

When Do Dairy Cows Sort Their TMR?

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Providing sufficient physically effective fibre in diets fed to high-producing dairy cows minimizes ruminal acidosis. However, the diet consumed differs from the TMR offered because of sorting. To develop guidelines for sufficient physically effective fibre, it is necessary to determine the extent that dairy cows sort long particles from small particles when fed a TMR. During the past years, a number of studies were conducted by our team to determine the requirements of dairy cows for physically effective fibre. During these studies we determined the sorting patterns of cows. In these studies, alfalfa, barley and corn silages were cut coarsely and finely and mixed with either a barley- or corn-based concentrate. Particle size distribution of the TMRs was determined using the Penn State Particle Separator with a top sieve (19-mm), middle sieve (8-mm) and pan. The sum of particles retained on the top and middle sieves, or the physically effectiveness factor (pef), for the TMRs containing fine and coarse silages were (dry matter basis): 0.36 and 53 for alfalfa silage diets, 0.33 and 0.41 for barley silage diets, and 0.30 and 0.56 for the corn silage-based diets.

For alfalfa silage diets, the proportion of long particles ($\geq 19\text{mm}$) left in the orts 24 h after feeding (19 and 25%) was higher than in the original diets (6 and 10%) for coarse and fine cut silages, respectively. The pef of the orts was also greater than the pef of the diets (0.64 vs. 0.44). However, for barley silage diets, the proportion of long particles ($\geq 19\text{mm}$) and the pef of the orts were smaller than in the original diets. For corn silage diets, the proportion of long particles ($\geq 19\text{mm}$) left in the orts (6.3 and 0.2%) was smaller than the proportion in the original diets (8.6 and 7.0%) for coarse and fine cut silage, respectively, when barley grain was fed. In contrast, the proportion of long particles ($\geq 19\text{mm}$) left in the orts (13.6 and 3.7%) was greater than in the original diets (7.6 and 2.3%) for coarse and fine silage, respectively, when corn grain was fed. The difference in the proportion of long particles between the TMR and the orts indicates whether cows select against or in favor of long forage particles. Mean ruminal pH was on average 6.29 for alfalfa silage diets, 5.65 for barley silage, 5.49 for corn silage with barley grain and 6.04 for corn silage with corn grain diets.

Implications: Dairy cows sort against long particles when fed alfalfa silage- or corn grain-based diets. Conversely, cows intentionally select long particles to meet their need for physically effective fibre when ruminal pH is low. How cows sort their feed depends on ruminal pH status.