

# Effect of carbohydrate conformation in hullless barley on carbohydrate availability in dairy cows

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The objective of this study is to study the effect of carbohydrate (CHO) structure on CHO availability in dairy cows. This study compared hulled barley (CDC Copeland) with four newly developed hullless barley cultivars (CDC Fibar, CDC Rattan, CDC McGwire, HB08302) on CHO digestion and rumen degradation and to quantify the relationship of amylose/amylopectin ratio (Ay:AP) and beta-glucan to CHO availability in dairy cows. The results show that a higher CHO (84 %DM,  $P<0.01$ ), a lower rapidly degradable CHO (CA) (24 %CHO,  $P<0.01$ ), a lower rate of degradable starch (17 %ST/h,  $P<0.01$ ) and a higher rumen bypass feed neutral detergent fiber (BNDF) (98 g/kg DM,  $P<0.01$ ), were found in the hulled compared to the hullless barley varieties. Among the hullless barley varieties, HB08302 was higher in effective degradability of neutral detergent fiber (EDNDF: 74 g/kg DM,  $P<0.01$ ) and rumen bypass starch (BST) (218 g/kg DM,  $P<0.01$ ) but lower in EDST (320 g/kg DM,  $P<0.01$ ), while CDC Rattan was found higher in EDST (461 g/kg DM,  $P<0.01$ ). The CA fraction was highly correlated with beta-glucan levels in barley ( $P<0.01$ ) but was also affected by amylose and Ay:AP ( $P<0.05$ ). However, EDNDF was found significantly related to amylose and Ay:AP ( $P<0.01$ ) while beta-glucan levels influenced the rate of degradation for starch, percentage of BST and EDST in rumen degradation ( $P<0.01$ ).

## Implication:

Hullless barley with altered carbohydrate characteristics could improve CHO digestion and degradation resulting in increased CHO availability in dairy cows