



## 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

1. 扬州大学动物科学与技术学院, 扬州225009; 2. 赣南师范学院, 赣州341000

### Effects of Different Plant Oils on the Enzyme Activity and Microbial Activity in vitro

1. College of Animal Science and Technology, Yangzhou University, Yangzhou 225009, China; 2. Gannan Normal College, Ganzhou 341000, China

- 摘要
- 参考文献
- 相关文章

Download: PDF (739KB) HTML (1KB) Export: BibTeX or EndNote (RIS) Supporting Info

**摘要** 本文旨在研究不同饱和程度的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。试验以3头装有瘤胃瘘管的山羊提供瘤胃液, 采用单因子试验设计, 对照组不加油脂, 试验组分别添加花生油、菜籽油、玉米油和豆油进行体外培养。结果表明: 乳酸脱氢酶、谷草转氨酶、谷丙转氨酶3种酶的活性都以菜籽油组最高, 豆油组、玉米油组、花生油组依次降低, 除花生油组外, 其他试验组均显著高于对照组 ( $P < 0.05$ ), 且试验组间存在显著差异 ( $P < 0.05$ )。总脱氢酶以豆油组最高, 显著高于对照组 ( $P < 0.05$ ), 并依次显著高于玉米油组、花生油组和菜籽油组 ( $P < 0.05$ )。此外, 油脂组原虫DNA、细菌DNA、微生物DNA、原虫/细菌区系比例的均值与对照组, 以及试验组间差异均不显著 ( $P > 0.05$ ), 但随着培养时间的延长其动态变化模式不尽相同。微生物DNA在各时间点都以豆油组与玉米油组的较高; 而原虫/细菌比例则以豆油组和玉米油组较低。综上所述, 饱和程度不同的油脂对体外培养瘤胃微生物区系及其微生物细胞活力影响不同, 其中以豆油促进微生物活力的效应最佳, 玉米油较好。

**关键词:** 油脂 瘤胃微生物 转氨酶 脱氢酶 体外

**Abstract:** The objectives of this paper were to determine the effects of different plant oils on the enzyme activity and microbial activity in vitro. Three goats with permanent cannulas were used in a simple factor design. The control group was supplemented with no oil and the experimental groups were supplemented with peanut oil, rapeseed oil, corn oil, and soybean oil, respectively. The results showed that the activity of lactate dehydrogenase (LDH), glutamic oxaloacetic transaminase (GOT), and glutamic-pyruvic transaminase (GPT) were highest in rapeseed oil group and that in soybean oil group, corn oil group and peanut oil group fell in turn, the activity of LDH, GOT and GPT in the experimental groups were significant higher than that in the control group except for peanut oil group ( $P < 0.05$ ) and there were significant differences among the experimental groups ( $P < 0.05$ ). The activity of total dehydrogenase in soybean oil group was the highest and significantly higher than that of the control group ( $P < 0.05$ ) and that in corn oil group, peanut oil group and rapeseed oil group fell in turn. Additionally, no significant difference was observed in the protozoal DNA, bacterial DNA, microbial DNA, and protozoa to bacteria ratio among groups ( $P > 0.05$ ). However, microbial DNA was generally higher in soybean oil group and corn oil group at all sampling time points, and the changing trend along with time differed from each other. It was further observed that, protozoa to bacteria ratios were much lower in soybean and corn oil. In conclusion, different oils had different effects on microflora and activity of ruminal microorganisms in vitro, while soybean oil and corn oil showed much better effects on promoting microbial activity than the others. [Chinese Journal of Animal Nutrition, 2011, 23 (8) : 1309 - 1316]

**Keywords:** oil, rumen microbe, transaminase, dehydrogenase, in vitro

#### 基金资助:

国家自然科学基金 (31072051); 扬州大学创新培育基金 (2010CXJ054)

**通讯作者** 王梦芝, 博士, 讲师, E-mail: mengzhiwang@yahoo.cn

**作者简介:** 王曙 (1987—), 男, 江苏宿迁人, 硕士研究生, 从事反刍动物瘤胃微生态营养调控的研究。E-mail: yzuwangshu@163.com

#### Service

- 把本文推荐给朋友
- 加入我的书架
- 加入引用管理器
- Email Alert
- RSS

#### 作者相关文章

引用本文:

. 不同植物油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,V23(08): 1309-1316

. Effects of Different Plant Oils on the Enzyme Activity and Microbial Activity in vitro[J]. Chinese Journal of Animal Nutrition, 2011,V23(08): 1309-1316.

链接本文:

[http://211.154.163.124/Jweb\\_dwyy/CN/10.3969/j.issn.1006-267x.2011.08.009](http://211.154.163.124/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2011.08.009) 或

[http://211.154.163.124/Jweb\\_dwyy/CN/Y2011/V23/I08/1309](http://211.154.163.124/Jweb_dwyy/CN/Y2011/V23/I08/1309)

- [1] DIJKSTRA J, GERRITS W J J, BANNINK A, et al. Modelling lipid metabolism in the rumen[C]//Modelling Nutrient Utilization in Farm Animals, MCNAMARA J P, FRANCE J, BEEVER D E, eds. Publisher: CABI Publishing, 2000.
- [2] MCGINN S M, BEAUCHEMIN K A, COATES T. Methane emissions from beef cattle: effects of monensin, sunflower oil, enzymes, yeast, and fumaric acid[J]. Journal of Animal Science, 2004, 82: 3346-3356.
- [3] 王梦芝, 程欣, 谢文文, 等. 体外法研究不同油脂对瘤胃原虫吞噬细菌微循环的影响[J]. 中国农业科学, 2010, 43(8): 3831-3837.
- [4] BUSQUET M, CALSAMIGLIA S, FERRET A, et al. Effect of garlic oil and four of its compounds on rumen microbial fermentation[J]. Journal of Dairy Science, 2005, 88: 4393-4404
- [5] 李旦, 王加启, 卜登攀, 等. 运用Real-time PCR方法研究日粮添加豆油与胡麻油对肉牛瘤胃纤维分解菌数量的影响[J]. 动物营养学报, 2008, 20(3): 256-260.
- [6] JALC ˇ D, C ˇ ERTIK M, KUNDRIKOVA K, et al. Effect of microbial oil and fish oil on rumen fermentation and metabolism of fatty acids in artificial rumen[J]. Czech Journal of Animal Science, 2009, 54(5): 229-237.
- [7] 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.
- [8] HUMEYAN D B, NAGARAJA T G, MILLER G W, et al. Rumen microbial changes in cattle fed diets with or without salinomycin[J]. Applied and Environmental Microbiology, 1986, 51(2): 340-345.
- [9] 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.
- [10] JENKINS T C. Lipid metabolism in the rumen[J]. Journal of Dairy Science, 1993, 76: 3851-3863.
- [11] JALC ˇ D, KI IDAYOV S, NERUD F. Effect of plant oils and organic acids on rumen fermentation in vitro[J]. Folia Microbiologic, 2002, 47 (2): 171-177.
- [12] 加勒特, 格里萨姆. 生物化学[M]. 3版. 北京: 高等教育出版社, 2005: 809-853.
- [13] OWENS F N, SECRIST D S, HILL W J, et al. Acidosis in cattle: a review[J]. Journal of Animal Science, 1998, 76: 275-286.
- [14] ENEMARK J M, J RGENSEN R J, ENEMARK P. Rumen acidosis with special emphasis on diagnostic aspects of subclinical rumen acidosis: a review[J]. Veterinary Zootechnique, 2002, 20(42): 16-29.
- [15] 胡红莲, 刘大程, 卢德勋, 等. 日粮不同NFC/NDF比对奶山羊血液参数的影响[J]. 江西农业大学学报, 2008, 30(5): 855-859.
- [16] 刘春龙, 李杰. 丝兰皂甙对绵羊瘤胃原虫数目及酶活性的影响[J]. 西南农业大学学报, 2005, 27(2): 214-217.
- [17] 程茂基, 卢德勋, 王洪荣, 等. 不同来源肽对培养液中瘤胃细菌蛋白产量的影响[J]. 畜牧兽医学报, 2004, 35(1): 1-5.
- [18] 李莉. 应用微生物学[M]. 武汉: 武汉理工大学出版社, 2006.
- [19] WANG M Z, WANG H R, YU L H. Effects of NDF content on protozoal community and grazing rate in rumen[J]. Journal of Animal and Veterinary Advances, 2009, 8(9): 1746-1752.
- [20] 陈蛋, 陈斌, 陆道礼, 等. 近红外光谱分析法测定菜籽油中芥酸的含量[J]. 农业工程学报, 2007, 23(1): 234-237.
- [1] 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
- [2] 吴丹, 王之盛, 薛白, 邹华围, 余群莲. 不同加工方法对白糟营养价值 and 体外瘤胃发酵的影响[J]. 动物营养学报, 2011, 23(08): 1422-1429
- [3] 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
- [4] 韩昊奇<sup>1</sup>, 刘大程<sup>1\*</sup>, 高民<sup>2</sup>, 胡红莲<sup>2</sup>, 谢昌贤<sup>3</sup>, 邓维康. 不同NFC/NDF比对奶山羊瘤胃微生物及瘤胃pH变化的影响[J]. 动物营养学报, 2011, 23(04): 597-603
- [5] 张桂杰<sup>1</sup>, 王红梅<sup>3</sup>, 罗海玲<sup>1\*</sup>, 张英俊<sup>2\*</sup>, 王海<sup>2</sup>, 朱虹. 应用体外产气与体外消化法评定不同生育期豆科牧草营养价值[J]. 动物营养学报, 2011, 23(03): 387-394
- [6] 刘立成<sup>1,2</sup>, 金龙<sup>1</sup>, 宋伟红<sup>2</sup>, 刘大森<sup>1\*</sup>. 体外批次培养法研究莫能菌素对亚油酸氢化及反式11-油酸合成的影响[J]. 动物营养学报, 2011, 23(02): 343-348
- [7] 黄辉<sup>1</sup>, 丁宏标<sup>2\*</sup>, 高秀华<sup>2</sup>, 汤海鹏<sup>2</sup>. 肉仔鸡体外消化模型评定不同添加水平β甘露聚糖酶作用效果的研究[J]. 动物营养学报, 2011, 23(01): 130-135
- [8] 王芃芃<sup>1,2</sup>, 谭支良<sup>1\*</sup>. 反刍动物瘤胃微生物氮同化作用研究进展[J]. 动物营养学报, 2010, 22(05): 1171-1176
- [9] 余群莲<sup>1,2</sup>, 王之盛<sup>1,2\*</sup>, 薛白<sup>1,2</sup>, 吴丹<sup>1,2</sup>, 王立志<sup>1,2</sup>. 饲料中结构性碳水化合物与非结构性碳水化合物的不同比例对降解后白糟体外发酵特性的影响 (英文) [J]. 动物营养学报, 2010, 22(04): 956-963
- [10] 李二超<sup>1</sup>, 曾增<sup>2</sup>, 禹娜<sup>1</sup>, 熊泽泉<sup>1</sup>, 王悦如<sup>1</sup>, 陈雪芬<sup>2</sup>. 饲料蛋白质和维生素B6对低盐度下凡纳滨对虾生长和转氨酶活力的影响[J]. 动物营养学报, 2010, 22(03): 634-639

- [11] 陆燕1,2, 林波1, 王恬2, 石放雄2, 刘建新1\*. 大蒜油对体外瘤胃发酵、甲烷生成和微生物区系的影响[J]. 动物营养学报, 2010,22(02): 386-392
- [12] 王佳堃1, 安培培1, 陈振明2, 叶均安1, 刘建新1\*. 湖羊瘤胃微生物Fosmid文库的构建和分析[J]. 动物营养学报, 2010,22(02): 341-345
- [13] 诸葛燕1, 叶元土1\*, 蔡春芳1, 张伟明2, 顾金寿2. 5种油脂源饲料对花生长的影响[J]. 动物营养学报, 2010,22(01): 100-107
- [14] 王洪荣, 王梦芝, 曹恒春, 李国祥, 徐爱秋. 日粮不同蛋白质来源对山羊瘤胃微生物氨基酸组成的影响 (英文) [J]. 动物营养学报, 2009,21(06): 834-845
- [15] 王梦芝, 喻礼怀, 王洪荣, 李国祥, 曹恒春. 不同蛋白质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(05): 673-679