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应用体外发酵法研究高精料饲料NSC/NDF与甲烷产量之间的关系

郑文思, 赵广永, 张婷婷, 牛文静, 董瑞兰

中国农业大学动物科技学院, 动物营养学国家重点实验室, 北京 100193

A Study on Relationship between Dietary NSC/NDF and Methane Production of High Concentrate Diets using *in Vitro* Incubation Technique

ZHENG Wensi, ZHAO Guangyong, ZHANG Tingting, NIU Wenjing, DONG Ruilan

State Key Laboratory of Animal Nutrition, College of Animal Science and Technology, China Agricultural University, Beijing 100193, China

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摘要 本试验旨在应用体外发酵法研究高精料饲料非结构性碳水化合物/中性洗涤纤维(NSC/NDF)与甲烷(CH₄)、产量之间的关系。采用常规饲料设计饲料配方,共设计5个精粗比(60:40、70:30、80:20、90:10和100:0),每个精粗比设计10种饲料,共50种试验饲料。应用体外产气法对样品进行体外48 h发酵。发酵结束后,收集气体和液体样品,测定气体中CH₄和CO₂产量及液体中挥发性脂肪酸(VFA)产量。结果表明:饲料NSC/NDF与体外发酵总产气量、CH₄和CO₂产量之间均存在极显著的正相关关系(P<0.01),与乙酸/丙酸和CH₄/TVFA之间均存在极显著的负相关关系(P<0.01),但是相关系数均偏低。结果提示,高精料饲料条件下,随着饲料NSC/NDF的提高,饲料体外发酵的CH₄相对产量下降,但由于相关系数偏低,饲料NSC/NDF不能作为准确预测饲料体外发酵CH₄产量的指标。

关键词: NFC/NDF 体外发酵 甲烷 挥发性脂肪酸

Abstract: This experiment was conducted to study the relationship between dietary non-structural carbohydrates/neutral detergent fiber (NSC/NDF) and methane (CH₄), production of high concentrate diets using *in vitro* incubation technique. Fifty diets with 5 ratios of concentrate to roughage (60:40, 70:30, 80:20, 90:10 and 100:0) and 10 diets for each ratio were formulated. An *in vitro* gas test was used for 48 h incubation. After that, gas and liquid samples were collected for the determination of CH₄ and CO₂ production in gas and volatile fatty acids (VFA) production in liquid. The results showed that significantly positive relationships were found between dietary NSC/NDF and CH₄, CO₂ and total VFA (TVFA) production (P<0.01), and significantly negative relationships were found between dietary NSC/NDF, acetate/propionate and CH₄/TVFA (P<0.01), but regression coefficients were all low. It is concluded that *in vitro* relative CH₄ production of high concentrate diet is decreased with the increase of dietary NSC/NDF, but the low regression coefficients indicate that *in vitro* CH₄ production can not be accurately predicted merely based on dietary NSC/NDF.

Keywords: NSC/NDF, *in vitro* incubation, methane, volatile fatty acids

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通讯作者 赵广永,教授,博士生导师, E-mail: zhaogy@cau.edu.cn

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