



Aberystwyth University

Effect of a blend of essential oils on the fermentation of starch-rich substrate as estimated by its gas production profile

Duval, Stephan; Newbold, C. James

Published in:

International Symposium on ruminant physiology (ISRP)

Publication date:

2009

Citation for published version (APA):

Duval, S., & Newbold, C. J. (2009). Effect of a blend of essential oils on the fermentation of starch-rich substrate as estimated by its gas production profile. In Y. Chilliard, F. Glasser, Y. Faulconnier, F. Bocquier, I. Veissie, & M. Doreau (Eds.), *International Symposium on ruminant physiology (ISRP)* (pp. 166-167). Wageningen Academic Publishers. <http://hdl.handle.net/2160/4418>

General rights

Copyright and moral rights for the publications made accessible in the Aberystwyth Research Portal (the Institutional Repository) are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Aberystwyth Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Aberystwyth Research Portal

Take down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

tel: +44 1970 62 2400
email: is@aber.ac.uk

Table of contents

Foreword	9
Invited contributions	43
Conference	
Evolutionary adaptations of ruminants and their potential relevance for modern production systems <i>M. Clauss, I.D. Hume and J. Hummel</i>	45
Digestion and absorption	
Recent advances in metagenomics applied to ruminant gastrointestinal ecosystem <i>K.E. Nelson</i>	46
Gene expression in the digestive tissues of ruminants and their relationships with feeding and digestive processes <i>E.E. Connor, R.W. Li, R.L. Baldwin, VI and C. Li</i>	47
The role of microbes in rumen lipolysis and fatty acid biohydrogenation <i>R.J. Wallace</i>	48
Microbial ecosystem and methanogenesis in ruminants <i>D.P. Morgavi, E. Forano, C. Martin and C.J. Newbold</i>	49
Transport of cations and anions across forestomach epithelia <i>S. Leonhard-Marek, F. Stumpff and H. Martens</i>	50
Carbohydrate quantitative digestion and absorption in ruminants: from feed starch and fiber to nutrients available for tissues <i>P. Nozière, I. Ortigues-Marty, C. Loncke and D. Sauvant</i>	51
Metabolism and endocrinology	
Nutritional regulation of foetal growth and implications for productive life in ruminants <i>M.E. Symonds</i>	52
Adipose tissue and muscle growth interactions in cattle <i>M. Bonnet, I. Cassar-Malek, Y. Chilliard and B. Picard</i>	53
The relationship between energy intake and efficiency of energy utilisation in lactating ruminants <i>B.J. Tolkamp</i>	54
Genomics of metabolic adaptations in the peri-partum cow <i>J.J. Looor</i>	55
Ruminant physiology	11

Trans fatty acids and mammary lipogenesis in ruminants <i>K.J. Shingfield, L. Bernard, C. Leroux and Y. Chilliard</i>	56
Metabolic and hormonal adaptations to heat stress in ruminants <i>U. Bernabucci, N. Lacetera, L.H. Baumgard, R.P. Rhoads, B. Ronchi and A. Nardone</i>	57
Digestion and metabolism integration	
Strategies for optimising nitrogen use by ruminants: digestive and metabolic mechanisms <i>S. Calsamiglia, A. Ferret, C.K. Reynolds, N.B. Kristensen and A.M. van Vuuren</i>	58
Nutrition and reproduction	
Nutritional sub-fertility in the dairy cow: towards improved reproductive management through a better biological understanding <i>N.C. Friggens, C. Disenhaus and H.V. Petit</i>	59
Nutrition and reproduction in the male ruminant in natural or artificial reproductive management <i>G.B. Martin</i>	60
Effects of pollutants on the reproduction and welfare of ruminants <i>S.M. Rhind, M. Bellingham, R.M. Sharpe, C. Cotinot, N.P. Evans, K.D. Sinclair, E. van der Zalm, K. Hart, J.S. Schmidt, B. Fischer, B. Mandon-Pepin, P. Pocar, T. Amezaga, R.G. Lea and P.A. Fowler</i>	61
Nutrition and welfare	
Impact of nutritional factors on the welfare of ruminants <i>G. Bertoni, L. Calamari and E. Trevisi</i>	62
Links between ruminants' feeding behaviour and their welfare <i>J.J. Villalba, F.D. Provenza and X. Manteca</i>	63
Stress and microbial endocrinology: prospects for ruminant nutrition <i>P. Freestone and M. Lyte</i>	64
Closing conference	
Feeding practices for sustainable ruminant production facing environmental changes and human food crisis <i>F. Bocquier and E. González-García</i>	65
Short communications – Digestion and absorption	
Prediction of starch digestion in the small intestine of lactating cows <i>A. Bannink, J.L. Ellis, J. France and J. Dijkstra</i>	68
Rate of propionate absorption influences intake in dairy cows fed ryegrass <i>A. Boudon, J. Juton, R. Delagarde, P. Faverdin and J.-L. Peyraud</i>	70

Ruminal calcium (Ca) transport as affected by luminal Ca concentrations and Ca sources <i>G. Breves, M. Wilkens, G. Ricken and B. Schröder</i>	72
Estimation of microbial N flow from purine derivative urinary excretion in sheep and goats fed diets with different alfalfa hay:concentrate ratios <i>G. Cantalapiedra-Hijar, E. Molina-Alcaide, S. Ramos, M.L. Tejido, D.R. Yáñez-Ruiz and M.D. Carro</i>	74
High sulfur content of dried distiller's grains: effects on ruminal fermentation <i>J.S. Drouillard, L.K. Thompson, S. Uwituze, K.K. Karges and L.C. Hollis</i>	76
The effect of accelerated diet step-up rate on performance of feedlot steers dosed with <i>Megasphaera elsdenii</i> NCIMB 41125 <i>P.H. Henning, A.A. Campbell, F.H. Hagg, H.H. Meissner and C.H. Horn</i>	78
The fate of glycerol entering the rumen of dairy cows <i>K. Holtenius, A. Werner Omazic and C. Kronqvist</i>	80
The effects of incremental fish oil supplementation on bacterial populations in the rumen <i>S. Huws, E.J. Kim, M.R.F. Lee, E. Pinloche, R.J. Wallace and N.D. Scollan</i>	82
Methane emissions and liveweight gain of cattle fed supplements of cottonseed and coconut oil <i>A.V. Klieve, S.R. McLennan, D. Ouwerkerk and R.S. Hegarty</i>	84
Effects of a niacin supplementation to different diets on rumen fermentation, amounts of niacin at the duodenum and its concentration in blood and milk of dairy cows <i>P. Lebzien, I.-D. Niehoff, L. Hüther, W. Bigalke, S. Dänicke and G. Flachowsky</i>	86
Alpine vegetation essential oils and their effect on rumen lipid metabolism <i>in vitro</i> <i>M. Lourenço, L. Falchero, A. Tava and V. Fievez</i>	88
Level of intake and physiological state influences methane emissions from sheep fed fresh pasture <i>S. Muetzel, T.W. Knight, S.O. Hoskin, G. Molano, S. Maclean, D. Silva-Villacorta and H. Clark</i>	90
Ruminal metabolism of soluble rapeseed meal protein <i>in vitro</i> <i>T. Stefanski and S. Ahvenjärvi</i>	92
Effects of particle size and dry matter content of a total mixed ration on intraruminal transport and net portal absorption of VFA in lactating dairy cows <i>A.C. Storm and N.B. Kristensen</i>	94
Use of polyethylene glycol (PEG) to assess the effect of condensed tannins on nitrogen balance and digestibility in sheep fed fresh sainfoin (<i>Onobrychis vicifolia</i>) <i>K. Theodoridou, J. Aufrère, D. Andueza and R. Baumont</i>	96

Influence of progressive faunation with <i>Entodinium caudatum</i> , <i>Epidinium ecaudatum</i> and <i>Eudiplodinium maggii</i> on ruminal fermentation and total tract digestibility in sheep <i>J.O. Zeitz, S.L. Amelchanka, T. Michałowski, K. Wereszka, M. Kreuzer and C.R. Soliva</i>	98
Characterisation of methanogens in the rumen of cattle with different feed efficiency <i>M. Zhou, E. Hernandez-Sanabria and L.L. Guan</i>	100
The influence of the grape pomace on ruminal parameters and retained nitrogen of sheep <i>M.J. Abarghuei, Y. Rouzbehan and D. Alipour</i>	102
Ammonia inhibits urea transport across the isolated rumen epithelium by modulating cellular extrusion of protons <i>K. Abdoun, F. Stumpff, K. Wolf and H. Martens</i>	104
Comparison of <i>in sacco</i> degradability of wheat straw treated in different ways <i>A. Aghazadeh, D. Ghorbannejad, N. Maheri-Sis and S. Razzagzadeh</i>	106
Ruminal microbial protein synthesis of wethers and heifers fed fresh temperate pastures supplemented or not with sorghum grain <i>M. Aguerre, C. Cajarville, G.V. Kozloski and J.L. Repetto</i>	108
Effect of using <i>Megasphaera elsdenii</i> NCIMB 41125 as a probiotic on feed intake and milk production in early lactation dairy cows <i>P.C. Aikman, P.H. Henning, C.H. Horn and A.K. Jones</i>	110
The effects of peppermint addition on the <i>in vitro</i> hydrogenation of fatty acids of hay <i>S. Ando, T. Yasutake, T. Ichinohe and T. Awano</i>	112
Effect of DCAD on performance of high producing dairy cows can be modulated by protein content of diets <i>E. Apper-Bossard, J.-L. Peyraud and F. Meschy</i>	114
Efficacy of the combined use of acids and heat to protect protein from sunflower meal against rumen degradation: metabolisable protein supply <i>J.M. Arroyo and J. González</i>	116
Effects of undernutrition on digestibility and live weight changes in Barbarine ewes <i>N. Atti, M. Doreau, M. Mahouachi and F. Bocquier</i>	118
Evaluation of DNA extraction methods from rumen contents for gut microbiota studies <i>G. Balmes, A. Serrano, A. Bach, M. Terre and A. Aris</i>	120
Estimating digesta kinetics of large and small particles in dairy cows fed primary growth and regrowth grass silages <i>A.R. Bayat, M. Rinne, K. Kuoppala, S. Ahvenjärvi and P. Huhtanen</i>	122
Effect of supplementation with high levels of soybean oil to rams fed dehydrated lucerne on digestibility and energy valorisation of the diets <i>R.J.B. Bessa and A.V. Portugal</i>	124

A meta-analysis of the satiating effect of VFA absorbed in the rumen and glucose absorbed in the intestines of ruminants <i>A. Boudon, J. Juton, L. Delaby and P. Faverdin</i>	126
Effects of the methionine analogue isopropyl ester of 2-hydroxy-4-methylthio-butanoic acid (HMBi) on rumen parameters <i>A. Brisson, A. Marquet, P. Mosoni, D.P. Morgavi, E. Forano, C. Martin and E. Devillard</i>	128
Integrated model of omasal bicarbonate transport in sheep: interactions with SCFA and Na ⁺ /H ⁺ exchange <i>D. Caushi, M. Beisele, K. Wolf and H. Martens</i>	130
Effects of urea treated <i>Leucaena leucocephala</i> leaves and supplements on <i>in vitro</i> fermentation characteristics <i>Z.P. Chen, Y.H. Yang, Z.S. Wang, A.G. Zhou, B. Xue and Y.M. Cai</i>	132
Evaluating anaerobic fermentation profiles of corn milling co-products <i>M.L. Chizzotti, L.O. Tedeschi and P.J. Kononoff</i>	134
Two different drying methods of bovine faeces for estimating <i>n</i> -alkane concentration, intake and digestibility: a comparison <i>F. Sánchez Chopa, L.B. Nadin and H.L. Leandro</i>	136
Increasing alfalfa non structural carbohydrates through genetic selection and cutting management <i>C. Chouinard-Michaud, R. Michaud, Y. Castonguay, A. Bertrand, G. Bélanger, G.F. Tremblay, R. Berthiaume and G. Allard</i>	138
Effect of induction of sub-acute ruminal acidosis (SARA) on milk fat profile and rumen parameters <i>E. Colman, W. Fokink, M. Craninx, J.R. Newbold and V. Fievez</i>	140
Protein fermentation characteristics in rumen fluid determined with the gas production technique <i>J.W. Cone, M.A.M. Rodrigues, C.M. Guedes and M.C. Blok</i>	142
Performance and ruminal protozoa in lambs with chromium supplementation <i>B.S.L. Dallago, C.M.M. Pimentel, D.F. Caldeira, A.C. Lopes, T.P. Paim, E. Franco, B.O. Borges and H. Louvandini</i>	144
The effect of grain sources on <i>in vitro</i> rumen acid load of close-up dry cow diets <i>S. Danesh Mesgaran, A. Heravi Moussavi, H. Jahani-Azizabadi, A.R. Vakili, F. Tabataiee and M. Danesh Mesgaran</i>	146
<i>In vitro</i> first order dry matter disappearance kinetics of guar meal <i>M. Danesh Mesgaran, H. Jahani-Azizabadi, M. Vatandoost, M. Mojtahedi, E. Abdi Ghezeljeh, A.R. Vakili and A. Fanaie-Nokar</i>	148

Effects of <i>Saccharomyces cerevisiae</i> from rice distiller's by-product on <i>in sacco</i> degradability kinetics of dry matter constituents <i>S. Das, P. Biswas and A.K. Patra</i>	150
The effect of pH and osmolality on the level and composition of soluble N in untreated legumes for ruminants <i>L.H. de Jonge, W. Spek, H. van Laar and J. Dijkstra</i>	152
Effect of the rumen environment and type of supplemented nitrogen on the predation of rumen bacteria by protozoa <i>in vitro</i> <i>G. de la Fuente, A. Belanche, J. Balcells and M. Fondevila</i>	154
Endogenous phosphorus flow in ruminants <i>R.S. Dias, T. Silva, R.M.P. Pardo, J.C. Silva Filho, D.M.S.S. Vitti, E. Kebreab, S. Lopez and J. France</i>	156
Application of the Weston model to predict feed intake in calves <i>R.S. Dias, H. Patino, E. Prates and J. France</i>	158
Effect of coconut oil supplementation on methane emission from grazing yak (<i>Bos grunniens</i>) in winter pasture on the Tibetan plateau <i>X. Ding, R.J. Long, J. Mi and B. Yang</i>	160
Effect of extrusion and lagnosulfonate treatment of canola seed on feed intake and digestibility of dairy cows <i>W.B.R. dos Santos, C.A. Neves, G.T. dos Santos, D.C. da Silva, A.F. Branco, F.S. dos Santos and H.V. Petit</i>	162
Effects of beta acid extracts of hops on ruminal metabolism and apparent total tract digestibility by steers fed high concentrate diets <i>J.S. Drouillard, S. Uwituze, M.K. Shelor, J.J. Higgins and S. Garden</i>	164
Effect of a blend of essential oils on the fermentation of starch-rich substrate as estimated by its gas production profile <i>S.M. Duval and C.J. Newbold</i>	166
Prediction of methane production by cattle in some current whole farm models <i>J.L. Ellis, A. Bannink, J. Dijkstra, E. Kebreab and J. France</i>	168
Effect of energy intake on splanchnic net flux and whole body balance of nitrogen in mature sheep fed lucerne hay cubes <i>M. EL-Sabagh, T. Sugino, T. Obitsu and K. Taniguchi</i>	170
Methane production by growing bulls fed diets supplemented or not with extruded linseed <i>M. Eugène, C. Martin, M.M. Mialon, D. Krauss, G. Renand and M. Doreau</i>	172
Improvement of <i>in vitro</i> ruminal fermentation of ensiled peppermint (<i>Mentha piperitae</i>) byproduct when combined with alfalfa hay or corn silage <i>J.-S. Eun, D.R. ZoBell and Suhubdy</i>	174

Kinetics of <i>in vitro</i> ruminal fermentation of glycerol, propylene glycol, molasses and their drenching effect in blood concentrations of glucose and insulin in ewes <i>S.M. Ferraro, G.D. Mendoza, L.A. Miranda and C.G. Gutiérrez</i>	176
Effect of sodium butyrate feed additive in milk replacer and/or starter mixture on mRNA expression of IGF-1, IGF-2 and ghrelin in GIT of neonatal calves <i>J. Flaga, P. Górka, Z.M. Kowalski, U. Kaczor, A. Grzegorzewska, M. Jaworski, P. Pietrzak, A. Kotunia and R. Zabielski</i>	178
Activities of microbial fibrolytic enzymes in ten herbivore microbial ecosystems <i>F.N. Fon and I.V. Nsahlai</i>	180
Retinol-Binding-Protein 4 (RBP4) and abomasal displacement (DA) <i>M. Fűrll, B. Fűrll, L. Locher and J. Raila</i>	182
Inoculants for low-dry matter corn crop ensilage: an ongoing question <i>A. Ghaempour, G.R. Ghorbani, M. Khorvash and A. Nikkhah</i>	184
Use of chitosans to modulate digestion and ruminal fermentation in sheep <i>I. Goiri, L.M. Oregui and A. Garcia-Rodriguez</i>	186
Efficacy of the combined use of acids and heat to protect protein from sunflower meal against rumen degradation: 2. Feed amino acid supply <i>J. González, J.M. Arroyo, M. Ouarti and C. Centeno</i>	188
Two hour chamber measurement provides a useful estimate of daily methane production in sheep <i>J.P. Goopy, R.S. Hegarty and D.L. Robinson</i>	190
The effect of type of liquid feed on small intestine development in newborn calves <i>P. Górka, P. Pietrzak, A. Kotunia, J. Flaga, Z.M. Kowalski and R. Zabielski</i>	192
Effects of supplementation timing on ruminal digestion and fermentation pattern during continuous culture fermentation of grass herbage <i>P. Gregorini and K.J. Soder</i>	194
In-series tension receptors and epithelial receptors in the omasum of sheep <i>W.L. Grovum</i>	196
Changes in methanogenic populations residing in the rumen of dairy cows in response to a sainfoin (<i>Onobrychis viciifolia</i> Scop.) based diet <i>A. Guglielmelli, O. Perez, F. Tiemessen, M. Domenis, R. Albanese, S. Calabrò, H.S. Smidt and W.F. Pellikaan</i>	198
Virginiamycin supplementation has a selective effect on rumen bacterial population of Chinese Luxi steers <i>T.J. Guo, J.Q. Wang, D.P. Bu, K.L. Liu, J.P. Wang, D. Li, S.Y. Luan, J. Wang and X.K. Huo</i>	200

Dietary protein and carbohydrate alter ruminal fermentation, digesta characteristics and behaviour in lactating dairy cattle <i>M.B. Hall</i>	202
Heat stress alters ruminal fermentation and digesta characteristics and behaviour in lactating dairy cattle <i>M.B. Hall</i>	204
Effects of replacing soya with <i>Vicia faba</i> beans on fermentation in the rumen of the ovine Sicilo-Sarde breed <i>M. Hammami, H. Rouissi, H. Selmi, B. Rekik and A. Ben Gara</i>	206
Diet selection and rumen fermentation parameters of sheep grazing four subtropical pastures during the summer <i>A. Hassen and W.A. van Niekerk</i>	208
Effect of different inclusion levels of oil palm fronds on <i>in vitro</i> rumen fermentation with adapted and non-adapted rumen fluid <i>H.A. Hassim, M. Lourenço, G. Goel, Y.M. Goh and V. Fievez</i>	210
Identification of novel biohydrogenation intermediates formed during incubations of linoleic acid with rumen microbiota <i>in vitro</i> <i>A.M. Honkanen, J.M. Griinari, V. Toivonen, A. Vanhatalo and K.J. Shingfield</i>	212
The effect of subacute ruminal acidosis induction and recovery on rumen methanogen density in dairy cattle <i>S.E. Hook, M.A. Steele, K.S. Northwood, A.-D.G. Wright and B.W. McBride</i>	214
Selective enrichment, isolation and characterisation of fast-growing acid-tolerant lactate utilisers from rumen contents of animals on high-energy diets <i>C.H. Horn, A. Kistner and G. Fouche</i>	216
Vitamins D and E are not metabolised in the rumen of high yielding dairy cows <i>L. Hymøller and S.K. Jensen</i>	218
Effects of dietary linoleic and linolenic acids on the rumen population of cellulolytic bacteria and ciliate protozoa in dairy cows <i>M. Ivan, J. Chiquette, H.V. Petit and A.R. Alimon</i>	220
Effect of maturity stage at harvest on the number of large particles in faeces from pregnant ewes fed grass silage <i>A.R. Jalali, P. Nørgaard and E. Nadeau</i>	222
Degradation of lignocellulose and methane production by anaerobic fungal monoculture and their natural co-cultures with methanogens obtained from different herbivores <i>W. Jin, Y.F. Cheng and W.Y. Zhu</i>	226
The effects of a trehalose-producing <i>Saccharomyces cerevisiae</i> strain on rumen fermentation in sheep <i>V. Jurkovich, H. Fébel, J. Kutasi, A. Harnos, P. Kovács, L. Könyves and E. Brydl</i>	228

Effects of rapeseed lipids in the diet on ruminal lipid metabolism and milk fatty acid composition in cows fed grass silage based diets <i>P. Kairenius, V. Toivonen, S. Ahvenjärvi, A. Vanhatalo, D.I. Givens and K.J. Shingfield</i>	232
The effects of garlic oil on <i>in vitro</i> rumen fermentation and methane production are influenced by the basal diet <i>C. Kamel, H.M.R. Greathead, M.J. Ranilla, M.L. Tejido, S. Ramos and M.D. Carro</i>	234
Effects of yellow grease supplementation with two levels of forage to concentrate ratios on digestion and milk production of lactating dairy cows <i>S. Kargar, G.R. Ghorbani and M. Alikhani</i>	236
Improved methodology for estimating rumen protein degradation using the <i>in vitro</i> gas production technique <i>L. Karlsson, M. Hetta, P. Udén and K. Martinsson</i>	238
Relationship between ruminal mat characteristics and chewing activity in Holstein dry cows fed beet pulp and alfalfa or grass hay <i>K. Izumi</i>	240
Stability of fatty acids in grass and maize silages after exposure to air during the feed out period <i>N.A. Khan, J.W. Cone and W.H. Hendriks</i>	242
Effects of a diverse high altitude forage in comparison with a total mixed ration on ruminal nutrient fermentation and methanogenesis <i>in vitro</i> <i>R. Khiaosa-ard, F. Leiber, M. Kreuzer and C.R. Soliva</i>	244
Microbial outflow determined from reticular or omasal sampling of dairy cows fed grass silage with different neutral detergent fibre content at two levels of concentrate supplementation <i>S.J. Krizsan, S. Ahvenjärvi, S.K. Nes and H. Volden</i>	246
Potassium transport across gastrointestinal epithelia of ruminants <i>N. Kronshage and S. Leonhard-Marek</i>	248
Rumen pH and function in dairy cows of the South Island of New Zealand <i>J. Laporte-Urbe and J. Gibbs</i>	250
Influence of various concentrations of triticale meal in cattle feed on rumen protozoa <i>O. Latal, J. Pozdisek and A. Pechova</i>	252
Strategies of forage supplementation to increase dry matter intake and rumen outflow rate in heifers fed low-quality hay of tropical grass <i>J.D. Latorre, A.J. Ayala and J.C. Ku</i>	254
Effect of feeding grain on ruminal acidosis in cattle: a pilot study <i>I.J. Lean and A.R. Rabiee</i>	256

Effect of feeding grain on ruminal acidosis in cattle: acidosis indices <i>I.J. Lean and A.R. Rabiee</i>	258
Using Grazplan software to estimate annual methane outputs of grazing Merino ewes having different lifetime reproductive performances <i>G.J. Lee</i>	260
Substrate oriented rumen fermentations in sheep during provoked acidosis <i>A. Lettat, P. Nozière, M. Silberberg, D.P. Morgavi and C. Martin</i>	262
Effects of levels and combinations of fish oil and sunflower oil inclusion in the diet on rumen fermentation and total tract digestibility in China Nooxi steers <i>S. Liang, D.P. Bu, J.Q. Wang, Khas-Erdene, S.J. Liu, H.Y. Wei and L.Y. Zhou</i>	264
Effect of combined ensiling of sorghum and soybean with or without molasses and lactobacilli on <i>in vitro</i> rumen fermentation <i>R. Lima, M. Lourenço, R.F. Díaz, A. Castro and V. Fievez</i>	266
<i>In vitro</i> gas production measurements to evaluate interactions among corn, soybean meal and distillers grain <i>Y. Lin, Z.S. Wang, S.J. Lai and G.Y. Yang</i>	268
Effect of acetate kinase gene deletion engineering bacteria of <i>Selenomonas ruminantium</i> on propionate metabolism <i>in vitro</i> <i>M. Long, X. Xing, L. Liu, X.Y. Pang, Z. Wang and G.W. Liu</i>	270
Comparisons in bacteria community changes in the rumen and in <i>in vitro</i> cultures as revealed by denaturing gradient gel electrophoresis <i>X.J. Lv, S.Y. Mao and W.Y. Zhu</i>	272
Effect of feed intake on the intestinal supply of N fractions in dairy cows <i>G.L. Lynch, T.H. Klusmeyer, I.R. Ipharraguerre and J.H. Clark</i>	274
Is the <i>trans</i> -10 shift that sometimes occurs in the ruminal biohydrogenation of linoleic acid caused by low pH or starch? A Rusitec study <i>M.R.G. Maia, R.J.B. Bessa and R.J. Wallace</i>	276
Variation in sire genetics is an irrelevant determinant of digestibility in supplemented crossbred sheep fed canola and lupins <i>A.E.O. Malau-Aduli, R.E. Walker, J.M. Sykes, C.F. Ranson and C.W. Bignell</i>	278
Carbonic anhydrase II is secreted into whole saliva of three ruminating species <i>M. Mau, T.M. Kaise and K.-H. Südekum</i>	280
Effects of forage to concentrate ratio on rumen fermentation pattern in buffaloes <i>A. Aghazadeh, N. Parvishi and H. Mansoury</i>	282
Mid to long term stability of ruminal physicochemistry in dairy cows fed a fibre- or a starch-based diet <i>V. Monteils, M. Rey and T. Gidenne</i>	284

Fatty acid profile and fermentation characteristics of ruminal fluid of dairy cows fed TMR complemented with different grazing times <i>E. Morales-Almaráz, F. Vicente, A. González, A. Soldado, A. Martínez-Fernández and B. de la Roza-Delgado</i>	286
Relationship between degradation characteristics of canola and pasture hays and milk production characteristics of late lactation dairy cows <i>S.K. Muir, J. Hill, Phanchung, J. Tharmaraj and D.F. Chapman</i>	290
Effect of feeding different levels of banana peelings on the rumen environment, degradability and digesta kinetics of cattle fed a basal diet of elephant grass <i>J. Nambi-Kasozi, F.B. Bareeba, E.N. Sabiiti and E. Spörndly</i>	292
Effect of associating ryegrass to lucerne or sainfoin on rumen digestion <i>in vitro</i> <i>V. Niderkorn, R. Baumont, A. Le Morvan, R. Bergeault, Y. Papon and D. Macheboeuf</i>	294
Methane production and microbial profile in the rumen from three high water-soluble carbohydrate perennial ryegrass monocultures differing in their heading dates using RUSITEC <i>V. Niderkorn, E.J. Kim, F.J. Hou, C.J. Newbold and N.D. Scollan</i>	296
The relationship between soluble and total faecal phosphorus excretion in lactating dairy cows of the Swedish Red and White breed <i>M. Nordqvist, R. Spörndly and K. Holtenius</i>	298
Prediction of digestibility and intake of mixed diets in dairy cows from faecal samples with near infrared reflectance spectroscopy (NIRS) <i>L. Nyholm, J. Nousiainen, M. Rinne, S. Ahvenjärvi and P. Huhtanen</i>	300
Bioavailability of soil-bound persistent organic pollutants in dairy ruminants: a review <i>F. Ounnas, G. Rychen, C. Feidt and S. Jurjanz</i>	302
Effect of medium-chain fatty acids from coconut oil or krabok oil on <i>in vitro</i> rumen biohydrogenation <i>P. Panyakaew, G. Goel, M. Lourenço, C. Yuangklang and V. Fievez</i>	304
Evaluation of the nutritive value of processed barley grain with different methods using an <i>in vitro</i> gas production technique with two sources of inocula <i>E. Parand and A. Taghizadeh</i>	306
Comparison of transcriptome and proteome expressions in the anaerobic rumen fungus <i>Neocallimastix frontalis</i> PMA02 under different substrate conditions <i>M.-A. Park, J. Song, M. Kwon, J.K. Ha and J. Chang</i>	308
Effects of crude glycerin on ruminal metabolism and digestibility when fed in combination with steam-flaked corn <i>G.L. Parsons and J.S. Drouillard</i>	310
Evaluation of models for prediction of voluntary feed intake in beef steers <i>H. Patino, K. Swanson, J. France and E. Prates</i>	312

Effect of different combining ratios of high-quality and poor-quality roughage on rumen fermentation parameters <i>in vitro</i> <i>D.Y. Peng, Z.S. Wang, B. Xue, L.Z. Wang and A.Q. Lai</i>	314
Mucosal acidification and hyperosmolarity differentially affect the barrier function of the isolated ovine ruminal epithelia <i>G.B. Penner, J.R. Aschenbach, G. Gäbel and M. Oba</i>	316
Effect of supplemental yeast (<i>Saccharomyces cerevisiae</i>) and fat level on feed intake and nutrient digestion in beef cattle <i>W. Polviset, C. Yuangklang, C. Wachirapakorn and S. Chumpawadee</i>	318
Methanogenesis kinetics and fermentation patterns in the rumen of sheep with or without protozoa <i>M. Popova, C. Martin, Y. Rochette, D. Graviou and D.P. Morgavi</i>	320
Methodological aspects of quantitative analysis of ruminant faeces for adenosine triphosphate by the firefly luciferin-luciferase system <i>M. Predotova, A. Sundrum, R.G. Joergensen and E. Schlecht</i>	322
Effects of increasing dietary protein on intake and total tract apparent digestibility in dairy crossbred heifers <i>M.F.S. Queiroz, T.T. Berchielli and R.D. Signoretti</i>	326
Modulation of Na transport by heat shock proteins in sheep rumen epithelium <i>I. Rabbani, U. Tietjen and H. Martens</i>	328
Electrogenic transport of SCFA anions in sheep rumen epithelium <i>R. Rackwitz, J.R. Aschenbach, P. Philipp and G. Gäbel</i>	330
Effects of the ratio of nonfibre carbohydrates to rumen degradable protein on feed intake and digestibility in mid-lactation Holstein cows <i>H. Rafiee</i>	332
Influence of diet and detachment procedure on recovery of solid-associated microbes from sheep ruminal digesta <i>S. Ramos, M.L. Tejido, M.E. Martínez, M.J. Ranilla, C. Saro and M.D. Carro</i>	334
Mode of action of <i>Chrysanthemum coronarium</i> as a modulator of biohydrogenation of fatty acids in the rumen <i>E. Ramos Morales, N. McKain, C. Atasoglu, T.A. Wood and R.J. Wallace</i>	336
Portal absorption of ethanol and propanol in early lactating dairy cows <i>B.M.L. Raun and N.B. Kristensen</i>	338
Effects of high non-structural carbohydrate concentration in lucerne on feeding behaviour and ruminal pH of early lactating cows <i>G. Régimbald, V. Girard, A.F. Brito, G. Allard, D. Pellerin, G.F. Tremblay and R. Berthiaume</i>	340

Comparison of marker infusion techniques to determine the clearance of ruminal volatile fatty acids <i>J.C. Resende Júnior, J.L.P. Daniel, F.C. Meireles, M.B. Moreira, R.F. Lima and M.G. Cardoso</i>	344
Differences of bacterial communities in the rumen liquor and faeces of steers fed on alfalfa or sainfoin silage and under arctic production <i>G.A. Romero-Perez, K.H. Ominski, T.A. McAllister and D.O. Krause</i>	346
Molecular diversity of the bacterial community in the rumen of the feral dromedary camel <i>A.A. Samsudin, A.-D.G. Wright and R.A.M. Al Jassim</i>	348
Variations in the production of CH ₄ per unit of digestible organic matter intake <i>D. Sauvant and S. Giger-Reverdin</i>	350
Trace elements of gastrointestinal tract contents of the European moose (<i>Alces alces</i>) <i>A. Scopin and T. Rukavishnikova</i>	352
Effect of low dietary P on rumen microbial P metabolism and synthesis <i>J. Sehested, P. Lund, M.R. Weisbjerg and T. Hvelplund</i>	354
Effects of synchronisation of energy and nitrogen supply on ruminal fermentation and microbial protein synthesis <i>J.K. Seo, H.J. Kim, J.K. Baek and J.K. Ha</i>	356
Influence of tree leaf supplementation on nutrient utilisation, rumen fermentation and digesta kinetics in sheep fed <i>Cenchrus ciliaris</i> grass based diets <i>S. Singh</i>	358
A new method for simultaneous recording of methane eructation, reticulo-rumen motility and jaw movements in rumen fistulated cattle <i>A.-K. Skovsted Koch, P. Nørgaard and K. Hilden</i>	360
Dramatic shifts in rapidly fermentable carbohydrates influence mRNA expression of IGFBP3, IGFBP5 and IGFBP6 in rumen papillae <i>M.A. Steele, S.E. Hook, S.L. Greenwood, O. Al Zahal and B.W. McBride</i>	362
Effects of various linseed treatments on biohydrogenation of C18:3n3 <i>in vitro</i> <i>A. Sterk, R. Hovenier, B. Vlaeminck, A.M. van Vuuren and J. Dijkstra</i>	364
The ruminal anion channel: a pathway for the efflux of SCFA <i>F. Stumpff, M. Georgi and H. Martens</i>	366
Novel technique for tracing ingestive and ruminative behaviours <i>Suhubdy, B.A. Young, D.R. ZoBell and F.D. Provenza</i>	368
Postnatal changes in the expression of the ruminal monocarboxylate transporter 1 <i>F. Taifour, J. Steinhoff, H. Pfannkuche, H.M. Hammon and G. Gäbel</i>	370

Digestion site and extent of nitrogen fractions in growing steers fed maize silage and lucerne hay with different ratios <i>K. Taniguchi, K. Yukizane, T. Obitsu and T. Sugino</i>	372
Ruminal fatty acid profile and fermentation characteristics in ewes fed sunflower and fish oils <i>P.G. Toral, G. Hervás, K.J. Shingfield, V. Toivonen, A. Belenguer and P. Frutos</i>	374
Nutritive value attributes in timothy and alfalfa as affected by sample preparation treatments <i>G.F. Tremblay, S. Pelletier, A. Bertrand, G. Bélanger, Y. Castonguay and R. Michaud</i>	376
Intake, growth, ciliate protozoa and extra cellular microbial enzyme status of lambs on different yeast culture feeding <i>M.K. Tripathi and S.A. Karim</i>	378
Enzymatic approach of linoleic acid ruminal biohydrogenation <i>A. Troegeler-Meynadier, M.C. Nicot and F. Enjalbert</i>	380
Intake and partial digestion of nitrogen by sheep grazing four subtropical pastures during the summer <i>W.A. van Niekerk and A. Hassen</i>	382
Effects of extruded linseed, a mixture of C8:0 and C10:0 fatty acids, and diallyldisulfide on methane emission in dairy cows <i>S.M. van Zijderveld, W.J.J. Gerrits, J. Dijkstra, J.R. Newbold, D. Deswysen and H.B. Perdok</i>	384
Ruminal bacteria, protozoa and fatty acid profile in sheep and goats supplemented with tannins <i>V. Vasta, D.R. Yáñez-Ruiz, M. Mele, A. Serra, G. Luciano, M. Lanza and A. Priolo</i>	386
Effects of dietary concentrate to forage rate on microbial protein recycling in the rumen of goats <i>M.Z. Wang, H.R. Wang and G.X. Li</i>	388
<i>In vitro</i> effects of phlorotannins from <i>Ascophyllum nodosum</i> (brown seaweed) on rumen bacterial populations and fermentation <i>Y. Wang, T.W. Alexander and T.A. McAllister</i>	392
Study on the measurement of fluorescence-labelled technique for protozoa predation rate on bacteria in the rumen <i>M.Z. Wang, H.R. Wang and L.H. Yu</i>	394
Effect of freeze-thaw treatment of herbage on the biohydrogenation of α -linolenic acid <i>D. Warner, A. Elgersma and R.J. Dewhurst</i>	396
Estimation of the fractional rate of forage NDF digestion by <i>in vitro</i> gas production or <i>in situ</i> methods <i>M.R. Weisbjerg, M. Rinne and P. Huhtanen</i>	398

Gastrointestinal calcium (Ca) transport in sheep as affected by dietary Ca and treatment with 1.25-dihydroxyvitamin D ₃ <i>M. Wilkens, N. Mrochen, G. Breves and B. Schröder</i>	400
Effects of propionate-producing bacteria on propionate metabolism <i>in vitro</i> <i>X. Xing, M. Long, X.Y. Pang, Z. Wang and G.W. Liu</i>	402
Comparison of passage rate, structure and motility of the reticulo-rumen in two sheep breeds <i>A. Yamazaki, S. Choki, T. Kakizaki, A. Matsuura, M. Irimajiri and K. Hodate</i>	404
Effect of dietary vitamin E supplementation on dietary nutrient digestibility in the Boer goat <i>L. Yan, H. Meng, H. Luo and H. Zhu</i>	406
Site and extent of feed digestion in the digestive tract of beef cattle fed high-grain diet supplemented with cinnamaldehyde or eugenol <i>W.Z. Yang, C. Benchaar, M.L. He and K.A. Beauchemin</i>	408
Effects of aniso-prescription of chinese herbal medicine on the main digestive enzymes in the jejunum of growing cattle <i>W.R. Yang, Y.H. Cui, Z.B. Yang, S.Z. Jiang and P. Wang</i>	410
Effects of dietary energy intake and ruminal SCFA on mRNA expression of Na ⁺ /H ⁺ exchangers in rumen epithelium of goats <i>W. Yang, H. Martens and Z. Shen</i>	412
Effect of calcium level on feed intake, nutrient digestion, fecal microbial population and growth performance of dairy calves <i>C. Yuangklang, C. Wachirapakorn and A.C. Beynen</i>	414
Effect of protein level on feed intake, nutrient digestibility and blood urea nitrogen in crossbred Brahman heifers <i>C. Yuangklang, K. Vasupen, S. Wongsuthavas, S. Bureenok and J. Khotsakdee</i>	416
Effect of fat level and supplemental yeast (<i>Saccharomyces cerevisiae</i>) on voluntary feed intake, digestion coefficient of nutrients and growth performance in meat goats <i>C. Yuangklang and J. Khotsakdee</i>	418
The ruminal ratio of <i>trans</i> -10/ <i>trans</i> -11 fatty acids obtained <i>in vitro</i> reflects <i>in vivo</i> values and strongly depends on the diet of the donor cow <i>A. Zened, A. Troegeler-Meynadier, M.C. Nicot and F. Enjalbert</i>	420
Short communications – Metabolism and endocrinology	423
Effects of extracellular essential amino acid deprivation on protein synthesis signaling in bovine mammary epithelial cells <i>in vitro</i> <i>J.A.D.R.N. Appuhamy, A.L. Bell, J. Escobar and M.D. Hanigan</i>	424
Plasma angiopoietin-like protein 4 concentration is decreased by energy restriction in lactating dairy cattle <i>B.J. Bradford, L.K. Mamedova, K.J. Harvatine and Y.R. Boisclair</i>	426

Thiazolidinediones increase lipogenic enzyme activity in internal and external adipose tissue depots in sheep <i>F.T. Fahri, I.J. Clarke, D.W. Pethick, B.G. Tatham, R.D. Warner and F.R. Dunshea</i>	428
Selection for muscling reduces muscle response to adrenaline <i>G.E. Gardner, P. McGilchrist, J.M. Thompson and K.M. Martin</i>	430
Glucose metabolism in neonatal calves: dependence on postnatal maturation <i>H.M. Hammon, J. Steinhoff, S. Goers, E. Kanitz, R.M. Bruckmaier and C.C. Metges</i>	432
The effects of beta-adrenergic agonist (BA) and growth hormone (GH) on metabolic characteristics and factors involved in determining skeletal muscle fibre type in growing lambs <i>K. Hemmings, T. Parr, Z. Daniel, P. Buttery and J. Brameld</i>	434
Recovery of α -linolenic acid in milk fat of dairy cows fed flowering forage plants <i>T. Kälber, M. Kreuzer, H.R. Wettstein and F. Leiber</i>	436
Effect of diet and breed on fatty acid composition of beef steers <i>E.J. Kim, R.I. Richardson, K. Gibson, D. Coulmier and N.D. Scollan</i>	438
Effects of abomasal infusion of tallow and camelina oil on responses to glucose and insulin in dairy cows during late pregnancy <i>T. Kokkonen, S. Salin, J. Taponen, K. Elo and A. Vanhatalo</i>	440
Mammary amino acid metabolism in response to increased energy and protein supply in lactating dairy cows <i>S. Lemosquet, H. Lapierre, H. Rulquin and J. Guinard-Flament</i>	442
Empirical prediction of net splanchnic release of β -hydroxybutyrate in ruminants <i>C. Loncke, P. Nozière, J. Vernet, H. Lapierre, D. Sauvant and I. Ortigues-Marty</i>	444
Postweaning adaptation of liver activity to solid diet in goat kids <i>D. Magistrelli, A.A. Aufy and F. Rosi</i>	446
Quantitative estimation of the endogenous synthesis of rumenic acid in goats fed lipid supplements <i>J. Mouriot, L. Bernard, P. Capitan, C. Joly, O. Loreau, J.M. Chardigny and Y. Chilliard</i>	448
Recycling of phosphate is not affected by P intake in lactating dairy cows <i>L. Puggaard, N.B. Kristensen and J. Sehested</i>	450
Regulation of dairy cattle adipose tissue metabolism by adrenergic control systems and gene transcription mechanisms dictating increased overall efficiency <i>J.M. Sumner, C. Schachtschneider, A. Hutjens, A. Youngquist, G. Duncan, S. Rocco, J. Miller, J.L. Vierck and J.P. McNamara</i>	452
Evaluation of response to insulin infusion in Holstein cattle undergoing an extended lactation <i>L.C. Maret, K.L. Macmillan, C. Grainger, C.V.C. Phyn, F.R. Dunshea and B.J. Leury</i>	454

Nutritive value and silage characteristics of partly stoned olive cakes treated with molasses <i>M.J. Abarghuei, Y. Rouzbehan and D. Alipour</i>	456
Expression of adipogenic genes in <i>longissimus</i> muscle and different adipose tissues of cattle representing either the accretion or the secretion type <i>E. Albrecht, J.X. Xu, T. Viergutz, G. Nürnberg, R.Q. Zhao and J. Wegner</i>	458
Influence of lipid sources on the fatty acid composition of <i>longissimus</i> muscle of heifers finished in a feedlot ¹ <i>T.T. Berchielli, G. Fiorentini and R.A. Reis</i>	460
The effects of condensed tannins in <i>Lotus corniculatus</i> on valine kinetics in the mammary gland of the ewe <i>E.N. Bermingham, W.C. McNabb, B.R. Sinclair, M. Tavendale and N.C. Roy</i>	462
Lipid supplements rich in n-3 polyunsaturated fatty acids deeply modify <i>trans</i> 18:1 isomers in the <i>longissimus thoracis</i> muscle of finishing cattle <i>E. Bispo Villar, A. Thomas, B. Lyan, D. Gruffat, D. Durand and D. Bauchart</i>	464
Serum IGF-I concentration from birth to slaughter in calves under different management strategies analysed with a spline model <i>M. Blanco, I. Casasús and D. Villaba</i>	468
Effect of crown daisy (<i>Chrysanthemum coronarium</i>) and ricinoleic acid on sheep milk production and quality <i>R. Bodas, S. Andrés, A.B. Rodríguez, J. Romero, R.J. Wallace, F.J. Giráldez and S. López</i>	470
Heat production of dairy cows under acute and chronic heat load <i>A. Brosh, A. Asher, J. Miron, A. Shabtay, G. Adin, U. Moalem, E. Tahar, S. Abboud and Y. Aharoni</i>	472
Effect of different supply and source of polyunsaturated fatty acid on milk fat synthesis of grazing dairy sheep <i>A. Cabiddu, M. Addis, S. Spada, M. Acciario, M. Sitzia, M. Decandia and G. Molle</i>	474
Effect of roughage diet type and NaCl addition on the milk urea content in dairy cows <i>S. De Campeneere, J.M. Vanacker and D.L. De Brabander</i>	476
Heavy metals in poultry manure, bovine tissues and human kidneys in Yucatán México <i>A. Castellanos-Ruelas and G. Rosado-Rubio</i>	478
Maternal nutritional plane alters ovine jejunal mRNA expression of glucagon like peptide-2 in offspring at 20 and 180 days of age <i>J.S. Caton, L.P. Reynolds, J.M. Wallace, K.A. Vonnahme, A.M. Meyer, M.L. Johnson and D.A. Redmer</i>	480
Long term chronic and oral exposure of dairy goats to mixtures of polycyclic aromatic hydrocarbons: research of potential bioindicators of exposure in milk, urine and blood lymphocytes <i>A. Chahin, Y. Guiavarc'h, M.A. Dziurla, H. Toussaint, C. Feidt and G. Rychen</i>	482

Fat body partition in dry Pelibuey ewes fed roughage diets with three levels of energy <i>A. Chay-Canul, A. Ayala-Burgos, J. Magaña-Monforte, J. Ku-Vera and L.O. Tedeschi</i>	484
Investigation of the potential to use isotopic fractionation between milk and urine as a test for nitrogen use efficiency of dairy cows <i>L. Cheng and R.J. Dewhurst</i>	486
Blocking vasodilatory prostaglandin synthesis by ketoprofen fails to prevent the renal blood flow increase induced by insulin in conscious sheep <i>A. Cirio, I. Tebot, J.Y. Ayoub, C. Paquet, S. Junot and J.M. Bonnet</i>	488
Blocking NO synthesis by L-NAME perfusion partially prevents the renal blood flow increase induced by insulin perfusion in conscious sheep <i>A. Cirio, I. Tebot, C. Paquet, J-Y. Ayoub and J.M. Bonnet</i>	490
Concentrate feeding increases plasma leptin level in mid lactation goats <i>C. Delavaud, J. Rouel, E. Bruneteau, M. Tourret, P. Guillouet, A. Ferlay and Y. Chilliard</i>	492
Milk production and composition of dairy cows fed extruded canola and lignosulfonate <i>G.T. dos Santos, C.A. Neves, D.C. da Silva, W.B.R. dos Santos, J.C. Damasceno and H.V. Petit</i>	494
Effects of antioxidant supplementation in the diet on blood parameters and muscle characteristics in fighting bulls during extreme exercise <i>D. Durand, V. Santé Lhoutellier, D. Micol, N. Mirabeau, J. Garcia-Schneider, H. Compan and B. Picard</i>	496
Effects of stage of grass silage maturity and level of concentrate in ewes in late gestation and early lactation on feed intake, blood energy metabolites and the performance of their lambs <i>M. Eknæs, Å.T. Randby and P. Nørgaard</i>	498
Influence of intensive nursing and feeding during early growth stage on growth and muscle physiology in grass-fattening Japanese Black cattle (Wagyu) <i>K. Etoh, K. Metoki, S. Kaneda, T. Abe, T. Etoh, K. Hayashi, Y. Nakamura, F. Ebara, J. Wegner and T. Gotoh</i>	500
Transcriptomic profile in adipose tissues is modified by nutrition in lactating goats <i>Y. Faulconnier, J. Domagalski, M.B. Montazer Torbati, Y. Gaudron, D. Bany, Y. Chilliard and C. Leroux</i>	502
Glucose release in response to adrenaline is lower in Merino ewes bred for lower fatness <i>M.B. Ferguson, J.R. Briegel, D.W. Pethick, N.R. Adams, H.E. Pugh and G.E. Gardner</i>	504
Glucose uptake in response to insulin is lower in Merino ewes bred for lower fatness. <i>M.B. Ferguson, J.R. Briegel, N.R. Adams, D.W. Pethick and G.E. Gardner</i>	506
Effect of supplementation with different urea levels on young grazing bulls recently weaned in the dry season in tropical conditions <i>H.J. Fernandes, M.O. Porto, A.A. Rocha, J. Cavali and M.F. Paulino</i>	508

Effects of amino acid infusion on ghrelin action in lactating cows <i>R. Fukumori, A. Yokotani, T. Sugino, F. Itoh, H. Shingu, N. Moriya, Y. Hasegawa, M. Kojima, K. Kangawa, T. Obitsu, S. Kushibiki and K. Taniguchi</i>	510
Effect of <i>Lactobacilli</i> probiotic supplementation on blood glucose, insulin and NEFA performance of dairy cattle during late pregnancy and early lactation <i>M.A. Galina, V.J. Chavez, J. Pineda, J.D. Hummel, R.M. Ortiz and M. Delgado-Pertiñez</i>	512
An unprotected conjugated linoleic acid (CLA) supplement reduces milk fat synthesis and forage intake in lactating goats <i>M.A.S. Gama, D.E. Oliveira, D. Fernandes, J. de Souza and J.H. Bruschi</i>	514
The effects of chromium supplementation on blood parameters related to protein and lipid metabolism in early lactating cows <i>G.R. Ghorbani, M. Khorvash, M. Mirzaee and H.R. Rahmani</i>	516
Production and processing studies on calpain-system gene markers in cattle <i>P.L. Greenwood, L.M. Cafe, D.W. Pethick, D.L. Robinson and J.M. Thompson</i>	518
Effects of grazing time allocation on intake, foraging behaviour and hunger-related hormone and metabolites of dairy cows during the first grazing session <i>P. Gregorini, C.E.F. Clark, J.G. Jago, C.B. Glassey, K.L.M. McLeod and A.J. Romera</i>	520
Compared hepatic metabolism of linoleic and linolenic acids of finishing bovines given a n-3 PUFA-rich diet <i>D. Gruffat, M. Gobert, D. Durand and D. Bauchart</i>	522
Effect of muscle and animal types on the expression of HSP in cattle muscle <i>N. Guillemain, H. Levéziel, C. Jurie, J.F. Hocquette and B. Picard</i>	524
Effects of terpene oral administration on their transfer in goat milk <i>I. Hadjigeorgiou, I. Pouloupoulou, E. Zoidis and T. Masouras</i>	526
Effects of lactogenic hormones on the expression of IGF-binding protein mRNA in cultured bovine mammary epithelial cells <i>A. Hagino, Y. Ohtani, S. Oda and K. Katoh</i>	528
Effect of vitamin E levels in diet on the slaughter performance of the Boer goat <i>H. Luo, H. Meng, H. Zhu, G. Zhang, L. Yan and D. Yue</i>	530
Effect of plant oils on milk fatty acid composition in cows fed red clover silage based diets <i>A. Halmemies, T. Kokkonen, S. Jaakkola, A.-M. Lampi, V. Toivonen, K.J. Shingfield and A. Vanhatalo</i>	532
Myosin heavy chain expression in ovine skeletal muscles <i>K. Hemmings, T. Parr, Z. Daniel, B. Picard, P. Buttery and J. Brameld</i>	534
The effects of beta-adrenergic agonist (BA) and growth hormone (GH) on lamb growth characteristics and myosin heavy chain expression <i>K. Hemmings, T. Parr, Z. Daniel, P. Buttery and J. Brameld</i>	536

The association of interleukin-6 and insulin sensitivity in bovine subcutaneous and perirenal adipose tissue explants treated with propionate <i>A. Hosseini, M. Mielenz and H. Sauerwein</i>	538
New insights on mammary tissue responses to dietary lipids using transcriptomics <i>G. Invernizzi, B.J. Thering, M. Bionaz, D. Graugnard, P. Piantoni, R.E. Everts, H.A. Lewin, G. Savoini and J.J. Looor</i>	540
Effect of body condition score at parturition on blood glucose and insulin responses during a glucose tolerance test in Estonian Holstein and Estonian Red cows <i>H. Jaakson, K. Ling, J. Samarütel, A. Ilves, T. Kaart and O. Kärt</i>	542
Effects of feeding rapeseed oil, soybean oil or linseed oil on stearoyl-CoA desaturase expression in the mammary gland of dairy cows <i>A.A.A. Jacobs, A.M. van Vuuren, J. van Baal, D. van den Hengel and J. Dijkstra</i>	544
Effects of chromium supplementation on production responses and some blood indicators of glucose metabolism in heat stressed dairy cows <i>M. Khorvash, G.R. Ghorbani, M. Mirzaee and H.R. Rahmani</i>	546
Effect of late gestation maternal nutrition on leptin, IGF-1, insulin and glucose concentration in suckling lambs <i>A. Kiani, A.H. Tauson, A. Chwalibog and M.O. Nielsen</i>	548
Effects of increasing supplementation levels of rice bran on milk production of lactating dairy goats <i>C.-H. Kim, J.K. Park, H.J. Choi, D.Y. Park and J.D. Kim</i>	550
Monocarboxylate transporters (MCT1-MCT14) in the ruminant pancreas <i>D. Kirat and S. Kato</i>	552
Circadian variation in plasma total antioxidative capacity and levels of ascorbic acid in sheep <i>S. Kobayashi, M. Kumagai, Y. Kikuchi, A. Hagino and S. Oda</i>	554
Expression of fatty acid and amino acid transporters around differentiation in bovine mammary epithelial cells (BMEC) <i>Y. Kobayashi, K. Higuchi, I. Nonaka, H. Ohtani, N. Kanematsu, K. Katoh, K. Sato, O. Enishi and M. Sutoh</i>	556
Hepatic acetylation of the blood flow marker <i>p</i> -aminohippuric acid affect measurement of hepatic blood flow in cattle <i>N.B. Kristensen, B.A. Røjen, B.M.L. Raun, A.C. Storm, L. Puggaard and M. Larsen</i>	558
Magnesium and calcium metabolism in periparturient dairy cows fed different levels of calcium <i>C. Kronqvist, U. Emanuelson, R. Spörndly, M. Trävén and K. Holtenius</i>	560
Insulin resistance after single dose dexamethasone treatment in dairy cows <i>M. Kusenda, A. Starke, M. Kaske, M. Piechota, M. Hoeltersshinken and J. Rehage</i>	562

Plasma concentrations of incretins (GIP and GLP-1) did not increase in periparturient cows abomasally infused with glucose <i>M. Larsen, A.E. Relling, C.K. Reynolds and N.B. Kristensen</i>	564
Response of plasma ghrelin to growth hormone releasing hormone (GHRH) administration during compensatory growth in steers <i>H.G. Lee, C.H. Lee, Z.S. Hong, C.X. Xu, Y.C. Jin, H. Kuwayama and Y.J. Choi</i>	566
Milk fatty acid profile of cows fed diets supplemented with soybean or fish oil and with two concentrate levels <i>L.C. Leite and D.P.D. Lanna</i>	568
Performance, metabolic parameters and fatty acid composition of milk fat due to dietary CLA and rumen-protected fat of dairy cows <i>T. Liermann, J. Groß, P. Möckel, A.-M. Pfeiffer, G. Jahreis and F.J. Schwarz</i>	570
A technique to assess internal body fat of dairy goats using real-time ultrasound <i>L.D. Lima, I.A.M.A. Teixeira, H.G. Silva, K.T. Resende, J.C. Canola and O.B. Neto</i>	572
Energy expenditure of Angus heifers divergently selected for residual feed intake <i>D.S. Lines, M.L. Wolcott, W.S. Pitchford, C.D.K. Bottema, R.M. Herd and V.H. Oddy</i>	574
Pattern of change and correlation of blood NEFA and urea with energy balance and related variables in dairy cows the first 21 days post-calving <i>N.E. Lobos, M.A. Wattiaux, G.A. Broderick and P.M. Crump</i>	576
Expression of RBP4-mRNA in adipose tissue and RBP4 in serum of healthy dairy cows <i>L. Locher, L. Zapfe, M. Kern, N. Klötting, M. Blüher, J. Raila and M. Fürll</i>	580
Comparative aspects of hormone sensitive lipase (HSL), lipoprotein lipase (LPL), adiponectin and leptin mRNA-expression in bovine fat tissue <i>L. Locher, L. Zapfe, N. Klötting, M. Kern, M. Blüher and M. Fürll</i>	582
Exploring the potential for using erythrocyte membranes in the assessment of long-chain polyunsaturated fatty acid status of dairy cows <i>A.L. Lock, C.L. Preseault and H.M. Dann</i>	584
Adaptation of hepatic glucose uptake and metabolism in growing lambs fed energy and nitrogen imbalanced diets <i>C. Loncke, G. Kraft, I. Savary-Auzeloux and I. Ortigues-Marty</i>	586
Milk fatty acid profile from dairy cows fed increasing levels of soybean oil in diets based on tropical forage <i>F.C.F. Lopes, C.G.S. Ribeiro, M.T. Ribeiro, N.M. Rodriguez, H.G.B. Filho, R.J.C. Castro, P.A.V. Barros and M.A.S. Gama</i>	588
Effects of linseed and <i>Acacia cyanophylla</i> intake on performance and milk fatty acid composition in Sicilo-Sarde ewes fed oat silage or grazing triticale pasture <i>O. Maamouri, N. Atti, A. Ferlay, K. Kraeim, M. Mahouachi and Y. Chilliard</i>	590

Effect of supplementation of area specific mineral mixture or common salt on nutrient utilisation and growth in female calves fed wheat straw and concentrates <i>S.K. Mahanta, A. Kumar, G.H. Pailan and N.C. Verma</i>	592
Unrefined sunflower oil supplementation selectively influenced the milk fatty acid profile and oxidative status in Simmental cows <i>T.S. Marenjak, I. Delaš, N. Poljičak-Milas and J. Piršljin</i>	594
Additive effects of <i>trans</i> 10, <i>cis</i> 12-CLA and propionic acid on milk fat content and composition in dairy cows <i>G. Maxin, F. Glasser, P. Lamberton and H. Rulquin</i>	596
Selection for muscling in Angus steers increases glycogen and reduces response to adrenaline in muscle <i>P. McGilchrist, P.L. Greenwood, D.W. Pethick and G.E. Gardner</i>	598
Selection for muscling in Angus steers increases leanness and adipose tissue response to adrenaline <i>P. McGilchrist, P.L. Greenwood, D.W. Pethick and G.E. Gardner</i>	600
Effects of maternal nutritional plane and selenium supply during gestation on neonatal offspring growth and visceral organ mass <i>A.M. Meyer, J.J. Reed, T.L. Neville, J.B. Taylor, D.A. Redmer, L.P. Reynolds, K.A. Vonnahme and J.S. Caton</i>	604
Heifer nutrition during gestation affects expression of IGF-1R, IGF-2 and IGF-2R in omental adipose tissue of their mature off-spring <i>G.C. Micke, T.M. Sullivan, S. Lie, S. Gentili, I.C. McMillen and V.E.A. Perry</i>	606
Tissue distribution of the nutrient sensing free fatty acid receptors FFAR2 and FFAR3 mRNA expression in the bovine species <i>M. Mielenz, A. Hosseini, S. Vorspohl and H. Sauerwein</i>	608
A preliminary milk recording study on restrictedly suckled cows in Burkina Faso <i>V. Millogo, G.A. Ouédraogo, K. Svennersten-Sjaunja and S. Agenäs</i>	610
Effect of a myostatin mutation, nutrition and a β -adrenergic agonist (Ractopamine) on carcass and meat quality in lambs <i>F.E. Milton, P.L. Greenwood, M.B. McDonagh and V.H. Oddy</i>	612
Chromium eases coincident challenges of lactation and heat stress <i>M. Mirzaee, G.R. Ghorbani, M. Khorvash, H.R. Rahmani and A. Nikkhah</i>	614
The effects of diet on ascorbic acid status of Sudanese camels <i>H.E. Mohamed, A. Al-Haidary and A.C. Beynen</i>	616
Subcutaneous or oral administration of liposome-encapsulated vasoactive intestinal peptide increases dietary intake in small ruminants <i>G.K. Murdoch, R. Soofi-Siawash, E. Okine, L. Goonewardene and R.J. Christopherson</i>	618

Hormonal regulation of phosphate homeostasis in goats during transition to rumination <i>A. Muscher, E. Pfeiffer, G. Breves and K. Huber</i>	620
Effects of dry matter and energy intake on the concentrations of blood metabolites in dairy cows receiving fresh-cut grass <i>F.Y. Obese, K.L. Macmillan and A.R. Egan</i>	622
Gene expression of adiponectin and its receptors in bovine mammary gland and mammary epithelial cells <i>Y. Ohtani, T. Yonezawa, A. Hagino and K. Katoh</i>	624
Diet supplementation with different levels of unprotected conjugated linoleic acid (CLA) progressively decreases milk fat content and yield in dairy ewes <i>D.E. Oliveira, M.P. Soares, M.A.S. Gama, R. Dresch, M. Baldin and L.L. Martelo</i>	626
Blood parameters of sheep fed different levels of detoxificated castor bean waste <i>L.G.R. Pereira, D.R. Menezes, R.G. Costa, G.G.L. Araújo and M.G. Malheiro</i>	628
Flax hulls and oil supplementation on the activity of antioxidant enzymes in dairy cows <i>H.V. Petit, C. Côrtes, N. Gagnon, M.F. Palin, S. Tao, C. Benchaar and P. Lacasse</i>	630
Alteration in the activation of NF- κ B upon TNF- α and/or IFN- α/γ treatment of C2C12 myotubes <i>B. Pijet, M. Pijet, A. Pogorzelska, B. Pajak and A. Orzechowski</i>	632
Leptin impairs expression levels of myogenic regulatory factors (MRF) and potentiates staurosporine effect in C2C12 myotubes <i>M. Pijet, B. Pijet, A. Pogorzelska and A. Orzechowski</i>	634
Plasma glucagon-like peptide-1 concentration in non-lactating cows during abomasal infusion of linseed oil and in response to glucose and insulin challenges <i>J.A.A. Pires, A.E. Relling, C.K. Reynolds and R.R. Grummer</i>	636
Effects of abomasal infusion of nicotinic acid on responses to glucose and β -agonist challenges in partially feed-restricted lactating cows <i>J.A.A. Pires, L.F. Stumpf, I.D. Soutullo, J.B. Pescara, S.E. Stebulis and R.R. Grummer</i>	638
Genomic effects of insulin and insulin signalling inhibitors in evaluation of the mitochondrial contribution to myogenesis <i>A. Pogorzelska, M. Pijet, B. Pijet and A. Orzechowski</i>	640
Use of carcass specific gravity to predict chemical body composition of F1 Boer \times Saanen kids <i>K.T. Resende, L. Akinaga, I.A.M.A. Teixeira, J.M. Pereira Filho, T.T. Berchielli and A.C.D. Ferreira</i>	642
Effect of botanical composition of permanent grasslands and feeding practices in three regions of France on liposoluble components in cow milk <i>A. Reynaud, B. Martin, A. Ferlay, C. Agabriel, A. Farruggia, J.M. Besle, M. Doreau and B. Graulet</i>	644

Intravenous infusion of a lipid emulsion causes insulin resistance in Merino ewes under hyperinsulinaemic euglycaemic conditions <i>M.W. Robertson, F.R. Dunshea and B.J. Leury</i>	648
Effect of feeding solid feed on the hepatic gene expression for the urea cycle and glycogen metabolism in Holstein calves during weaning transition <i>A.L. Ruiz-Sánchez and M. Oba</i>	650
Continuous lactation effects on mammary extraction rates of nutrients in dairy goats <i>S. Safayi and M.O. Nielsen</i>	652
Effects of <i>i.v.</i> administration of apelin on endocrine in sheep and goats <i>K. Sato, Y. Kobayashi, T. Takahashi and K. Katoh</i>	654
<i>Trans</i> -10, <i>cis</i> -12 conjugated linoleic acid reduces milk fat synthesis and insulin sensitivity in goats during early lactation <i>Ph. Schmidely, S. Hourte and M. Magnin</i>	656
Effect of two feeding levels on growth, blood metabolites and insulin in postweaning dual purpose cattle <i>I. Seijas, K. Drescher, L. Pinto-Santini, A. Ruiz-Gaviria, A. Ruiz and N. Martínez</i>	658
Characteristics of galactopoietic and lipolytic effects of exogenous growth hormone-releasing hormone in lactating Japanese Black cows under negative energy balance <i>H. Shingu, S. Kushibiki, E. Touno, A. Oshibe, Y. Ueda, M. Shinoda and K. Hodate</i>	660
Chemerin, highly expressed in adipose tissues, stimulates the glycerol release in bovine differentiated adipocytes <i>in vitro</i> <i>S.H. Song, K. Fukui, K. Hamano, S. Sasaki, S.G. Roh and K. Katoh</i>	662
Novel minimal invasive technique for measuring hepatic metabolism quantitatively in dairy cows exemplified by studying hepatic glucose-net production after dexamethasone treatment <i>A. Starke, K. Wussow, L. Matthies, M. Kusenda, R. Busche, A. Haudum, A. Beineke and J. Rehage</i>	664
Effects of ghrelin injection on blood metabolites and hormones of non-lactating and lactating cows <i>T. Sugino, R. Fukumori, A. Yokotani, F. Itoh, H. Shingu, N. Moriya, Y. Hasegawa, M. Kojima, K. Kangawa, T. Obitsu, S. Kushibiki and K. Taniguchi</i>	668
Cellularity and lipogenic activities in perirenal and intermuscular adipose tissues from Blonde d'Aquitaine, Charolais and Holstein fetuses <i>H. Taga, M. Bonnet, C. Labonne, I. Cassar-Malek, B. Picard and Y. Chilliard</i>	670
Increasing inclusion of wheat in maize and grass silage-based diets: production responses in dairy cows <i>M.N. Tahir, M. Hetta and C. Swensson</i>	672

Intravenous insulin perfusion mimics the meal-dependent rise of renal blood flow in conscious sheep	674
<i>I. Tebot, J.M. Bonnet, J.Y. Ayoub, C. Paquet, S.M. Da Silva and A. Cirio</i>	
Femur biometry, densitometry and chemical composition of Moxoto goats supplemented with concentrate in a semiarid region	676
<i>I.A.M.A. Teixeira, M.J. Araújo, A.N. Medeiros, R.G. Costa, S.M. Baraldi Artoni, C.A.T. Marques and K.T. Resende</i>	
<i>Ad libitum</i> concentrate for dairy cows: performance and calculated energy balance in the 'Kempen System' vs. a conventional Dutch feeding strategy	678
<i>H. ter Wijlen, H. van Laar and J. Martín-Tereso</i>	
Mobilisation of muscle protein and fat tissue in dairy cows around calving investigated by ultrasound measurements	680
<i>S.G.A. Van der Drift, L. Vernooij and R. Jorritsma</i>	
Expression of genes involved in different metabolic pathways in the liver of metabolically challenged dairy cows during early lactation: a field study	682
<i>H.A. Van Dorland, M. Graber, S. Kohler, T. Kaufmann and R.M. Bruckmaier</i>	
Metabolic and production responses of dairy cows to two levels of rapeseed and soya-bean expeller supplementation on red clover silage based diet	684
<i>A. Vanhatalo, P. Pursiainen, M. Tuori, M. Rinne and S. Jaakkola</i>	
Advances in the understanding of milk cholesterol level regulation	686
<i>E. Viturro, C. Farke and H.H.D. Meyer</i>	
Delayed response of milk fatty acids to micro algae fed in early lactation	688
<i>B. Vlaeminck, M. Hostens, G. Opsomer and V. Fievez</i>	
Plasma cortisol response to adrenocorticotropin hormone is negatively related to previous wool growth and is greater in twin than single sheep	690
<i>K.L. Walters, F.R. Dunshea, A.J. Tilbrook and B.J. Leury</i>	
Effect of reducing dietary crude protein content and supplementing rumen protected lysine on performance of high producing dairy cows during heat stress	692
<i>X. Wang, H. Zhao, F.C. Wan and Q. Sheng</i>	
Dietary glycerol supplementation to dairy cows: effects on lactation performance and metabolism	694
<i>A. Werner Omazic, J. Bertilsson, M. Tråvén and K. Holtenius</i>	
Effect of feeding <i>Leucaena</i> hay on thyroid hormones and plasma zinc in dairy goats	696
<i>J. Wongsanit, J.T. Schonewille, T. Rukkhamsuk, H. Everts and W.H. Hendriks</i>	
Effects of different levels of vitamin A supplementation on antioxidant status of beef cattle with a diet based poor quality silaged corn straw	698
<i>Z.B. Yang, X.M. Ma, W.R. Yang, F.C. Wan, S.Z. Jiang and T.T. Zhang</i>	

Effect of urea treated <i>Leucaena leucocephala</i> leaf meal on growth performance and serum parameters of growing Nanjiang goats <i>Y.H. Yang, Z.S. Wang, B. Xue, Y.M. Cai and L.Z. Wang</i>	700
Effect of chromium and zinc supplementation on production and blood parameters of lactation Holstein cows under heat stress <i>S. Zhao, Z.S. Wang, B. Xue, L.Z. Wang and D.W. Wang</i>	702
Urinary excretion of volatile fatty acids in sheep sustained by total intragastric infusions <i>G.-Y. Zhao and Y.-B. Sun</i>	704
Study on fasting metabolism in growing water buffaloes (<i>Bubalus bubalis</i>) in Guangxi, China <i>C.X. Zou, B.Z.H. Yang, X.W. Liang, Zh.Sh. Xia, K. Liang, S.J. Wei, L.L. Li and Sh.L. Li</i>	706
Short communications – Nutrition and reproduction	709
Characterisation of dairy cows carrying ‘fertil +/+’ or ‘fertil -/-’ haplotype for one QTL of female fertility located on chromosome 3 <i>S. Coyral-Castel, C. Ramé, C. Fabre-Nys, D. Monniaux, P. Monget, F. Dupont, A. Eggen, S. Fritz, A. Malafosse, P. Faverdin, C. Disenhaus, P. Le Mézec and J. Dupont</i>	710
The effect of marine algae supplementation in the ration of high yielding dairy cows during transition and its effect on metabolic parameters in the serum and follicular fluid around parturition <i>M. Hostens, V. Fievez, B. Vlaeminck, S. De Vlieghe, S. Piepers and G. Opsomer</i>	712
Proteome and immunoassay analyses elucidate the role of pituitary hormone isoforms and highlight novel signals in response to feed restriction in dairy cows <i>B. Kuhla, D. Albrecht, R.M. Bruckmaier, T. Vieregut and C.C. Metzger</i>	714
Interaction between photoperiod and nutritional status on ovine seasonality <i>J.B. Menassol, D. Chesneau, A. Collet, B. Malpoux and R.J. Scaramuzzi</i>	716
Influence of nutritional background on neuroendocrine reproductive and appetite responses to central insulin or NPY administration in sheep <i>D.W. Miller, E.J. Bennett, J.L. Harrison, P.A. Findlay and C.L. Adam</i>	720
Effect of plane of nutrition on sexual behaviour of Boer and Mubende bucks <i>S.S. Walusimbi, J. Ottobre, D. Mpairwe, M. Day D. Mutetikka and D.K. Ssemambo</i>	722
17 β -oestradiol has dramatic effects on mammary epithelium integrity and loss of lactose in urine in dairy cows in late lactation <i>S. Agenäs, I. Lundström and K. Holtenius</i>	724
The effect of protein supplementation on reproductive performance in Moghani ewes maintained on rangeland <i>M. Bayeriyar and S. Kargar</i>	726

Delay in muscle development in bovine cloned fetuses <i>I. Cassar-Malek, C. Jurie, B. Picard, A. Listrat, M. Guillomot, P. Chavatte-Palmer and Y. Heyman</i>	728
Association between body condition score changes, parity and feeding system and fertility of lactating dairy cows <i>P. Celi, A.R. Rabiee, T.F. Duffield and I.J. Lean</i>	730
Leptin and NEFA concentrations in yearling Jezersko-Solchava ewes during puberty and in the first reproductive season <i>V. Cestnik, M. Kosec, Z. Jenko and N. Čebulj-Kadunc</i>	732
Possible implications of feeding soybean meal on fertility and milk production of high yielding dairy cows in the early <i>post partum</i> period: preliminary results <i>S. Cools, L. Vanhaecke and G. Opsomer</i>	734
MAP kinases ERK1/2, but not AMP-activated protein kinase, are involved in the effects of unsaturated fatty acids on goat granulosa cells steroidogenesis <i>in vitro</i> <i>S. Coyral-Castel, C. Ramé, A. Fatet and J. Dupont</i>	738
Post-natal consequences of a maternal nutritional restriction in the periconceptual period in sheep: effects on male lambs <i>N. Debus, P. Chavatte-Palmer, G. Viudes, V. Berthelot, S. Camous and P. Hassoun</i>	740
The infusion of glucose reduces circulating oestradiol and the level of aromatase in granulosa cells of ewes in the luteal phase of the oestrous cycle <i>C. Gallet, J. Dupont, D. Monniaux, B.K. Campbell and R.J. Scaramuzzi</i>	742
Factors decreasing pregnancy rate after embryo transfer in lactating dairy cows <i>H. Kadokawa, Y. Kimura, N. Tameoka, M. Uchiza and M. Yonai</i>	744
Periconception nutrition: effects on gestation length, lamb survival, body and organ growth <i>D.O. Kleemann, J.M. Kelly, S.R. Rudiger, J.L. Morrison, I.C. McMillen, S. Zhang, S.M. MacLaughlin, S. Hiendleder, D.H. Smith, R.J. Grimson, K.S. Jaensch, F.D. Brien, K.J. Lennon and S.K. Walker</i>	746
Regulatory changes of chemokines in the bovine corpus luteum during the oestrous cycle <i>H. Kliem, M. Djurkovic, B. Berisha, H.H.D. Meyer and D. Schams</i>	748
Consequences of maternal feeding restriction during goat's pregnancy on kid morphology and weight at birth <i>B. Laporte, P. Chavatte-Palmer, S. Roussel-Huchette, J. Perault and C. Duvaux-Ponter</i>	750
Maternal efficiency in beef cattle is not compromised by selection for leanness or feed efficiency <i>M. Laurence, A. Barnes, E. Taylor, D.W. Pethick, F. Jones, J. Speijers and J. Accioly</i>	752
Effect of feeding strategies during the winter on fertility of dairy heifers first calving at 3 years of age <i>Y. Le Cozler, J.R. Peccatte and L. Delaby</i>	754

Expression of adipokines in bovine ovaries: effect of human recombinant adiponectin and resistin on ovarian cells <i>in vitro</i> <i>V. Maillard, S. Uzbekova, F. Guignot, C. Ramé, C. Perreau and J. Dupont</i>	756
Effects of prostaglandin F _{2α} (PGF _{2α}) intrauterine injection on oestrus synchronisation in Bali cattle (<i>Bos sondaicus</i>) <i>A. Malik, Sudarmaji, H. Wahid, Y. Rosnina and M. Afdal</i>	758
Use of metabolic profiles in transition cows and cows with low conception rates on a small-scale dairy farm <i>T.S. Marenjak, Ž. Ipša, N. Poljičak-Milas, J. Piršljim and B. Beer Ljubić</i>	760
Long term <i>in vitro</i> quantitative evaluation of spermatozoid concentrations from Iranian Lori rams: a new model for aging investigation <i>S. Mohammadzadeh, A. Mohammadzadeh, S.M. Moosavi, A. Chegeni and A. Kiani</i>	762
Effects of different fat types on concentration of oestradiol and progesterone in the blood of ewes <i>A. Moharrery</i>	764
Expression of P450-aromatase in the corpus luteum of small ruminants <i>J.A. Mondragón, C. Miranda, R. Ocadiz-Delgado, J. García-Mena, P. Gariglio and M.C. Romano</i>	766
Correlation between quantitative three dimensional Doppler parameters and real blood flow within the utero-placental unit: evaluation in a pregnant sheep experimental model <i>O. Morel, F. Pachy, V. Tsatsaris, M. Bonneau, P. Laigre and P. Chavatte-Palmer</i>	768
Productive and reproductive performance of grazing dual purpose cows with or without access to <i>Leucaena leucocephala</i> in the tropics <i>I. Peniche-González, C. Aguilar-Pérez, J. Ku-Vera, A. Ayala-Burgos and Z. González-López</i>	770
Dietary protein during gestation affects fetal growth and circulating indicators of placental function <i>V.E.A. Perry, G.C. Micke and T.M. Sullivan</i>	772
Blood chemistry modifications and the appearance of pregnancy toxæmia in nutritionally restricted dairy goats <i>A.A. Ponter, B. Laporte, J. Promp, C. Ficheux, J. Tessier, J. Perault, S. Roussel-Huchette, P. Chavatte-Palmer and C. Duvaux-Ponter</i>	774
Genetic strain x diet interactions on physiological parameters associated with milk production, energy partitioning, and reproduction <i>J.R. Roche, C.R. Burke, J.K. Kay, C.V.C. Phyn, S. Meier and M.C. Lucy</i>	776
Change in serum blood components as affected by breeding period and dietary protected protein in ewes <i>G.M.A. Solouma, A.K.I. Abd El Moty, A.Y. Kassab, A.A. Abdel-Ghani and E.B. Soliman</i>	778

Short-term nutritional supplementation with lupin grain increases total IRS-2 and IRS-4 and decreases aromatase in ovine granulosa cells <i>A. Somchit, B.K. Campbell, M. Khalid and R.J. Scaramuzzi</i>	780
Dairy heifer growth and time to mating weight when fed elephant grass as sole feed: A simulation model <i>F. Tibayungwa, J.Y.T. Mugisha and M. Nabasirye</i>	782
Effect of supplemental n-3 fatty acid source on semen quality in Iranian Holstein bulls <i>A. Towhidi, A. Khoshvaghht, A. Zare Shahneh and M. Nourozi</i>	784
The effect of short-term treatment of ewes with either intravenous glucose or a supplement of soya and maize during the luteal phase on the number of follicles and the AMPK signalling pathway in granulosa and theca cells <i>N. Zouaidi, G. Khaldi, J. Dupont and R.J. Scaramuzzi</i>	786
Short communications – Nutrition and welfare	789
How repeated acidosis challenges affect sheep's behaviour and reactivity? <i>L. Commun, M.M. Mialon, C. Martin, M. Silberberg and I. Veissier</i>	790
Relationships between feed intake variability and rumen pH in mid-lactating goats fed an acidogenic diet <i>S. Giger-Reverdin, C. Duvaux-Ponter and D. Sauvant</i>	792
Sheep avoid eating saltbushes with high sulphur concentrations <i>H.C. Norman, D.K. Revell and D.G. Masters</i>	794
Influence of diet-induced sub-acute ruminal acidosis on the oxidative status of plasma in dairy cows <i>N. Wullepit, W. Fokkink, V. Fievez, J.R. Newbold, D. Fremaut and S. De Smet</i>	796
Milk yield and quality of two genetic groups of dairy cattle under two cooling strategies during severe summer conditions <i>L. Avendaño-Reyes, F.D. Alvarez-Valenzuela, A. Correa-Calderón, J.A. Hernández-Rivera, R. Pérez-Velázquez, P.H. Robinson and J.S. Fadel</i>	798
The impact of long term grain feeding on the core body temperature of cattle <i>D.T. Beatty, G.E. Gardner and R. Jacob</i>	800
Stress physiology in cattle is modified by temperament and hormonal growth promotant <i>L.M. Cafe, D.M. Ferguson, D.L. Robinson and P.L. Greenwood</i>	802
The effects of Yerba Mate (<i>Ilex paraguarensis</i>) supplementation on the productive performance of lambs <i>P. Celi and H.W. Raadsma</i>	804
Response of white blood cell stress-related gene expression to heat stress in lactating dairy cattle <i>K. DiGiacomo, F.R. Dunshea, B.J. Leury, L.H. Baumgard and R.P. Rhoads</i>	806

Feeding selenomethionine improves viability in Iranian Holstein suckling calves <i>M. Ebrahimi, A. Towhidi and A. Nikkhah</i>	808
Effects of age on transportation and preslaughter stress responsiveness in Moroccan dromedary camels <i>M. El Khasmi, F. Riad, A. Safwate, H. El Tahri, M. Farh, N. El Abbadi, M. Bengoumi, V. Coxam and B. Faye</i>	810
Influence of two drying off methods on udder health in Holstein cows given short dry periods <i>M.H. Ghafari, G.R. Ghorbani, H.R. Rahmani, M. Yari, A.H. Ghafari, A. Akbariyan and M. Mirzaee</i>	812
Pre-slaughter stress and lipoperoxidation: protective effect of vitamin E and plant extracts rich in polyphenols given to finishing cattle <i>M. Gobert, C. Bourguet, C. Terlouw, V. Deiss, O. Berdeaux, B. Comte, D. Gruffat, D. Bauchart and D. Durand</i>	814
The effects of feeding <i>Chromolaena odorata</i> to goat dams during pregnancy on the acceptance of this feedstuff by their offspring <i>P.V. Hai, J.T. Schonewille, D.V. Tien, H. Everts and W.H. Hendriks</i>	816
Effects of the methionine analogue isopropyl ester of 2-hydroxy-4-methylthio-butanoic acid (HMBi) on blood parameters of cows under heat-stressed conditions <i>Z. Han, G. Zhou, Z. Jin, Y. Chen, Y. Wang, E. Devillard and H. Peng</i>	818
Effect of level of endophyte-infected perennial ryegrass intake on plasma prolactin and some physiological parameters in Merino ewes <i>M.L.E. Henry, S. Kemp, I.J. Clarke, F.R. Dunshea and B.J. Leury</i>	822
Effect of physical processing of diet on eating and ruminating behaviors of dairy cows in early lactation <i>A. Hosseinkhani, H. Daghigh Kia and S.A.R. Vakili</i>	824
The validity of glucometer produced for humans in farm animals <i>Ö. Kaynar and A. Hayirli</i>	828
Effect of chromium supplementation on production and blood parameters of early-lactation Holstein cows under heat stress <i>A.Q. Lai, Z.S. Wang, B. Xue, L.Z. Wang and D.Y. Peng</i>	830
Effect of cassava (<i>Manihot esculenta</i>) foliage on nutrition, parasite infection and growth of lambs <i>C. Marie-Magdeleine, M. Mahieu, L. Philiber, P. Despois and H. Archimède</i>	832
The effects of high levels of rumen degradable protein on rumen fermentation and rumen histamine concentrations in dairy cows <i>R. Pilachai, J.T. Schonewille, A. Chaiyotwittayakun, S. Aiumlamai, C. Wachirapakorn, H. Everts and W.H. Hendriks</i>	834

Effect of vitamin E supplementation on SCC in periparturient dairy goats <i>L. Pinotti, V. Dell'Orto and A. Baldi</i>	836
Serum constituents and thyroid hormones in sheep fed <i>Kochia scoparia</i> hay <i>A. Riasi and M. Danesh Mesgaran</i>	838
The potential of pomegranate peels to decrease the incidence of oxidative-stress related diseases in cattle <i>A. Shabtay, H. Eitam, A. Orlov and A. Brosh</i>	840
Improved water TDS can improve dairy cattle performance under heat stress <i>M. Shapasand, A.R. Alizadeh, M. Yosefi and J. Amini</i>	842
Adrenal response to ACTH challenge in early lactating dairy cows characterised by different inflammatory conditions <i>E. Trevisi, A. Minuti, R. Lombardelli and G. Bertoni</i>	844
Performance and physiological responses of Holstein calves undergoing heat stress to supplementation with Chromium – Methionine <i>M. Yari, G.R. Ghorbani, M. Alikhani, H.R. Rahmani, M. Khorvash, M. Mirzaee, F. Hashem Zade and M. Ghafari</i>	846
Forage intake enhances omasal epithelium growth associated with accelerated epithelial cell cycle progression and increased cyclin D1 in weanling goats <i>H. Zhao, J. Lu and Z. Shen</i>	848
Author index	851