



Tropentag, September 20-22, 2017, Bonn

“Future Agriculture:
Socio-ecological transitions and bio-cultural shifts”

Protein Nutrition of Dairy Cows in the Tropics: Challenges and Perspectives

KHATERINE SALAZAR-CUBILLAS, PEDRO ALAN SAINZ-SANCHEZ, RAVINDRAVARMA GOWNIPURAM, SEBASTIAN GLOWACKI, SHIMELS WASSIE, ALICE ONYANGO, JOAQUÍN CASTRO-MONTOYA, UTA DICKHOEFER

Hohenheim University, Inst. of Agricultural Sciences in the Tropics (Hans-Ruthenberg-Institute), Germany

Abstract

Global milk demand is estimated to grow by 25 % over the next 10 years, in particular in tropical regions of Africa and Asia. Although the majority of dairy cows are found there, their annual milk production is lower than in temperate systems. These low performance result in a high demand for natural resources, low nitrogen use efficiency, and high environmental emissions per unit of milk produced. Hence, there is a strong need to increase animal performances in tropical dairy systems. The aim was therefore to highlight future challenges and perspectives related to tropical dairy cattle nutrition based on results of different trials conducted by our group in the tropics.

Rumen-degradable protein intake was adjusted to the nitrogen (N) requirements of rumen microbes in a study in Peru with lactating cows grazing a legume-grass sward. Lowest rumen-degradable protein intake reduced urinary N excretion and linearly increased efficiency of N use for milk synthesis from 0.20 to 0.25 g milk N/g N intake. Moreover, a study conducted in El Salvador showed that a tropical legume silage (Jackbean) can replace 55 % of crude protein from soybean in diets of dairy cows without any negative effects on milk yield, while increasing N use efficiency from 0.13 to 0.15 g N/g N intake. In this line, common methods to estimate metabolisable energy concentrations in ruminant feeds do not appear to be valid for tropical diets, and results of a study with heifers show that estimated efficiency of rumen microbial protein (MCP) synthesis is lower (5 g MCP/MJ ME intake) than values published in the literature for temperate cattle diets (10.1 g MCP/MJ ME intake), hampering the adjustment of N intakes to actual requirements of rumen microbes and their host.

Evidence exists of the potential to increase resources use efficiency by tropical cattle, therefore further research is needed to develop and validate scientific methodology for an accurate evaluation of the nutritive value of tropical ruminant feeds. Moreover, differences in rumen protein turnover and protein requirements should be quantified to adjust rumen-degradable protein intake to actual requirements, and to thereby enhance N use efficiency in dairy feeding.

Keywords: Nitrogen partitioning, protein use efficiency, tropical dairy cattle