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乙酸与丙酸比对体外瘤胃液挥发性脂肪酸发酵模式和微生物群体多样性的影响

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Acetate to Propionate Ratio: Effects on Volatile Fatty Acid Fermentation Pattern and Microorganisms Diversities in Rumen Fluid *in Vitro*

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摘要

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摘要 本文主要研究乙酸与丙酸比(乙/丙)对体外瘤胃液挥发性脂肪酸发酵模式及微生物群体多样性的影响。试验以4头瘤胃瘘管山羊提供瘤胃液,设4个处理,培养底物乙/丙分别为30:70、50:50、70:30和100:0。测定培养液中挥发性脂肪酸的浓度的变化,并通过单链构象多态性(SSCP)图谱检测细菌和原虫的群体多样性。结果表明:培养液乙酸浓度以100:0组最高,显著高于其他3组($P<0.05$),50:50组最低;丙酸浓度以30:70组最高,显著高于50:50和70:30组($P<0.05$);丁酸的浓度30:70组显著高于70:30组($P<0.05$);各组培养液乙/丙均接近3:1,30:70组显著低于70:30和100:0组($P<0.05$)。细菌SSCP图谱显示,50:50组条带数最多,100:0组条带数最少;原虫的SSCP图谱以100:0组条带数最多,30:70组条带数最少。细菌、原虫的SSCP图谱皆以50:50和70:30组图谱间相似性指数为高。总之,乙/丙对培养液挥发性脂肪酸模式、细菌或原虫的群体多样性都存在影响。

关键词: 瘤胃 细菌 原虫 乙酸、丙酸比 多样性

Abstract: This paper was conducted to investigate the effects of acetate to propionate ratio on the pattern of volatile fatty acid (VFA) fermentation and diversities of rumen microorganisms. Four goats fitted with permanent ruminal cannulas were used to provide rumen fluid for the *in vitro* study. The four treatments were set according to the acetate to propionate ratio in culture substrates, which were 30 : 70, 50 : 0, 70 : 30, and 100 : 0, respectively. Variation of VFA concentration was recorded, and diversities of bacteria and protozoa were investigated by SSCP fingerprint technique. The results showed as follows: acetate concentration of 100 : 0 group was the highest and was significantly higher than that of the other three groups ($P<0.05$), while that of 50 : 50 group was the lowest. Propionate concentration of 30 : 70 group was the highest and was significantly higher than that of groups 50 : 50 and 70 : 30 ($P<0.05$). Butyrate concentration of 30 : 70 group was significantly higher than that of 70 : 30 group ($P<0.05$). Acetate to propionate ratios in culture medium of all the treatments were close to 3 : 1, while that of 30 : 70 group was significantly lower than that of groups 70 : 30 and 100 : 0 ($P<0.05$). Bacterial SSCP fingerprint showed that bands number of 50 : 50 group was the most, while that of 100 : 0 group was the least; protozoa SSCP fingerprint showed that bands number of 100 : 0 group was the most, while that of 30 : 70 group was the least. Similarity index was the highest between 50 : 50 group and 70 : 30 group on both bacteria and protozoa fingerprints. In conclusion, the VFA pattern and diversities of rumen bacterial or protozoal community can be modified by acetate to propionate ratio *in vitro*.

Keywords: rumen, bacteria, protozoa, acetate to propionate ratio, diversity**收稿日期:** 2011-07-11;**基金资助:**

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- [1] 冯仰廉.反刍动物营养学[M].北京:科学出版社,2004.
- [2] 熊本海,卢德勋,张子仪.瘤胃乙酸与丙酸摩尔比例的改变对瘤胃发酵及血液指标的影响[J].畜牧兽医学报,2002,33(6):537-543.
- [3] MENKE K H, STEINGASS H. Estimation of the energetic feed value obtained from chemical analysis and *in vitro* gas production using rumen fluid[J]. Animal Research and Development, 1988, 28:7-55.
- [4] 熊本海,卢德勋,高俊.绵羊瘤胃VFA吸收效率及模型参数的研究[J].动物营养学报,1999,11:248-255.
- [5] 王梦芝.山羊瘤胃原虫与细菌吞噬关系和微生物AA变化机制的研究.博士学位论文.扬州:扬州大学,2008.
- [6] 赵亚华.生物化学与分子生物学实验技术教程[M].北京:高等教育出版社,2005.
- [7] ZHOU J, BRUNS M A, TIEDJE J M. DNA recovery from soils of diverse composition[J]. Applied and Environmental Microbiology, 1996, 62(2):316-322.
- [8] MUYZER G, DE WAAL E C, UITTERLINDEN A G. Profiling of complex microbial populations by denaturing gradient gel electrophoresis analysis of polymerase chain reaction-amplified genes encoding for 16S rRNA[J]. Applied and Environmental Microbiology, 1993, 59:695-700.
- [9] 王梦芝,喻礼怀,王洪荣,等.不同蛋白饲料对瘤胃微生物体外发酵和群体结构的影响[J].动物营养学报,2009,21(5):673-679.
- [10] SCHMALENBERGER A, TEBBE C C. Bacterial diversity in maize rhizospheres: conclusions on the use of genetic profiles based on PCR-amplified partial small subunit rRNA genes in ecological studies[J]. Molecular Ecology, 2003, 12:251-262.
- [11] CARRIQUO J A, PINTO F R, SIMAS C, et al. Assessment of band-based similarity coefficients for automatic type and subtype classification of microbial isolates analyzed by pulsed-field gel electrophoresis[J]. Journal of Clinical Microbiology, 2005, 43(11):5483-5490.
- [12] Phi;RSKOV, E R, GRUBB D A, SMITH J S. Efficiency of utilization of volatile fatty acids for maintenance and energy retention by sheep[J]. British Journal of Nutrition, 1979, 41:541-552.
- [13] 朱伟云,姚文,毛胜勇.变性梯度凝胶电泳法研究断奶仔猪粪样细菌区系变化[J].微生物学报,2003,8:503-508.
- [14] CALSAMIGLIA S, STERN M D, FIRKINS J L. Effects of protein source on nitrogen metabolism in continuous culture and intestinal digestion *in vitro*[J]. Journal of Animal Science, 1995, 73:1819-1827.
- [15] TAJIIMA K, AMINOV R I, NAGAMINE T, et al. Diet-dependent shifts in the bacterial population of the rumen revealed with real-time PCR[J]. Applied and Environmental Microbiology, 2001, 67(6):2766-2774.
- [16] TAJIMA K, ARAI S, OGATA K, et al. Rumen bacterial community transition during adaptation to high-grain diet[J]. Environmental Microbiology, 2000(6):273-284.
- [17] PREVOT S, SENAUD J, BOHATIER J, et al. Variation in the composition of the ruminal bacterial microflora during the adaptation phase in an artificial fermentor (Rusitec)[J]. Zoological Science Tokyo, 1994, 11:871-878.
- [1] 王东升,霍文婕,朱伟云,毛胜勇.反相高效液相色谱法测定瘤胃液中的生物胺[J].动物营养学报,2011,23(12):2165-2169
- [2] 徐晓锋,张力莉.单宁对反刍动物促营养作用的研究进展[J].动物营养学报,2011,23(12):2084-2089
- [3] 王志博,张永根,辛杭书,刘薇,夏科.海南霉素对外瘤胃微生物发酵和氮代谢的影响[J].动物营养学报,2011,23(12):2210-2216
- [4] 杜宇,王之盛,董利锋.石榴皮多酚提取物对亚急性瘤胃酸中毒相关有害因子的影响[J].动物营养学报,2011,23(11):2031-2036
- [5] 赵培厅,刘大程,高民,胡红莲,韩昊奇,周向丽,邓维康,王鹏飞.饲粮不同NFC/NDF对奶山羊瘤胃溶纤维丁酸弧菌、牛链球菌及埃氏巨型球菌含量变化的影响[J].动物营养学报,2011,23(10):1716-1724
- [6] 王梦芝,王曙,潘晓花,王洪荣,王加启.4种油脂对瘤胃微生物体外产气及辅酶F420的影响[J].动物营养学报,2011,23(10):1819-1825
- [7] 李鹏,林雪彦,苏鹏程,刘桂梅,艾金涛,王中华.饲粮能氮瘤胃释放同步化对泌乳奶牛瘤胃发酵、生产性能及氮平衡的影响[J].动物营养学报,2011,23(09):1505-1512
- [8] 董利锋,王之盛,杜宇.不同释放速度瘤胃调控剂对瘤胃亚急性酸中毒体外发酵参数的影响[J].动物营养学报,2011,23(09):1608-1614
- [9] 王曙,王梦芝,卢占军,董淑红,张鑫,王洪荣.不同植物油脂对体外培养条件下培养液酶活及微生物活力的影响[J].动物营养学报,2011,23(08):1309-1316
- [10] 王文娟,万发春,杨维仁,宋恩亮,刘晓牧,谭秀文,刘桂芬.瘤胃灌注大豆小肽对肉牛瘤胃发酵的影响[J].动物营养学报,2011,23(08):1324-1331
- [11] 陈俊材,王威,王之盛.利用体外法研究纳米氧化锌的添加对瘤胃发酵的影响[J].动物营养学报,2011,23(08):1415-1421
- [12] 高洋,徐明,刘南南,赵向辉,刘婵娟,姚军虎.黑麦草酸性洗涤木质素/中性洗涤纤维、长度对山羊采食行为及瘤胃液pH和纤维素酶活性的影响[J].动物营养学报,2011,23(07):1130-1139
- [13] 李兴伟,薛白,王之盛,徐世晓,王基恒,李占锋.羧基缩合尿素的营养价值评价[J].动物营养学报,2011,23(07):1239-1246
- [14] 魏德泳,朱伟云,毛胜勇.山羊瘤胃内产乳酸菌的分离鉴定及其产D-、L-乳酸特性的研究[J].动物营养学报,2011,23(06):965-970
- [15] 张莹,郭旭生,龙瑞军,周建伟,朱玉环,米见对.饲粮氮水平对牦牛瘤胃发酵及营养物质消化代谢特征的影响[J].动物营养学报,2011,23(06):956-964