# Effects of Feeding Processed Oats Grain on Ruminal Fermentation and Animal Production Performance in Lactating Dairy Cows

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Barley grain has been used as main energy source in dairy cows diets in Canada and USA. However, the high price of this commodity has given producers incentive to replace it with by oat grain. Although, oat might be seen as a potential feed replacement, the raw grain shows high rumen degradation rate that could cause digestive disorders. Feed processing techniques such as thermal processing have been used in order to reduce the rumen degradation rate and extent in oats. However, little information regarding thermal processing on new oat varieties are available. This study aimed to determine the effect of processed oats grains on DM intake (DMI), milk yield and components, digestibility, and rumen fermentation in lactating dairy cows.

Eight lactating cows including four ruminally-cannulated cows were used in a double 4×4 Latin Square Design, with a 21-day period. Cows were fed a TMR with a 50:50 forage-to-concentrate ratio with one of the four treatments: T1=rolled barley, T2=rolled oat, T3=flaked oat, and T4=pelleted oat, where rolled barley was used as control. Daily intake was adjusted to allow 5% refusal. On days 18 to 20 of each period, DMI, total fecal collection and milk sampling were performed. Day 21 was used for ruminal fermentation measurement. The DMI did not differ among treatments (P=0.16). Milk yield was higher (P<0.01) for cows fed rolled oats (49.23 kg/d), while fat yield and FCM were not affected by treatment (P=0.11 and P=0.17, respectively). Protein yield (1.34 kg/d) and lactose yield (1.99 kg/d) were significantly lower (P < 0.05) for flaked oats when comparing to the other treatments. Feed efficiency was similar for rolled oats and barley, but higher (P=0.02) for pelleted and flaked oats. Digestibility of DM, OM, NDF and CP were not affected by treatment (P>0.05). Starch digestion was lowest (P<0.01) for rolled barley. Ruminal pH was not affected by treatment averaging 6.16. Total short chain fatty acids in the rumen were significantly higher (P=0.01) for flaked oats (96.71 mM) and barley (100.45 mM). Ruminal acetate concentration was lower (P<0.01) for pelleted oats when compared to rolled oats and barley (54.84, 58.98 and 61.11 mM, respectively). Propionate concentration did not differ between treatments.

Implications: These results demonstrate that oat grain can increase milk yield without causing milk fat depression or inducing changes in the ruminal pH. In addition, ruminal VFA's, degradability of DM and CP also showed minor difference between grains. This knowledge could be applied to reduce feeding costs through the greater use of oats in dairy cattle diets.