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不同中性洗涤纤维与淀粉比例饲料对生长肉兔生产性能、盲肠发酵及胃肠道发育的影响

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Effects of Different Neutral Detergent Fiber/Starch Ratio Diets on Performance, Caecum Fermentation and Gastrointestinal Development of Growing Rabbits

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摘要 本试验旨在研究不同中性洗涤纤维(NDF)与淀粉比例饲料对生长肉兔生产性能、盲肠发酵及胃肠道发育的影响。选用平均体重相近的35日龄断奶新西兰肉兔200只,随机分成4组,每组50只,分别饲喂NDF与淀粉比例为2.3(NDF,336 g/kg DM; 淀粉,145 g/kg DM; I组)、1.9(NDF,306 g/kg DM; 淀粉,164 g/kg DM; II组)、1.4(NDF,273 g/kg DM; 淀粉,192 g/kg DM; III组)和1.0(NDF,250 g/kg DM; 淀粉,250 g/kg DM; IV组)的试验饲料。预试期7 d,正试期40 d。结果表明:饲料NDF与淀粉比例对试兔平均日增重(ADG)、料重比(F/G)影响显著($P<0.05$),对平均日采食量(ADFI)无显著影响($P>0.05$)。随着NDF水平降低和淀粉水平的升高,ADG先升高后降低,以II组最高,为23.59 g/d; F/G先降低后升高,以II组最低,为2.93。试兔平均腹泻天数随饲料NDF水平升高而极显著降低($P<0.01$)。II组试兔的胃重、小肠重、盲肠重以及小肠长度均为最高(长),且饲料NDF与淀粉比例对胃重、小肠重的影响达到显著水平($P<0.05$)。饲料NDF与淀粉比例对盲肠内容物丙酸含量有显著影响($P<0.05$),对pH、氨态氮浓度、乙酸含量和丁酸含量及乙酸/(丙酸+丁酸)无显著影响($P>0.05$)。II和III组盲肠内容物丙酸含量显著高于I和IV组($P<0.05$)。饲料NDF与淀粉比例对试兔十二指肠绒毛高度有极显著的影响($P<0.01$),对试兔十二指肠隐窝深度及绒毛高度/隐窝深度无显著影响($P>0.05$)。以II组试兔的十二指肠绒毛长度最长,达到851.02 μm ,极显著高于其他各组($P<0.01$)。综合本试验测定指标,生长肉兔饲料适宜的NDF水平为305.7 g/kg DM,淀粉水平为163.8 g/kg DM,NDF与淀粉比例为1.9。

关键词: 中性洗涤纤维 淀粉 肉兔 生产性能 盲肠发酵 胃肠道发育

Abstract: An experiment was conducted to determine the effects of different neutral detergent fiber (NDF)/starch ratio diets on performance, caecum fermentation and gastrointestinal development of growing rabbits. A total of 200 35-day-old weanling rabbits were randomly assigned to 4 groups with 50 replicates in each group, and they were fed diets with the ratios of NDF/starch were 2.3 (NDF, 336 g/kg DM; starch, 145 g/kg DM; group I), 1.9 (NDF,306 g/kg DM; starch, 164 g/kg DM; group II), 1.4 (NDF, 273 g/kg DM; starch, 192 g/kg DM; group III) and 1.0 (NDF, 250 g/kg DM; starch, 250 g/kg DM; group IV), respectively. The trial lasted for 7 days for adaptation, and 40 days for experiment. The results showed as follows: the ratio of NDF/starch had significant influences on average daily gain (ADG) and feed/gain (F/G) ($P<0.05$), but had no significant influence on average daily feed intake (ADFI) ($P>0.05$). With the NDF level decreasing and starch level increasing, the ADG was firstly increased and then decreased, while the F/G had an opposite change, and the largest ADG (23.59 g/d) and the lowest F/G (2.93) were found in group II. Average diarrhea day of trial rabbits was significantly decreased with the NDF level increasing ($P<0.01$). The values of stomach weight (SW), small intestine weight (SIW), caecum weight (CW) and small intestine length (SIL) in group II were all the largest (longest) among all groups, and the ratio of NDF/starch had a significant influences on SW and SIW ($P<0.05$). The ratio of NDF/starch had a significant influence on propionic acid content in cecal digesta ($P<0.05$), but had no significant influence on pH, ammonia nitrogen concentration, acetic acid content, butyric acid content and acetic acid/(propionic acid+butyric acid) in cecal digesta ($P>0.05$). The propionic acid content in cecal digesta in groups II and III was significantly higher than that in groups I and IV ($P<0.05$). The ratio of NDF/starch had significant influence on duodenum villous height ($P<0.01$), but had no significant influence on duodenum and villous height/crypt depth ($P>0.05$). And duodenum villous height was the longest in group II (851 μm), which was significantly higher than that in other groups ($P<0.01$). Based on a comprehensive consideration of measured indices, the appropriate NDF level, starch level and NDF/starch ratio in

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the diet of growing rabbits are 305.7 g/kg DM, 163.8 g/kg DM and 1.9, respectively.

Keywords: neutral detergent fiber, starch, meat rabbit, performance, caecum fermentation, gastrointestinal development

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