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Phytoestrogen profile of retail goat and cow milk in the UK

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The dairy goat industry in the UK has been growing, and currently accounts for approximately 100,000 goats, producing 34 million litres of milk annually. This provides a market value of £70 million. Consumers, especially those with milk intolerances/allergies, perceive goat milk as a healthier alternative but the nutrient profiling of goat milk in the UK is not widely known. This study compared UK retail goat and cow milk for the concentrations of phytoestrogens (lignans, isoflavones and coumestans), which are associated with benefits in human health. Monthly milk samples (n=84) from 3 goat and 4 cow milk retailer brands were collected over 12 months. Phytoestrogen profile was assessed using LC-MS/MS (microLC 200, Eksigent/AB Sciex, USA; QTrap 5500 MS, AB Sciex, USA). Phytoestrogen concentrations data were analysed by a linear mixed effects model (Genstat 17th edition), using species, month and their interaction as fixed factors and milk ID as random factor. Compared with cow milk, goat milk contained less secoisolariciresinol (−62.7%), matairesinol (−50.0%), lariciresinol (−47.4%), hydroxymatairesinol (−56.2%), enterolactone (−67.6%), plant lignans (−52.5%), mammalian lignans (−66.6%) and total lignans (−66.5%), and more daidzein (+747.3%), glycitein (+167.5%), naringenin (+185%), equol (+985.8%) and isoflavones (+964.3%). In the UK, goat dairying is more intensive (typically all-year-round housing) than conventional dairy cow production. Certain intensive dairy practices (e.g. increased dietary soyabean meal instead of wheat, barley and oat) may reduce contents of lignans and increase contents of isoflavones in goat milk. In addition rumen microbiome or genetic differences between species may not be excluded. Consuming goat milk may increase intakes of isoflavones and reduce intakes of lignans, but the potential effect on human health was not assessed in the present study.

Meta-analysis on the effect of biopreservatives on *Staphylococcus aureus* inactivation in cheese

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Biopreservation methods based on the use of natural extracts and starter cultures have been proposed as hurdles to increase the microbiological safety of many food products, including cheese. The objective of this study was to construct two separate meta-regression models on the inactivation of Staphylococcus aureus (SA) in cheese containing essential oils (EOs) and added lactic acid bacteria (LAB). Twenty challenge studies were considered appropriate for inclusion in the meta-analyses (n=299), and the following information was extracted: antimicrobial class (EO or LAB) and name, mean log reduction, storage temperature, exposure time, antimicrobial application (i.e. cheese mixture, milk or film), and antimicrobial concentration. The EOs model revealed the significant impact of application type (P<0.0001), storage temperature (P<0.0001) and inoculum concentration (P=0.019) on SA microbial reduction. The effects of exposure time and antimicrobial concentration were dependent on the type of application (P<0.0001). The application of EOs in milk promoted the highest microbial reduction, whereas incorporation in films presented the lowest inhibitory effect. Among the types of EOs meta-analysed, lemon balm and sage produced the greatest bactericidal effects. The LAB model did not show differences (P=0.091) in the inhibitory effect achieved by different applications (milk or cheese mixture), but revealed the interaction between this term and exposure time (P=0.040). This meta-analysis has emphasised that the experimental practice of inoculating the antimicrobial in shredded cheese (‘cheese mixture’) should no longer be employed in challenge studies, since this application method biases the actual results. The inverse relationship between pathogen’s inoculum size and microbial reduction (P=0.025) should be further investigated.