**REFERENCIAS**

1. Preston TR, Leng R. Matching Ruminant production systems with avail resources in the tropics and sub-tropics. Journal [serial on the Internet]. *Penambul Boocks,* Australia. 2002. Available from: http:// www.utafoundation.org.

2. Barahona R, Sanchez S. Physical and chemical limitations to the digestibility of tropical forages and strategies to overcome them. *Revista CORPOICA*. 2005; 6(1):69 -82.

3. Denman SE, McSweeney CS. Development of a real-time PCR assay for monitoring anaerobic fungal and cellulolytic bacterial populations within the rumen. *FEMS Microbiol Ecol*. 2006; 58(3):572-82.

4. Dehority BA. Gross anatomy, physiology and enviroment of the ruminant stomach. In: Elsevier, editor. Rumen Microbiology. London; 2003.

5. Kopecny J, Zorec M, Mrazek J, Kobayashi Y, Marinsek-Logar R. *Butyrivibrio hungatei* sp. nov. and *Pseudobutyrivibrio xylanivorans* sp. nov., butyrate-producing bacteria from the rumen. *Int J Syst Evol Microbiol*. 2003; 53(Pt 1):201-9.

6. Belenguer A, Toral PG, Frutos P, Hervas G. Changes in the rumen bacterial community in response to sunflower oil and fish oil supplements in the diet of dairy sheep. *J Dairy Sci*. 2010; 93(7):3275-86.

7. Toral PG, A. Belenguer, P. Frutos, Hervás. G. Effect of the supplementation of a high-concentrate diet with sunflower and fish oils on ruminal fermentation in sheep. *Small Rumin Res*. 2009; 81:119-125.

8. Huws SA, Kim EJ, Kingston-Smith AH, Lee MR, Muetzel SM, Cookson AR, et al. Rumen protozoa are rich in polyunsaturated fatty acids due to the ingestion of chloroplasts. *FEMS Microbiol Ecol*. 2009; 69(3):461-71.

9. Blanch M, Calsamiglia S, DiLorenzo N, DiCostanzo A, Muetzel S, Wallace RJ. Physiological changes in rumen fermentation during acidosis induction and its control using a multivalent polyclonal antibody preparation in heifers. *J Anim Sci*. 2009; 87(5):1722-30.

10. Loor JJ, Herbein JH. Dietary canola or soybean oil with two levels of conjugated linoleic acids (CLA) alter profiles of 18:1 and 18:2 isomers in blood plasma and milk fat from dairy cows. [*Anim Feed Sci Technol*](http://www.elsevier.com/locate/anifeedsci)*.* 2003; 103(1-4):63-83

11. Vergara -Lopez J, Araujo-Febres O. Producción, Composición Química y Degradabilidad Ruminal In Situ de *Brachiaria humidicola* (RENDLE) Schweick en el Bosque Seco Tropical. *Rev Cient* (Maracaibo). 2006; 16(3):239-48.

12. Jouany J, Michalet-Doreau B, Doreau M. Manipulation of the rumen ecosystem to support high-performance beef cattle – review Asian - Aus*. J Anim Sci*. 2000; 13:96 -114.

13. Martínez H. Plan Energético Nacional 2006-2025. Contexto y Estrategias. Unidad de Planeación Minero Energética – UPME. 2007.

14. Asanuma N, Kawato M, Hino T. Presence of *Butyrivibrio fibrisolvens* in the digestive tract of dogs and cats, and its contribution to butyrate production. *J Gen Appl Microbiol*. 2001; 47(6):313-9.

15. Arroyo H, Guardia M, Flórez J. Caracterización bromatológica de materias primas y subproductos en el municipio de Quibdó, Chocó. *Revista Institucional Universitaria tecnológica del Chocó*. 2007; 26 (2):9-12.

16. Gil J, Buitrago J. La yuca en la alimentación animal. Centro Nacional de Agricultura Tropical (CIAT). Cali, Colombia 1990. p. 446.

17. FAO. Global cassava market study. Business opportunities for the use of cassava. 2004 [updated 2004; cited 2010 6 Junio]; Available from: http://www.fao.org/docrep/007/y5287e/y5287e00.htm.

 18. Van de Vossenberg JL, Joblin KN. Biohydrogenation of C18 unsaturated fatty acids to stearic acid by a strain of *Butyrivibrio hungatei* from the bovine rumen. *Lett Appl Microbiol*. 2003; 37(5):424-8.

19. McSweeney CS, Denman SE. Effect of sulfur supplements on cellulolytic rumen micro-organisms and microbial protein synthesis in cattle fed a high fibre diet. *J Appl Microbiol*. 2007; 103(5):1757-65.

20. Carulla JE, Cárdenas E, Sánchez N, Riveros C. Valor nutricional de los forrajes más usados en los sistemas de producción lechera especializada de la zona andina colombiana; En: Seminario Nacional de Lechería Especializada, Bases Nutricionales y su Impacto en la Productividad; 2004; Medellín, septiembre 1 y 2: 21 - 38.: Eventos y Asesorías Agropecuarias EU (ed).

21. Correa CHJ, Pabón RML, Carulla FJE. Valor nutricional del pasto kikuyo (*Pennisetum clandestinum* Hoechst Ex Chiov.) para la producción de leche en Colombia (Una revisión): I - Composición química y digestibilidad ruminal y posruminal. *Livestock Research for Rural Development*. 2008; 20.

22. Rios J, Gallego A, Vélez L, Agudelo J, Toro L, Lema A, et al. Caracterización y evaluación de agroecosistemas a escala predial. Un estudio de caso; Centro agropecuario Paysandú (Medellín, Colombia). *Revista Facultad Nacional de Agronomía*. 2004; 57(2).

23. Czerkawski JW, Breckenridge G. Design and development of a long-term rumen simulation technique (Rusitec). *Br J Nutr*. 1977; 38(3):371-84.

24. Carmona J, M , Giraldo LA. El gas metano en la producción ganadera y alternativas para medir sus emisiones y aminorar su impacto a nivel ambiental y productivo. *Rev Col Cienc Pec*. 2005; 18(1): 49-63.

25. Bryant MP. Commentary on the Hungate technique for culture of anaerobic bacteria. *Am J Clin Nutr*. 1972; 25(12):1324-8.

26. Grubb JA, Dehority BA. Variation in colony counts of total viable anaerobic rumen bacteria as influenced by media and cultural methods. *Appl Environ Microbiol*. 1976; 31(2):262-7.

27. Rodríguez F, Diaz T, Mackenzie G, Guativa L, Afanador G. Aislamiento, patrón de fermentación de carbohidratos y caracterización morfológica de bacterias celulolíticas del rumen bovinos alimentados con heno de Raigras en Colombia. *Rev Copoica.* 1996; 1:23-8.

28. Dehority BA. Carbon dioxide requirement of various species of rumen bacteria. *J Bacteriol*. 1971; 105(1):70-6.

29. Chen W, Supanwong K, Ohmiya K, Shimizu S, Kawakami H. Anaerobic degradation of veratrylglycerol-beta-guaiacyl ether and guaiacoxyacetic acid by mixed rumen bacteria. *Appl Environ Microbiol*. 1985; 50(6):1451-6.

30. Balamurugan R, Chittaranjan SP, Chandragunasekaran AM, Ramakrishna BS. Molecular detection of the ruminal bacterium, *Butyrivibrio fibrisolvens*, in feces from rural residents of southern India. *Microb Ecol Health D.* 2009; 21(1):38-43.

31. Drummond A, Ashton B, Buxton S, Cheung M, Cooper A, Duran C, et al., inventors; Geneious v5.4, Available from http://www.geneious.com/. 2011.

32. Swofford D. PAUP\* version 4.0. Phylogenetic analysis using parsimony (and other methods). Sinauer Associates Inc, Sunderland, Massachusetts. 2000.

33. Posada D, Crandall K. Modeltest: testing the model of DNA substitution. *Bioinformatics*. 1998; 14(9): 817-8.

34. Huelsenbeck JP, Ronquist F, Nielsen R, Bollback JP. Bayesian inference of phylogeny and its impact on evolutionary biology. *Science.* 2001; 294: 2310-4. .

35. Ronquist F, Huelsenbeck JP. MrBayes 3: Bayesian phylogenetic inference under mixed models. *Bioinformatics*. 2003; 19:1572-4.

36. Ouwerkerk D, Klieve AV, Forster RJ. Enumeration of *Megasphaera elsdenii* in rumen contents by real-time Taq nuclease assay. *J Appl Microbiol*. 2002; 92(4):753-8.

37. Palmquist DL, Lock AL, Shingfield KJ, Bauman DE. Biosynthesis of conjugated linoleic acid in ruminants and humans. *Adv Food Nutr Res*. 2005; 50:179-217.

38. Boeckaert C, Boon N, Abdulsudi IZ, Verstraete W, Fievez V. Accumulation of biohydrogenation intermediates and changes in the rumen protozoal population after micro algae feeding to dairy cattle. Commun. *Agric Appl Biol S*ci. 2006; 71(1):83-6.

39. Kim EJ, Huws SA, Lee MR, Wood JD, Muetzel SM, Wallace RJ, et al. Fish oil increases the duodenal flow of long chain polyunsaturated fatty acids and trans-11 18:1 and decreases 18:0 in steers via changes in the rumen bacterial community. *J Nutr*. 2008; 138(5):889-96.

40. Van Nieuwenhove CP, Oliszewski R, González SN, Pérez Chaia AB. Influence of bacteria used as adjunct culture and sunflower oil addition on conjugated linoleic acid content in buffalo cheese. [*Food Res Int*](http://www.elsevier.com/locate/foodres)*.* 2007; 40(5):559-64.

41. Wasowska I, Maia MR, Niedzwiedzka KM, Czauderna M, Ribeiro JM, Devillard E, et al. Influence of fish oil on ruminal biohydrogenation of C18 unsaturated fatty acids. *Br J Nutr*. 2006; 95(6):1199-211.

42. Mir Z, Rushfeldt ML, Mir PS, Paterson LJ, Weselake RJ. Effect of dietary supplementation with either conjugated linoleic acid (CLA) or linoleic acid rich oil on the CLA content of lamb tissues. *Small Rumin Res*. 2000; 36(1):25-31.

43. Čepeljnik T, Zorec M, Kostanjšek R, Nekrep F, Marinšek-Logar R. Is *Pseudobutyrivibrio xylanivorans* strain Mz5T suitable as a probiotic? An in Vitro study. *Folia Microbiol (Praha)*. 2003; 48(3):339-45.

44. Dehority BA, Tirabasso PA. Effect of ruminal cellulolytic bacterial concentrations on in situ digestion of forage cellulose. *J Anim Sci*. 1998; 76(11):2905-11.

45. Krause DO, Denman SE, Mackie RI, Morrison M, Rae AL, Attwood GT, et al. Opportunities to improve fiber degradation in the rumen: microbiology, ecology, and genomics. *FEMS Microbiol Rev*. 2003; 27(5):663-93.

46. Bach A, Yoon IK, Stern MD, Jung HG, Chester-Jones H. Effects of type of carbohydrate supplementation to lush pasture on microbial fermentation in continuous culture. *J Dairy Sci*. 1999; 82(1):153-60.

47. Hook SE, Steele MA, Northwood KS, Wright AD, McBride BW. Impact of High-Concentrate Feeding and Low Ruminal pH on Methanogens and Protozoa in the Rumen of Dairy Cows. *Microb Ecol*. Published online May 31, 2011

48. Orpin CG. The role of ciliate protozoa and fungi in the rumen digestion of plant cell walls. *Anim Feed Sci* *Technol*. 1983; 10:121-43.

49. Ljungdahl LG. The cellulase/hemicellulase system of the anaerobic fungus Orpinomyces PC-2 and aspects of its applied use. *Ann N Y Acad Sci*. 2008; 1125:308-21.

50. Michalet-Doreau B, I. Fernandez, C. Peyron, Millet L, G. Fonty. Fibrolytic activities and cellulolytic bacterial community structure in the solid and liquid phases of rumen contents. *Reprod Nutr Dev*. 2001; 41:187–94.

51. Colombatto C.D., F. L. Mould, M. K. Bhat, D. P. Morgavi, Beauchemin KA, E. Owen. Influence of fibrolytic enzymes on the hydrolysis and fermentation of pure cellulose and xylan by mixed ruminal microorganisms in vitro. *J Anim Sci*. 2003; 81:1040-50.

52. Ranilla MJ, Carro MD. Diet and procedures used to detach particle-associated microbes from ruminal digesta influence chemical composition of microbes and estimation of microbial growth in Rusitec fermenters. *J Anim Sci*. 2003; 81(2):537-44.

53. Mrázek J, Tepšič K, Avguštin G, Kopečný J. Diet-dependent shifts in ruminal butyrate-producing bacteria. *Folia Microbiol (Praha)*. 2006; 51(4):294-8.

54. Paillard D, McKain N, Chaudhary LC, Walker ND, Pizette F, Koppova I, et al. Relation between phylogenetic position, lipid metabolism and butyrate production by different *Butyrivibrio-*like bacteria from the rumen. *Antonie van Leeuwenhoek*. 2007; 91(4):417-22.

55. Wilde PF, Dawson RM. The biohydrogenation of alpha-linolenic acid and oleic acid by rumen micro-organisms. *Biochem J*. 1966; 98(2):469-75.

56. Paillard D, McKain N, Chaudhary L, Walker N, Pizette F, Koppova I, et al. Relation between phylogenetic position, lipid metabolism and butyrate production by different *Butyrivibrio*- like bacteria from the rumen. *Antonie van Leeuwenhoek*. 2007; 91(4):417-22.

57. Bessa RJB, Santos-Silva J, Ribeiro JMR, Portugal AV. Reticulo-rumen biohydrogenation and the enrichment of ruminant edible products with linoleic acid conjugated isomers. *Livest Prod Sci*. 2000; 63(3):201-11.

58. Stewart CS. Factors Affecting the Cellulolytic Activity of Rumen Contents. *Appl Environ Microbiol*. 1977; 33(3):497-502.

59. Wallace RJ, McKain N, Shingfield KJ, Devillard E. Isomers of conjugated linoleic acids are synthesized via different mechanisms in ruminal digesta and bacteria. *J Lipid Res*. 2007; 48(10):2247-54.

60. Biondi L, Valvo MA, Di Gloria M, Tenghi ES, Galofaro V, Priolo A. Changes in ewe milk fatty acids following turning out to pasture. *Small Rumin Res*. 2008; 75(1):17-23

61. Or-Rashid M, Wright T, McBride B. Microbial fatty acid conversion within the rumen and the subsequent utilization of these fatty acids to improve the healthfulness of ruminant food products. *Appl Microbiol Biot*. 2009; 84(6):1033-43.

62. Maia MRG, Chaudhary LC, Figueres L, Wallace RJ. Metabolism of polyunsaturated fatty acids and their toxicity to the microflora of the rumen. *Antonie van Leeuwenhoek*. 2007; 91(4):303-14.

63. Zlatanos S, Laskaridis K, Feist C, Sagredos A. CLA content and fatty acid composition of Greek Feta and hard cheeses. *Food Chemistry*. 2002; 78(4):471-7.

64. Irmak S, Dunford NT, Gilliland SE, Banskalieva V, Eisenmenger M. Biocatalysis of linoleic acid to conjugated linoleic acid. *Lipids*. 2006; 41(8):771-6.

65. Margherita SS, Hungate RE, Storz H. Variation in Rumen *Butyrivibrio* Strains. *J Bacteriol*. 1964; 87:1304-8.

66. Willems A, Amat-Marco M, Collins MD. Phylogenetic analysis of *Butyrivibrio* strains reveals three distinct groups of species within the *Clostridium* subphylum of the gram-positive bacteria. *Int J Syst Bacteriol*. 1996; 46(1):195-9.

67. Garcia W, Giraldo LA. Efecto de la suplementación del pasto Kykuyo (*Pennisetum clandestinum*) con coproductos del bioetanol obtenido a partir de harina de yuca en un fermentador RUSITEC. IV Congreso internacional de ciencia y tecnología de los biocombustibles CIBSCOL Seminario internacional: Biocombustibles y Co-productos a partir de Microalgas; 2010; Bucaramanga, Colombia Libro de Memorias; 2010. p. 4.

68. Collomb M, Sollberger H, Bütikofer U, Sieber R, Stoll W, Schaeren W. Impact of a basal diet of hay and fodder beet supplemented with rapeseed, linseed and sunflowerseed on the fatty acid composition of milk fat. ***Int Dairy J.*** 2004; 14(6):549-59.

69. Giraldo A, Velasco R, Villada H. Digestibilidad Aparente de una Harina Proveniente de Hojas de Yuca (Manihot esculenta Crantz). Información Tecnológica. 2008; 19(1):11-8.70.

70. Barcenilla A, Pryde SE, Martin JC, Duncan SH, Stewart CS, Henderson C, et al. Phylogenetic relationships of butyrate-producing bacteria from the human gut. *Appl Environ Microbiol*. 2000; 66(4):1654-61.

71 Attwood GT, Reilly K, Patel BK. Clostridium proteoclasticum sp. nov., a novel proteolytic bacterium from the bovine rumen. *Int J Syst Bacteriol*. 1996; 46(3):753-8.

72. Dalrymple BP, Swadling Y, Layton I, Gobius KS, Xue GP. Distribution and evolution of the xylanase genes xynA and xynB and their homologues in strains of Butyrivibrio fibrisolvens. *Appl Environ Microbiol*. 1999; 65(8):3660-7.

73. Reilly K, Carruthers VR, Attwood GT. Design and use of 16S ribosomal DNA-directed primers in competitive PCRs to enumerate proteolytic bacteria in the rumen. *Microb Ecol*. 2002; 43(2):259-70.

74. Van Gylswyk NO, Hippe H, Rainey FA. Pseudobutyrivibrio ruminis gen. nov., sp. nov., a Butyrate-Producing Bacterium from the Rumen That Closely Resembles Butyrivibrio fibrisolvens in Phenotype. *Int J Syst Bacteriol*. 1996; 46:559-63.

75. Forster RJ, Teather RM, Gong J, Deng SJ. 16S rDNA analysis of Butyrivibrio fibrisolvens: phylogenetic position and relation to butyrate-producing anaerobic bacteria from the rumen of white-tailed deer. *Lett Appl Microbiol*. 1996; 23(4):218-22

76. Varel VH, Tanner RS, Woese CR. Clostridium herbivorans sp. nov., a cellulolytic anaerobe from the pig intestine. *Int J Syst Bacteriol*. 1995; 45(3):490-4.