

COLLECTED ABSTRACTS

Editorial: Research on mastitis in sheep

George C. Fthenakis

Greece

The adverse financial effects of mastitis in sheep have been repeatedly documented. More recently, the disease was identified also to be of significant welfare concern (European Food Safety Authority 2009): clinical mastitis causes anxiety, severe pain, restlessness and changes in feeding patterns, whilst, in subclinical mastitis, behavioural patterns of sheep change.

Invited Review: Role of staphylococci in mastitis in sheep

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Abstract

Staphylococci have been isolated from various sites of the body of healthy sheep, as well as from many infections of those animals, the main one being mastitis. The objective of this review is to appraise the importance and significance of staphylococci in causing mastitis in ewes. The review includes a brief classification and taxonomy of staphylococci and describes the procedures for their isolation and identification, as well as their virulence determinants and the mechanisms of resistance to antibacterial agents. Various staphylococcal species have been implicated in staphylococcal mastitis and the characteristics of isolates are discussed with regard to potential virulence factors. Staphylococcal mastitis is explicitly described, with reference to sources of infection, the course of the disease and the relevant control measures. Finally, the potential significance of staphylococci present in ewes' milk for public health is discussed briefly.

Effect of feeding level during the prepubertal phase on mammary gland development in female goat kids

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France and Switzerland

Abstract

The experiment reported in this research communication aimed to determine the effects of post-weaning feeding level after early weaning on mammary parenchyma development in Alpine goats. Thirty Alpine female goat kids were weaned early (at around 9.8 kg and 32 days of age) and fed different levels of concentrate: Control (C, 730 g DM/d, n=10), Low (L, 365 g DM/d, n=10) or High (H, 1090 g DM/d, n=10) until 235 days of age with *ad libitum* hay and water. Half of the goat kids were slaughtered before puberty (at around 208 days of age) and half at midgestation (at around 308 days of age and 70 days of gestation) for mammary parenchyma sampling. A histological analysis, Western blot and DNA quantification were performed. Blood samples were taken before puberty and at midgestation to determine plasma levels of IGF-I and prolactin. The mammary gland weights before puberty and at midgestation were positively and significantly associated with concentrate level. However, the organization of the mammary parenchyma and protein expression and quantity of DNA in the parenchyma were similar among the three groups. Before puberty, prolactin and IGF-I concentrations were significantly increased by the feeding level. In conclusion, feeding level after early weaning did not impact mammary parenchyma structure although it modified the weight of the mammary gland. The establishment of the mammary gland was not impacted by rearing management before puberty. Hence, increasing the feeding level during the rearing period could be an interesting way to increase the body development of goats without impairing mammary development whilst having a positive impact on reproductive parameters such as litter weight.

Early lactation performance in Holstein heifers first calving at 36 months and managed for high or low weight gain during mid- and late gestation

Yannick Le Cozler, Jean-Louis Troccon, Bernard Marquis and Philippe Faverdin

France

Abstract

The effect of weight gain during mid- and late gestation in dairy heifers on performance at the start of first lactation was studied. In this experiment, 47 Holstein heifers with first calving at 36 months of age were used. The plane of nutrition aimed to have a high (900 g/d, H; n = 23) and low (500, L; n=24) average daily gain (ADG) from the 4th month of gestation until 3 weeks before the expected day of calving, achieved by *ad libitum* intake of high quality pasture (H) or controlled intake of a total mixed ration (L). Body weight (BW), body condition score (BCS), milking, and reproductive performances were recorded. Concentrations of plasma non-esterified fatty acids (NEFA), glucose, beta-hydroxybutyric acid (BHBA), and urea were characterised at weeks 2, 4, 6 and 8 of lactation. Milk fatty acid composition was determined at weeks 3 and 6. A total of 39 heifers successfully calved and completed first lactation. During feeding treatment the required ADG were achieved. BW and BCS were higher in H heifers at calving compared to L heifers: 707 vs 640 kg, and 3.91 vs 3.01 respectively. H heifers lost more weight, BCS and had lower feed intake during the beginning of first lactation (-0.8 kg DM/d/heifer over the first 4 weeks of lactation). Per day of lactation, H heifers produced significantly more milk (29.2 vs 26.2 kg), fat (1.27 vs 1.07 kg) and protein (0.84 vs 0.477 kg) from 0 to 8 weeks of lactation. Concentrations of NEFA, glucose and BHBA were higher in H heifers compared to L heifers, but urea concentration was not affected. Concentration of preformed fatty acids in the milk (C16 and more) was higher. As a result, the calculated daily net energy balance during the first 8 weeks of lactation was -1.53 and -5.95 MJ for L and H heifers, respectively.

Effect of supplementation with Yerba Mate (*Ilex paraguariensis*) and vitamin E on milk lipoperoxidation in cows receiving diets containing ground soybean seeds

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Brazil

Abstract

This research communication addresses the hypothesis that the association of dietary Vitamin E and Yerba Mate could help to prevent or decrease oxidation of milk enriched in unsaturated fatty acids (UFA). Four multiparous lactating Holstein cows were used in a 4 × 4 Latin square. Treatments were: (1) control diet with no Yerba Mate or Vitamin E; (2) diet containing 375 IU/kg Vitamin E; (3) diet containing 30g/kg Yerba Mate; and (4) diet containing 375 IU/kg Vitamin E and 30 g/kg Yerba Mate. To increase unsaturated fatty acids in milk, cows were fed 172 g/kg soybean seeds (on a dry matter basis). There was no interaction between Vitamin E and Yerba Mate supplementation for milk antioxidant-related (polyphenols, reducing power, conjugated dienes, and TBARS) analyses. Milk reducing power was increased when cows were supplemented with Yerba Mate. Our results suggest that the association of dietary Vitamin E and Yerba Mate does not help to prevent or decrease oxidation of milk in UFA.

Effects of stocking density during the dry period on dairy cow physiology, metabolism and behaviour

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UK

Abstract

The effects of high stocking density during the dry period on dairy cow physiology, behaviour and welfare were investigated. Holstein Friesian cows (n=48, calving over a seven month period) were dried-off 60±4 days before their expected calving date, and allocated to either high (H) or low (L) stocking density groups. Cows were housed in cubicles from dry-off to 21 days before calving and then moved to straw yards until calving. In cubicle pens, H and L cows had 0.5 vs 1.0 feed yokes/cow and 1.0 vs 1.5 cubicles/cow, respectively, and in straw yards, 0.3m vs 0.6m linear feed-face space and 6m² vs 12m² lying space, respectively. Video observations of feeding behaviour during the 3 hours after feed delivery (3 days/week) and agonistic interactions at the feed-face during peak feeding (2 days/week) were made. Daily lying proportion was measured using an accelerometer device throughout the dry period. Concentrations of faecal glucocorticoid metabolites (FGCM) at dry-off, d7 and d35 after dry-off, and 21 and 7 days before calving and the change in energy metabolites (glucose, NEFA, BHB) from dry-off to 7 days before calving were measured. H cows were less likely to start feeding within 5 minutes of feed delivery and spent less time feeding compared to L cows, but they engaged in displacements more frequently and spent more time standing in the feed alley. Irrespective of the treatment groups, FGCM concentrations significantly increased from dry-off to d7 and remained higher during the dry period. Stocking density did not affect daily lying proportion, energy metabolites during the dry period and milk yield during subsequent lactation. This study found that whilst high stocking density during the dry period increased competition at the feed-face and altered feeding behaviour, it did not affect stress responses, energy metabolism or subsequent milk yield.

Serum haptoglobin and protein electrophoretic fraction modifications in buffaloes (*Bubalus bubalis*) around calving and during early lactation

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Italy

Abstract

Serum protein distribution and concentration can be affected by different physiological and pathological conditions. The aim of this study was to evaluate the changes in the concentration of serum protein fractions and haptoglobin in clinically healthy dairy buffaloes during late pregnancy and early lactation. Blood and milk samples were collected from 30 buffaloes at around 7 days before expected calving (blood only) and 7, 30 and 50 days after calving. In serum samples, the total protein, haptoglobin, albumin, α 1-, α 2-, β 1-, β 2-, γ -globulins, and albumin/globulin ratio (A/G) values were evaluated. In milk, fat %, protein %, lactose %, somatic cell score (SCS) were assessed, along with milk yield (MY) and daily milk production (DMP). The peripartum period significantly influenced ($P<0.005$) total protein, albumin, haptoglobin, α 2-, β 2- and γ -globulins ($P<0.005$). Milk yield, DMP and fat % changed significantly throughout the monitoring period ($P<0.005$). Milk yield and DMP were positively correlated with total protein, albumin, β 2-globulins and A/G ratio, and negatively correlated with haptoglobin and α 2-globulins. These results provide new knowledge about the serum protein electrophoretic pattern in Italian Mediterranean Buffaloes during the last phase of pregnancy and early stages of lactation.

Gain and loss of subcutaneous and abdominal fat depot mass from late pregnancy to 100 days in milk in German Holsteins

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Germany

Abstract

This research paper addresses the hypothesis that in times of negative energy balance around parturition in dairy cattle, lipids stored in adipocytes are mobilised in a more intensive manner out of the abdominal depots than out of the subcutaneous adipose tissues. Furthermore, the impact of niacin supplementation and energy density of the ration on adipose tissue mass gain and loss was assessed. Absolute masses of subcutaneous (SCAT), retroperitoneal (RPAT), omental (OMAT), mesenterial (MAT) and abdominal adipose tissue as a whole (AAT) were estimated by ultrasonography at -42, 3, 21 and 100 DIM. Absolute and relative daily gain during dry period (-42 to 3 DIM) and loss in fresh cow period (3 to 21 DIM) and early lactation period (22 to 100 DIM) were calculated. Feeding regime neither by niacin nor by energy density exerted any effect on adipose tissue masses. The AAT was always bigger than SCAT, but RPAT, OMAT and MAT did not differ amongst each other. All depot masses showed similar patterns with an increase during dry period and a decrease after calving. In fresh cow period AAT absolutely and relatively lost more mass than SCAT. This confirms that AAT is more intensively mobilised than SCAT during that time span. Further absolute daily gain during dry period was strongly negatively correlated with absolute daily loss during fresh cow period. This underlines the impact of individual body condition on adipose mobilisation in periparturient dairy cows. According to these results, it has to be taken into account that the largest amount of fat mobilised in the fresh cow period originates from AAT. This might impact the pattern of adipose derived metabolites and metabolic effectors interacting in physiological and deregulated adaptation to negative energy balance.

In dual-purpose subtropical goats, one hour of extra-light given from 16 to 17 h after dawn (pulse of light) in winter stimulates milk yield

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Abstract

This research communication addresses the hypothesis that in dual-purpose goats, exposure to one hour of extra-light given from 16 to 17 h after dawn (pulse of light) in winter stimulates milk yield. One group of goats was maintained under natural short photoperiod (natural day; ND (n = 7)). Another group of lactating females was submitted to an artificial long-day photoperiod consisting of 16 h light and 8 h darkness (long days; LD (n = 7)). A third group of females received one single hour of extra-light 16 h after the fixed dawn (pulse of light; PL (n = 6)). Goats from LD and PL yielded 30% more milk than goats from ND. Mean percentages of fat, protein and lactose contents in milk did not differ between the 3 groups at any stage of lactation, but these components in grams/day were higher in goats from PL than in the others two groups within the first 45 d of lactation. In conclusion, dual-purpose lactating goats that started their lactation during natural short days, the daily exposition to a 1-hour pulse of light is sufficient to stimulate milk yield compared to females maintained under natural short photoperiod.

Isolated perfused udder model for transcriptome analysis in response to *Streptococcus agalactiae*

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Brazil

Abstract

This study aimed to evaluate the transcriptional changes occurring in isolated perfused mammary alveolar tissue in response to inoculation with *S. agalactiae* and to identify the most affected biological functions and pathways after 3h. Four udders taken at slaughter from cows with healthy mammary gland were perfused *ex situ* with warmed and gassed Tyrode's solution. Mammary alveolar tissue samples were taken from the left fore and rear quarters (IQ-inoculated quarters) before inoculation (hour 0) and at 3 h post inoculation (hpi) and at the same times from control right fore and rear quarters (not inoculated: NIQ). A total of 1,756 differentially expressed genes (DEGs) were identified between IQ and NIQ at 3hpi using edgeR package. Within this set of DEGs, 952 were up regulated and mainly involved with innate immune response and inflammatory response, e.g., *CD14*, *CCL5*, *TLR2*, *IL-8*, *SAA3*, as well as in transcriptional regulation such as *FOS*, *STAT3* and *NFKBIA*. Genes down-regulated (804) included those involved with lipid synthesis e.g., *APOC2*, *SCD*, *FABP3* and *FABP4*. The most affected pathways were chemokine signaling, Wnt signaling and complement and coagulation cascades, which likely reflects the early stage response of mammary tissue to *S. agalactiae* infection. No significant gene expression changes were detected by RNA-Seq in the others contrasts. Real time-PCR confirmed the increase in mRNA abundance of immune-related genes: *TLR2*, *TLR4*, *IL-1 β* , and *IL-10* at 3hpi between IQ and NIQ. The expression profiles of *Casp1* and *Bax* for any contrasts were unaffected whereas *Bcl2* was increased in IQ, which suggests no induction of apoptosis during the first hours after infection. Results provided novel information regarding the early functional pathways and gene network that orchestrate innate immune responses to *S. agalactiae* infection. This knowledge could contribute to new strategies to enhance resistance to this disease, such as genomic selection.

The relationship between mastitis and the B-mode, colour Doppler ultrasonography measurements of supramammary lymph nodes in cows

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Turkey

Abstract

This research communication aims to test the hypothesis that B-Mode, colour Doppler ultrasonographic measurements and characteristics can identify mastitis in dairy cows. A total of 102 lactating cows were divided into 3 groups: cows in which all mammary quarters were CMT-negative, cows with CMT-positive mammary quarters and cows with clinical mastitis in at least one quarter. Colour Doppler ultrasonography measurements of the supramammary lymph nodes revealed that distortion-type vascular morphology, the rate of type 4 vascular densities and the incidence of mixed-type vascular distributions were highest in the clinical mastitis group, whereas the frequency of avascularity in supramammary lymph nodes was highest in the CMT-negative group. All differences were significant. In conclusion, the use of B-mode and colour Doppler ultrasonographic measurements of the supramammary lymph nodes can provide useful information about the current condition of mastitis in cows, although its diagnostic potential remains to be determined.

Residue concentration of cefquinome taking into account different milk fractions and comparing the performance of two screening tests

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Abstract

This Research Communication describes the residue concentration of a dry cow antibiotic in two different milk fractions and describes effects of milk fraction and milk composition on the test performance of a rapid screening and a microbial inhibitor test. Thirteen dry cows were treated with an intramammary dry cow antibiotic containing 150 mg cefquinome. Quarter foremilk and stripping samples were collected on the first 10 d postpartum. All milk samples were analyzed for milk composition by the local Dairy Herd Improvement Association and were tested for antibiotic residues using the rapid screening test Milchtest BL and the microbial inhibitor test Delvotest BR Brilliant Plates. The residue concentration of cefquinome was determined in foremilk and stripping samples from milkings 1, 2, 3, 5, and 7 after calving using high performance liquid chromatography – tandem mass spectrometry. The logarithm of cefquinome concentration (logCef) was higher in foremilk than in stripping samples and higher in milk samples with lower lactose content. Furthermore, logCef decreased with the number of milkings ($P < 0.001$). The Milchtest BL was more likely to be not evaluated (i.e. no test and control line or no control line appeared) in stripping samples and milk samples with higher protein content. In the Delvotest BR Brilliant Plates milk samples with higher protein content were more likely to have a false positive result (i.e. the screening test result was positive, but the HPLC-MS/MS result was below the detection limit of the screening test). These results indicate that foremilk is the recommended milk fraction to be tested for residues of cefquinome and that a high protein content can be a cause of test failure and false positive results when milk during the first 10 d postpartum is tested for antibiotic residues using screening tests.

Comparative genomics of casein genes

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Abstract

This research paper addresses the hypothesis that comparative genomics can give a new insight into the functionality of casein genes with respect to the casein micelle. Comparative genomics is a rapidly emerging field in computational biology whereby two or more genomes are compared in order to obtain a global view on genomes as well as assigning previously unknown functions for genes. Casein genes are among the most rapidly evolving mammalian genes, with the gene products mainly grouped into four types (α_{s1} , α_{s2} , β - and κ -casein). Functionally, casein genes are central to the casein micelle, the exact structure of which is still a subject of intense debate. Moreover, and adding to this complexity, some mammals lack some of the casein genes, although casein micelles have been observed in their milk. This observation has prompted an investigation into the distribution of casein genes across a host of mammalian species. It was apparent from this study that casein gene sequences are very diverse from each other and we confirmed that many mammalian species lack one or more of the casein genes. The genes encoding β - and κ -caseins are present in most mammals whereas α -casein encoding genes are less represented. This suggests different mechanisms for casein micelle formation in different species as well as the functions that are assigned to each individual casein.

Association between the *GHR*, *GHRHR* and *IGF1* gene polymorphisms and milk coagulation properties in Sarda sheep

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Italy

Abstract

We investigated whether variation of the sheep Growth Hormone Receptor (*GHR*), Growth Hormone Releasing Hormone Receptor (*GHRHR*) and Insulin-Like Growth Factor 1 (*IGF1*) genes were associated with milk coagulation properties (MCP) in sheep. The *GHR*, *GHRHR* and *IGF1* genes are part of the GH system, which is known to modulate metabolism, growth and reproduction as well as mammogenesis and galactopoiesis in dairy species. A total of 380 dairy Sarda sheep were genotyped for 36 SNPs mapping to these three genes. Traditional MCP were measured as rennet coagulation time (RCT), curd-firming time (k_{20}) and curd firmness at 30 minutes (a_{30}). Modeling of curd firming over time (CF_t) was based on a 60 minutes lactodynamographic test, generating a total of 240 records of curd firmness (mm) for each milk sample. The model parameters obtained included: the rennet coagulation time as a result of modeling all data available (RCT_{eq} , min); the asymptotic potential value of curd firmness (CF_p , mm) at an infinite time; the CF instant rate constant (k_{CF} , % /min); the syneresis instant rate constant (k_{SR} , % /min); the maximum value of CF (CF_{max} , mm) and the time at achievement of CF_{max} (t_{max} , min). Statistical analysis revealed that variation of the *GHR* gene was significantly associated with RCT, k_{SR} and CF_p ($P < 0.05$). No other significant associations were detected. These findings may be useful for the dairy industry, as well as for selection programs.

X-ray diffraction has limited applicability in investigation of milk tampering

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Brazil

Abstract

The aim of this work was to use X-ray diffraction to identify substances used for adulteration of raw milk and to determine if crystallographic analysis can detect extraneous substances in milk. Two unknown substances were sent anonymously by employers linked to the dairy chain, who claimed that they were added directly in milk prior to water addition by truck drivers. The samples were analyzed by X-ray diffraction and submitted to physicochemical analysis. The first substance was identified by X-ray diffraction as sodium citrate, complying with its physicochemical attributes, such as the powerful ability to decrease the freezing point. The second substance was identified by X-ray diffraction as sucrose and this result was also in agreement with its ability to increase the density, decrease the freezing point and finally, to be positive for sucrose in the resorcinol qualitative test. To evaluate if X-ray diffraction can detect extraneous substances already mixed in milk, fresh raw milk samples tampered with urea, sodium hydroxide, sodium citrate and sucrose were freeze dried and analyzed by X-ray diffraction, with no detection of any extraneous substances at any percentage. This is the first report of attempted diagnosis of extraneous substances in milk by X-ray diffraction. However, this technique can be useful only when applied to identify substances used for adulteration prior to its dilution in milk, once the amorphous nature of milk seems to be a limitation for the accurate detection of extraneous substances.

Monitoring residue concentrations in milk from farm and throughout a milk powder manufacturing process

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Abstract

The experiments reported in this research paper aimed to investigate differences in the levels of chlorate (CHLO), perchlorate (PCHLO), trichloromethane (TCM) and iodine residues in bulk tank (BT) milk produced at different milk production periods, and to monitor those levels throughout a skim milk powder (SMP) production chain (BTs, collection tankers [CTs], whole milk silo [WMS] and skim milk silo [SMS]). Chlorate, PCHLO and iodine were measured in SMP, while TCM was measured in the milk cream. The CHLO, TCM and iodine levels in the mid-lactation milk stored in the WMS were lower than legislative and industrial specifications (0.0100 mg/ kg, 0.0015 mg/ kg and 150 µg/ L, respectively). However, in late-lactation, these levels were numerically higher than the mid-lactation levels and specifications. Trichloromethane accumulated in the cream portion after separation. Perchlorate was not detected in any of the samples. Regarding iodine, the levels in mid-lactation reconstituted SMP were higher than that required by manufacturers (100 µg/ L), indicating that the levels in milk should be lower than 142 µg/ L. The higher residue levels observed in late-lactation could be related to the low milk volume produced during that period and changes in sanitation practices, while changes in feed management could have affected iodine levels. This study could assist in controlling and setting limits for CHLO, TCM and iodine levels in milk, ensuring premium quality dairy products.

A comparison of the heat stability of fresh milk protein concentrates obtained by microfiltration, ultrafiltration and diafiltration

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Canada, Brazil and Denmark

Abstract

The objective of this work was to evaluate the impact of changes during membrane filtration on the heat stability of milk protein concentrates. Dairy protein concentrates have been widely employed in high protein drinks formulations and their stability to heat treatment is critical to ensure quality of the final product. Pasteurized milk was concentrated three-fold by membrane filtration, and the ionic composition was modified by addition of water or permeate from filtration (diafiltration). Diafiltration with water did not affect the apparent diameter of the casein micelles, but had a positive effect on heat coagulation time (HCT), which was significantly longer (50 min), compared to the non diafiltered concentrates (about 30 min). UHT treatments increased the particle size of the casein micelles, as well as the turbidity of retentates. Differences between samples with and without diafiltration were confirmed throughout further analysis of the protein composition of the undispersible fraction, highlighting the importance of soluble protein composition on the processing functionality of milk concentrates.

Influence of different storage conditions on the performance of spray-dried yogurt used as inoculum for milk fermentation

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Argentina

Abstract

A commercial drinkable yogurt with and without 4% of added trehalose (as cell protectant) was spray-dried obtaining a powder with low water activity (a_w). Total bacterial count in the powder was between 8.48-8.90 log cfu/g. The dried yogurt was stored: i) at 38°C and $a_w = 0.33$; ii) at 38°C in hermetically sealed flasks ($a_w = 0.21/0.22$); iii) in a cyclic temperature chamber (10-20°C) in hermetically sealed flasks ($a_w = 0.21/0.22$). Whole milk was then fermented by adding an inoculum of spray-dried yogurt after storage under these different conditions. The kinetics of acidification showed the presence of a *lag* time which was strongly dependent on storage conditions. The data was fitted with a logistic type equation from which the *lag* time was calculated. To evaluate structural differences among samples, Fourier Transform Infrared spectra (FTIR) were recorded. Partial Least Squares (PLS) models enabled a good correlation between *lag* time of fermentation and FTIR spectra. The *lag* time for yogurt powder stored at a_w about 0.21/0.22 and cyclic temperature 10-20 °C remained approximately constant over the 12 weeks of storage, while all the other conditions resulted in a dramatic increase. The addition of trehalose had a small influence on *lag* time and, therefore, as a protectant of lactobacilli.

Set-style yoghurts made from goat milk bases fortified with whey protein concentrates

Evangelia Zoidou, Sofia Theodorou, Ekaterini Moschopoulou, Lambros Sakkas, Georgios Theodorou, Artemi Chatzigeorgiou, Ioannis Politis and Golfo Moatsou
Greece

Abstract

This research paper addresses the hypothesis that the fortification of goat milk base with whey protein concentrate (WPC) could affect both the textural and the biofunctional properties of set-style yoghurt. The effect of fortification of goat milk base with two different WPCs on thermophilic bacteria counts, proteolysis, physical and biofunctional properties of set-style yoghurts was studied at specific sampling points throughout a four-week storage period. Fortification and storage did not influence thermophilic counts. Physical properties were affected significantly ($P < 0.05$) by the composition of the protein and the mineral fraction of the WPC but not by the storage. ACE-inhibitory activity was moderate in accordance to low lactobacilli counts and lack of proteolysis. DPPH⁻-radical scavenging activity, Fe²⁺-chelating activity and superoxide scavenging activity were high. At 28 days an anti-inflammatory effect was observed, which was not affected by WPC addition.

Reduced-fat Frescal sheep milk cheese with inulin: a first report about technological aspects and sensory evaluation

Joyce Valle Borges, José Augusto de Souza, Rafael Fagnani, Giselle Nobre Costa and Joice Sifuentes dos Santos

Brazil

Abstract

This research paper aimed to evaluate the role of inulin as a fat replacer on the quality of Frescal sheep milk cheese. Sheep milk and its derivatives are a promising niche in the dairy industry, mainly due to increasing interest of consumers in diversified products. Three Frescal sheep milk cheese formulations, namely whole milk cheese (WMC), semi-skimmed cheese (SSC) and semi-skimmed cheese with 5 g 100 g⁻¹ inulin (SSCI) were prepared. Their composition was evaluated and the feasibility of using inulin as a fat substitute was investigated. SSC and SSCI were considered “reduced fat” or “reduced calorie” products. The addition of inulin to SSCI cheeses yielded textural parameters (firmness, adhesiveness, cohesiveness, and gumminess) with intermediate characteristics between SSC and WMC. All the formulations presented scores higher than 7.6 in sensory analysis. In conclusion, the use of inulin in semi-skimmed sheep cheese allowed the production of cheese with texturizing properties similar to whole milk sheep cheese, enabling the development of a foodstuff with lower caloric content and beneficial characteristics valued by consumers.

Recovery of milk fat globule membrane (MFGM) from buttermilk: effect of Ca-binding salts

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Israel

Abstract

In this Research Communication we present a study of the effect of Ca-binding salts on the recovery of milk fat globule membrane (MFGM) from buttermilk. Sodium phosphate buffer was used for the purpose of MFGM recovery from buttermilk for the first time and we showed that 0.1 M buffer at pH 7.2 was the most effective for the recovery of MFGM. The fact of high efficacy of sodium phosphate buffer in recovery of MFGM from buttermilk allowed us to suggest that MFGM in buttermilk is present in association with casein through Ca- bridges formed between phospholipids of MFGM and phosphate groups of casein, primarily with k-casein as the peripheral protein of casein micelles.