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Prevention of ruminal acidosis by manipulating physically effective fibre (peNDF) of forage

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Key words : physically effective fibre, rumen acidosis, forage source, dairy cows

Introduction Providing sufficient peNDF in diets fed to high-producing dairy cows is necessary to minimize ruminal acidosis. Dairy cows ingest a diet that can differ from the diet offered because cows sort their diets. The objective of this study was to determine whether source of forage and grain affects sorting of feed by dairy cows.

Materials and methods Alfalfa silage, barley silage and corn silage, each chopped fine and coarse, were each used in a number of replicated separate studies. Within study, each silage was combined with either a barley or corn-based concentrate. Particle distribution of the diets was determined using the Penn State Particle Separator (Lammers et al., 1996). The physical effectiveness factor (pef) was determined as the sum of the proportion of particles retained on the top (919 mm) and middle (8 mm) sieves.

Results and discussion For alfalfa silage diets, the pef of the diets were smaller than the pef of the Orts. The increase in pef from diet to Orts was greater for barley (36%) than for corn (11%) diets. The pef of the barley silage diets were higher than the pef of the Orts for coarse and fine silages. For corn silage diets, the pef of the diets were greater than the pef of the Orts regardless of grain source fed. The reduction in pef from diet to Orts was greater for fine (46%) than for coarse (34%) diets.

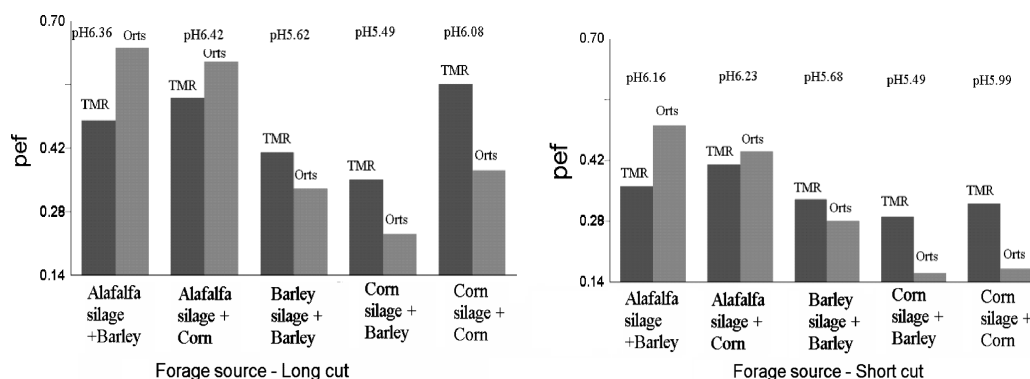


Figure 1 Physical effectiveness factors for the diets and Orts. The various sources of forages used in the total mixed rations (TMR) were chopped relatively long (left) or short (right).

Conclusions Dairy cows sort against long particles when ruminal pH is high. Conversely, cows intentionally select long particles to meet their need for physically effective fibre when ruminal pH is low. Whether dairy cows select for or against long particles depends more on their ruminal pH status than the feed source. Cows fed diets containing barley grain or finely chopped forages tend to select long particles due to lower rumen pH, compared to cows fed diets containing corn grain or long particle forages.

Reference

Lammers, B. P., D. R. Buckmaster, and A. J. Heinrichs. 1996. A simple method for the analysis of particle sizes of forage and total mixed rations. *J. Dairy Sci.* 79:922-928.