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应用康奈尔净碳水化合物-蛋白质体系和NRC模型评价不同干酒糟及其可溶物的营养价值

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Evaluation of Nutrition Values of Different Dried Distillers Grains with Solubles Using Cornell Net Carbohydrate and Protein System and National Research Council Models

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摘要 本试验旨在应用康奈尔净碳水化合物-蛋白质体系(CNCPS)和NRC模型评价不同干酒糟及其可溶物(DDGS)的营养价值。采集我国5个不同生产厂家的玉米DDGS和2个不同生产厂家的大麦DDGS作为样本,测定营养成分,利用CNCPS对蛋白质和碳水化合物组分进行分割,并根据NRC模型估测可消化养分含量和能值。结果表明:1)玉米DDGS中粗蛋白质(CP)、中性洗涤不溶性粗蛋白质(NDICP)和酸性洗涤不溶性粗蛋白质(ADICP)含量的平均值均高于大麦DDGS,但是玉米DDGS中可溶性粗蛋白质(SCP)、中性洗涤纤维(NDF)和酸性洗涤木质素(ADL)的含量的平均值均低于大麦DDGS。2)玉米DDGS中速降解真蛋白质(PB₂)、不可降解氮(PC)和不可利用碳水化合物(CC)含量的平均值均高于大麦DDGS。3)与大麦DDGS相比,玉米DDGS中瘤胃真可消化粗蛋白质(tdCP)和维持水平总可消化养分(TDN_m)含量的平均值略高,生产水平消化能(DE_p)、生产水平代谢能(ME_p)、生产水平泌乳净能(NE_{LP})、维持净能(NE_m)的平均值接近。结果提示,我国的玉米DDGS和大麦DDGS可以作为奶牛饲料,缓解我国蛋白质饲料紧张和价格高涨带来的影响。

关键词: 干酒糟及其可溶物 玉米 大麦 营养成分 能值 奶牛

Abstract: This study was conducted to evaluate the nutrition values of different dried distillers grains with solubles (DDGSs) using Cornell Net Carbohydrate and Protein System (CNCPS) and National Research Council (NRC) models. Corn DDGSs from five manufactures and barley DDGSs from two manufactures in China were selected as samples to determine nutrient composition, and then the protein and carbohydrate subfractions were partitioned using CNCPS. Finally, the digestible nutrient contents and energy values were predicted using NRC models. The results showed as follows: 1) the average contents of crude protein (CP), neutral detergent insoluble crude protein (NDICP) and acid detergent insoluble crude protein (ADICP) in corn DDGSs were all higher than those in barley DDGSs, while the average contents of soluble crude protein (SCP), neutral detergent fiber (NDF) and acid detergent lignin (ADL) were lower than those in barley DDGSs. 2) The average contents of intermediately degraded true protein (PB₂), undegradable nitrogen (PC) and unavailable carbohydrate (CC) in corn DDGSs were higher than those in barley DDGSs. 3) Compared with barley DDGSs, the average contents of truly digestible crude protein (tdCP) and total digestible nutrients at maintenance level (TDN_m) in corn DDGSs were a little higher, while the digestible energy at production level (DE_p), metabolizable energy at production level (ME_p), net energy for lactation at production level (NE_{LP}) and net energy for maintenance (NE_m) were close in corn and barley DDGSs. The results indicate that corn DDGSs and barley DDGSs in China can be used as dairy feeds to relieve the effects of protein feeds shortage and price increase.

Keywords: DDGS, corn, barley, nutrient composition, energy values, dairy cows

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