

**ABSTRACTS**  
**\* Author Presenting Paper**

**125** Effects of grain variability and processing on starch utilization by lactating dairy cattle. J. L. Firkins\*, M. L. Eastridge, N. R. St-Pierre, and S. M. Noftsger, *Ohio State University, Columbus.*

Starch digestion in dairy cows has been extensively reviewed (e.g., Mills et al., *J. Anim. Feed Sci.* 8:451), but processing, other than steam-flaking (Theurer et al., *J. Dairy Sci.* 82:1950) has received much less attention.  $NE_L$  concentrations of diets were increased by 8.5% for high-moisture vs dried corn (24.0 and 12.8% moisture; Wilkerson et al., *JDS* 80:2487). They estimated that grinding vs rolling numerically increased  $NE_L$  of high-moisture corn by 12.0% but had no effect on dry corn. However, Callison et al. [*JDS* 82(Suppl. 1):118] indicated that particle size of dry, ground corn had a large influence (54.2, 49.7, and 88.7% true ruminal and 91.3, 92.2, and 98.0% apparent total tract starch digestibility for corn with mean particle sizes of 4.75, 2.56, and 1.15 mm, respectively), increasing  $NE_L$  in the total diet from 1.63 to 1.74 Mcal/kg (18% increase for the corn, 36.6% of dietary DM). Similarly, estimated  $NE_L$  was increased by 18 to 33 and 13 to 20% by steam-flaking corn and milo, respectively, coinciding with higher ruminal starch digestibilities (Theurer et al.). Corn genotype affects starch digestibility [Dado et al., *JDS* 82(Suppl. 2):197]. Barley substitution for corn linearly increased ruminal and total starch digestibilities but quadratically affected NDF digestibilities in the rumen and total tract (Overton et al., *JDS* 78:1981). To optimize  $NE_L$  intake, the amount of ruminally available starch needs to be optimized to avoid increasing negative associative effects, reducing DMI, or increasing the incidence of ruminal acidosis (Nocek et al., *JDS* 80:1005), highlighting the need to predict digestibilities of starch in the rumen and relate this to fiber digestibility and effective fiber needs. Therefore, various dietary and microbial factors affecting starch digestibility will be reviewed, and multiple regression analyses will be done for effects of DMI and other dietary factors, grain source, and grain processing on site of starch digestibility. Limitations in present knowledge will be assessed and recommendations made, especially with regard to transition management.

**Key Words:** Dairy Cattle, Grain Processing, Starch Digestion