g whey and are suitable dietary protein sources.

Conclusions

WB milk contains higher concentrations of energy and protein than DC milk. Dried whey derived from WB mozzarella and feta cheeses meet the protein standards of an acceptable dried whey product. Development of a locally sourced, shelf-stable, powdered nutritional supplement derived from WB whey that is safe for human consumption is underway.

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