



动物营养学报

CHINESE JOURNAL OF ANIMAL NUTRITION

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动物营养学报 2014, Vol. 26 Issue (2) :397-403 DOI: 10.3969/j.issn.1006-267x.2014.02.015

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饲料谷氨酰胺添加水平对生长獭兔生长性能、氮代谢和空肠黏膜酶活性的影响

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Effects of Dietary Glutamine Supplemental Level on Growth Performance, Nitrogen Metabolism and Jejunum Mucosal Enzyme Activities of Growing Rex Rabbits

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摘要 本试验旨在研究饲料谷氨酰胺添加水平对生长獭兔生长性能、氮代谢和空肠黏膜酶活性的影响。试验选用断奶獭兔200只, 随机分为5组(每组40个重复, 每个重复1只), 分别饲喂谷氨酰胺添加水平为0、0.3%、0.6%、0.9%和1.2%的试验饲料。预试期7 d, 正试期60 d。结果表明: 在初始体重无显著差异($P>0.05$)的情况下, 饲料谷氨酰胺添加水平对生长獭兔的平均日采食量、平均日增重和料重比均无显著影响($P>0.05$); 随着饲料谷氨酰胺添加水平的升高, 平均日增重先升高后降低, 料重比先降低后升高, 在饲料谷氨酰胺添加水平为0.9%时达到最高平均日增重和最低料重比。饲料谷氨酰胺添加水平对生长獭兔的尿氮、食入氮无显著影响($P>0.05$)。饲料谷氨酰胺添加水平极显著影响生长獭兔的粪氮($P=0.0048$)、可消化氮($P=0.0060$)、沉积氮($P=0.0053$)、氮表观消化率($P=0.0009$)、氮利用率($P=0.0081$)、氮生物学效价($P=0.0023$), 其中粪氮在饲料谷氨酰胺添加水平为0.9%时达到最小值, 其他指标在此时达到最大值。饲料谷氨酰胺添加水平显著或极显著影响蛋氨酸($P=0.0001$)、胱氨酸($P=0.0063$)、谷氨酸($P=0.0106$)和脯氨酸的表观消化率($P=0.0001$), 而对其他氨基酸的表观消化率无显著影响($P>0.05$)。饲料谷氨酰胺添加水平对生长獭兔的空肠黏膜蔗糖酶和乳糖酶活性无显著影响($P>0.05$), 而极显著影响空肠黏膜麦芽糖酶($P=0.0015$)、鸟氨酸转氨酶($P=0.0029$)和谷氨酸合成酶活性($P=0.0076$)。综合本试验测定指标得出, 生长獭兔饲料适宜的谷氨酰胺添加水平为0.9%。

关键词: 谷氨酰胺 生长獭兔 生长性能 氮代谢 空肠黏膜酶活性

Abstract: This experiment was conducted to study the effects of dietary glutamine supplemental level on growth performance, nitrogen metabolism and jejunum mucosal enzyme activities of growing Rex rabbits. Two hundred weaned Rex rabbits were randomly assigned to 5 groups with 40 replicates in each group and each replicate contained 1 rabbit. Rabbits in 5 groups were fed experimental diets supplemented with 0, 0.3%, 0.6%, 0.9% and 1.2% glutamine, respectively. The experiment lasted for 7 days for adaptation and 60 days for test. The results showed as follows: under the condition of no significant difference in initial body weight ($P>0.05$), dietary glutamine supplemental level did not significantly affect average daily intake (ADI), average daily gain (ADG) and feed/gain (F/G) of growing Rex rabbits ($P>0.05$). With the increase of dietary glutamine supplemental level, the average daily gain (ADG) tended to be increased firstly and then decreased, while the feed/gain (F/G) showed the opposite trend, and the highest ADG and the lowest F/G both appeared in 0.9% glutamine group. Dietary glutamine supplemental level had significant effects on fecal nitrogen ($P=0.0048$), digestible nitrogen ($P=0.0081$), retention nitrogen ($P=0.0053$), nitrogen apparent digestibility ($P=0.0009$), nitrogen utilization rate ($P=0.0081$) and nitrogen biological value ($P=0.0023$), but had no significant effects on urine nitrogen and nitrogen intake of growing Rex rabbits ($P>0.05$). The values of the lowest fecal nitrogen and the highest digestible nitrogen, retention nitrogen, nitrogen apparent digestibility, nitrogen utilization rate and nitrogen biological value appeared in 0.9% glutamine group. Dietary glutamine supplemental level had a significant effect on the apparent digestibility of methionine ($P=0.0010$), cystine ($P=0.0063$), glutamic acid ($P=0.0106$) and proline ($P=0.0001$), but had no significant effect on the apparent digestibility of other amino acids of growing Rex rabbits ($P>0.05$). Dietary glutamine supplemental level had significant effects on the activities of maltase ($P=0.0108$), ornithine transaminase ($P=0.0029$) and glutamate synthase ($P=0.0076$) in jejunal mucosa, but had no significant effects on the activities of sucrase and lactase in jejunal mucosa of growing Rex rabbits ($P>0.05$). Considering all indices of this experiment, the appropriate glutamine

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引用本文:

付朝晖, 李福昌, 李冰等. 饲料谷氨酰胺添加水平对生长獭兔生长性能、氮代谢和空肠黏膜酶活性的影响[J]. 动物营养学报, 2014, V26(2): 397-403

FU Zhaohui, LI Fuchang, LI Bing etc. Effects of Dietary Glutamine Supplemental Level on Growth Performance, Nitrogen Metabolism and Jejunum Mucosal Enzyme Activities of Growing Rex Rabbits[J]. Chinese Journal of Animal Nutrition, 2014, V26(2): 397-403.

链接本文:

http://118.145.16.228/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2014.02.015 或 http://118.145.16.228/Jweb_dwyy/CN/Y2014/V26/I2/397

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