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Comparison of Nutrition Quality between Cow and Goat Dairy Products: A Meta-analysis

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Introduction

Goat milk plays a significant role in feeding the under nourished communities around the world (Amigo and Fontecha, 2011; Haenlein, 2004). The three main reasons for this are: (i) goat has better ability to survive in harsh climatic conditions than other ruminants (Silanikove, 2000; Morand-Fehr, 2005), (ii) goat milk has the ability to cover afflicted people with cow milk allergenicity and gastrointestinal problems (Park, 1994; Ceballos et al., 2009a); and (iii) goat milk has many desired nutritional properties (Amigo and Fontecha, 2011; Haenlein, 2004; Ceballos et al., 2009b; Silanikove et al., 2010; Alferez et al., 2006). The present study aimed at providing additional information on the nutritional quality of goat dairy products *vis-a-vis* common dairy products from cow milk by using a meta-analysis approach.

Materials and Methods

The meta-analysis was executed using three approaches; i.e. literature search and selection, studies coding and statistical analysis. The literature search was conducted on the Internet using EBSCO Information Services (<http://search.ebscohost.com/>) and Science Direct (<http://www.sciencedirect.com/>). The following keywords were used for the search: “comparison”, “nutrition”, “quality”, “composition”, “goat”, “cow”, “milk” and “dairy”. The following criteria were used for the selection: published in English as full text articles, peer-reviewed published journals, direct comparison between goat- and cow-dairy products for nutritional composition including macro- and micro-nutrients. Eventually, a total of 22 studies were derived from comprehensive reviews on 15 selected references. Based on the comprehensive review about the “premium” quality of dairy products (Haug et al., 2007; Huth et al., 2006; Steijns, 2008; Drewnowski, 2005) and the available results from the selected studies, 10 parameters were selected for the nutritional quality analysis i.e. total solid, protein, fat, ash, monounsaturated fatty acid (MUFA), polyunsaturated fatty acids (PUFA), α -linolenic acid (ALA), ratio of omega-6 to omega-3, *cis*-9, *trans*-11 conjugated linoleic acid (CLA9) and Ca. Effect size as the “Hedges' d” was applied to quantify the parameter distance between cow- and goat- dairy products (Hedges and Olkin, 1985; Sanchez-Meca and Marin-Martinez, 2010). To calculate the difference in the nutritional component between goat dairy products and that of cow, the cow group was pooled into a control group and the goat group was pooled into an experimental group. Therefore, the positive effect size indicates that parameter observed is greater in the goat group, and vice

versa. The effect size calculations were calculated by using MetaWin 2.0 (Rosenberg et al., 2000).

Results

Goat dairy products contain significantly higher (95% confidence interval, CI) total solids (1.66 ± 0.18), protein (2.06 ± 0.15), fat (0.98 ± 0.17), ash (1.63 ± 0.25), PUFA (1.95 ± 0.83), ALA (4.95 ± 2.67) and significantly lower CLA9 (-1.19 ± 0.98) than those of cow milk (Figure 1). It was also observed that the goat dairy products have significantly ($P < 0.001$) lower omega-6 to omega-3 ratios (5.16 against 10.34) than the cows milk.

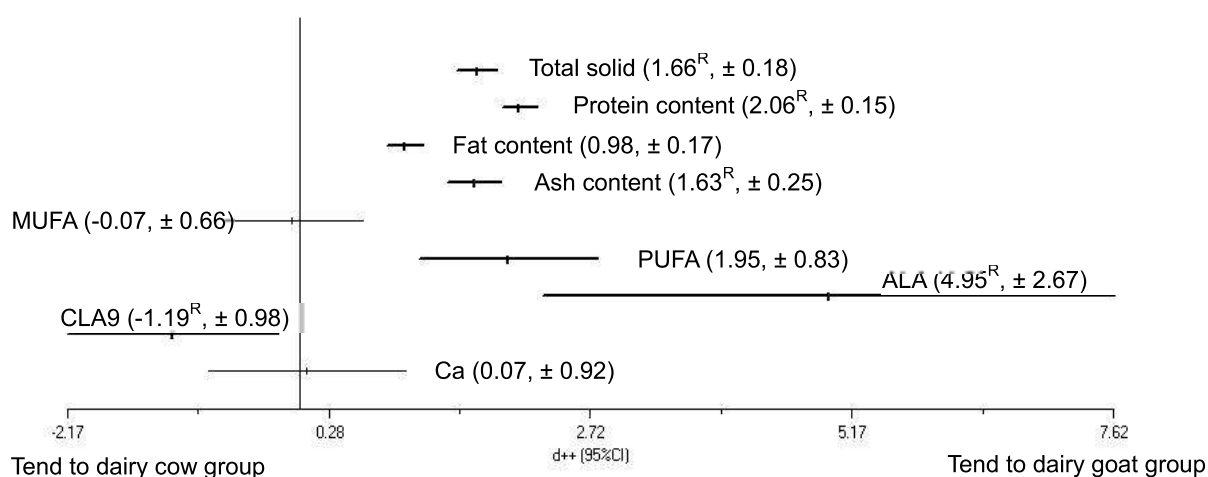


Figure 1. Forest plot of cumulative effect size and 95% CI of some parameters as the prediction for comparing the nutritional quality of cow and goat dairy products. The bold lines indicate the significant proofed analysis and the robust model

Conclusions

The current meta-analysis showed that goat dairy products have different nutritional qualities from those of cow dairy products. The unique nutritional feature of goat dairy products is that it may support human health. Further meta-analyses employing more parameters are necessary.

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