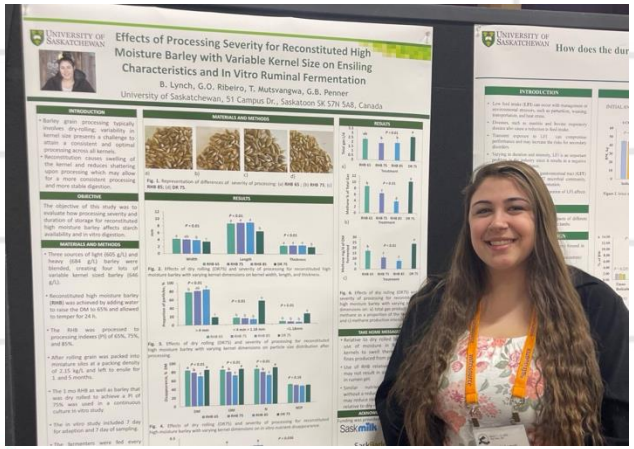
UNIVERSITY OF SASKATCHEWAN

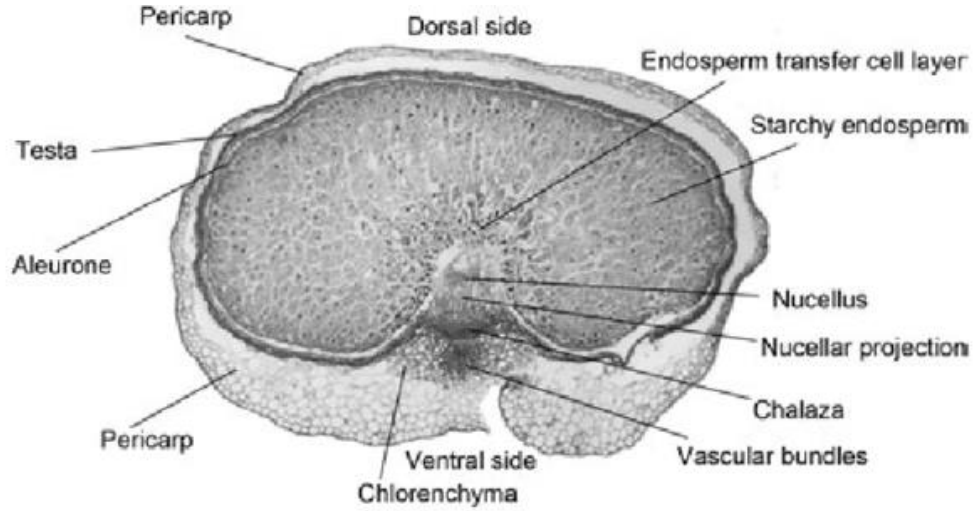
Does the method of barley grain processing affect performance of lactating cows and risk for ruminal acidosis?

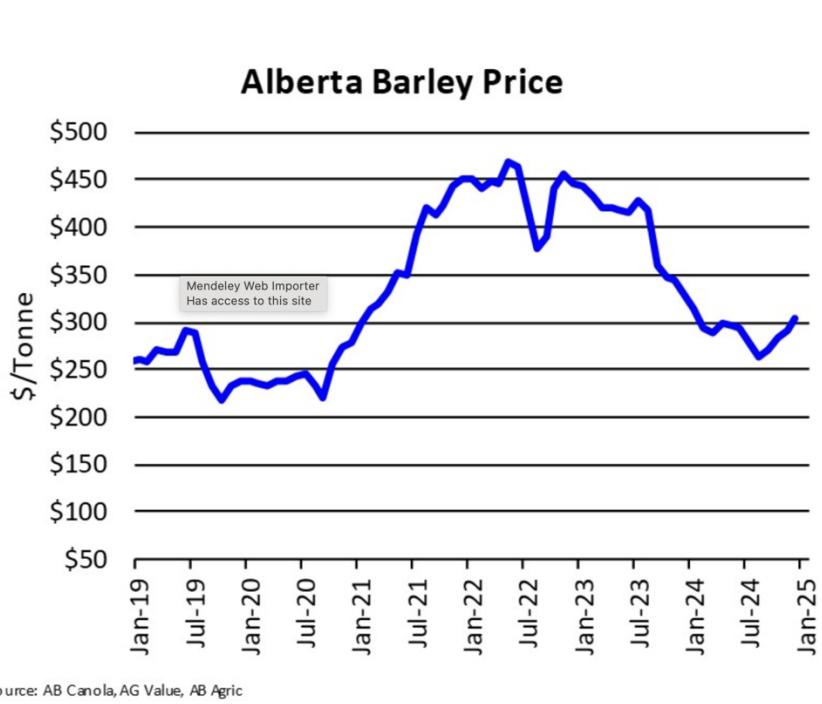
Beverly Lynch, G.O. Ribeiro, T. Mutsvangwa, and G.B. Penner



Barley grain characteristics

- Barley starch is protected by the hull and pericarp
- Once exposed by processing, the starchy endosperm is rapidly digested



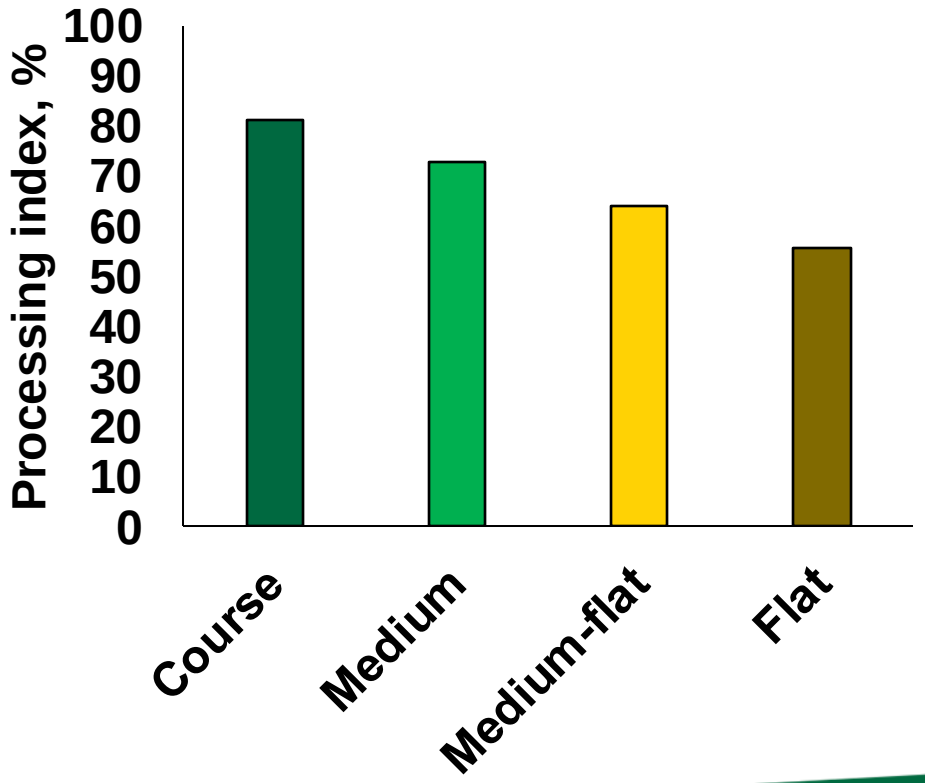


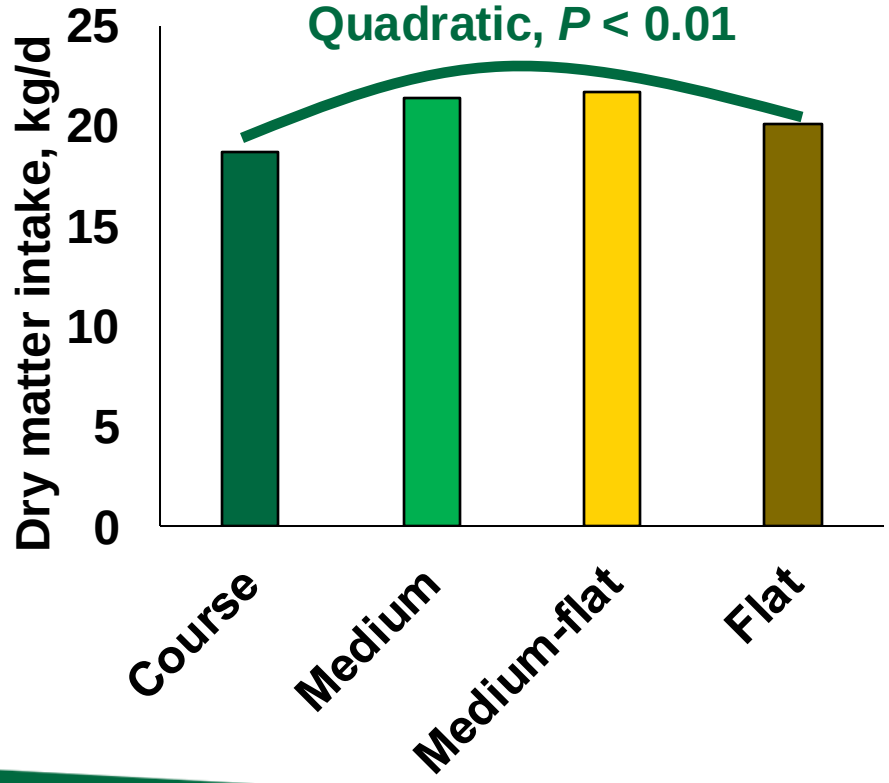
Source: AB Canola, AG Value, AB Agric

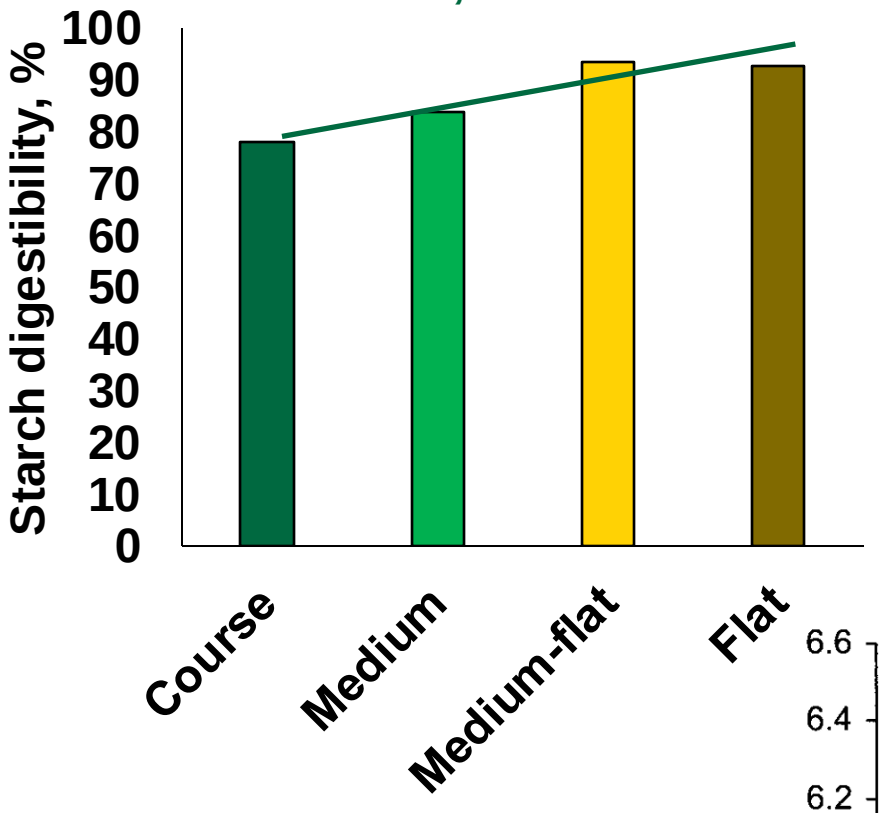
Yang et al., 2000; Journal of Dairy Science

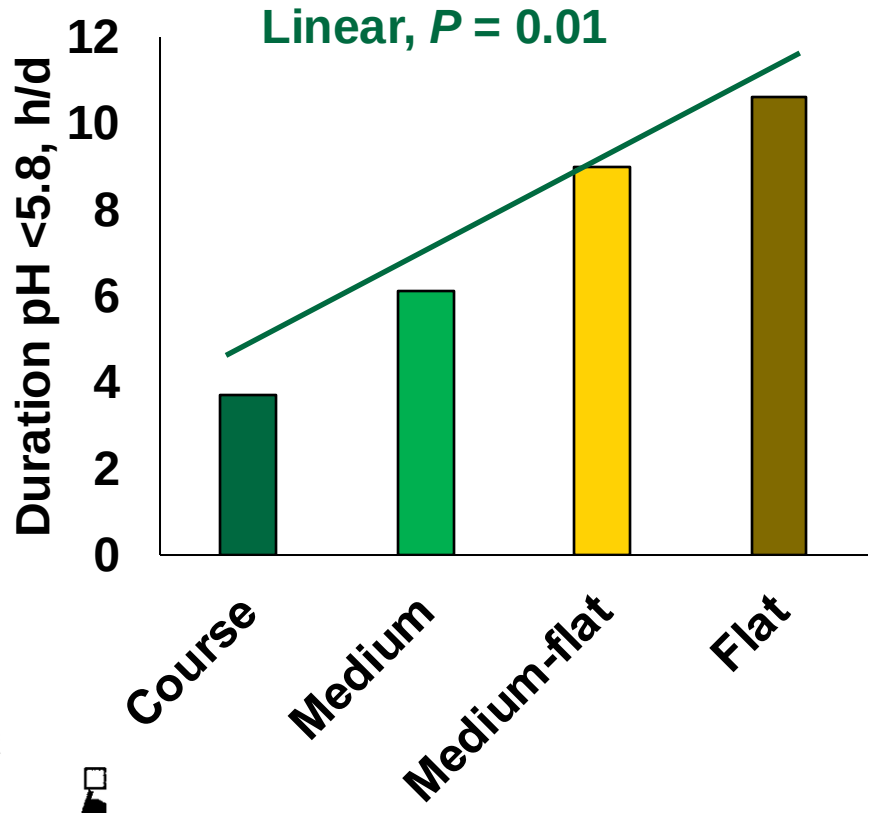
Ensuring adequate but not excessive processing

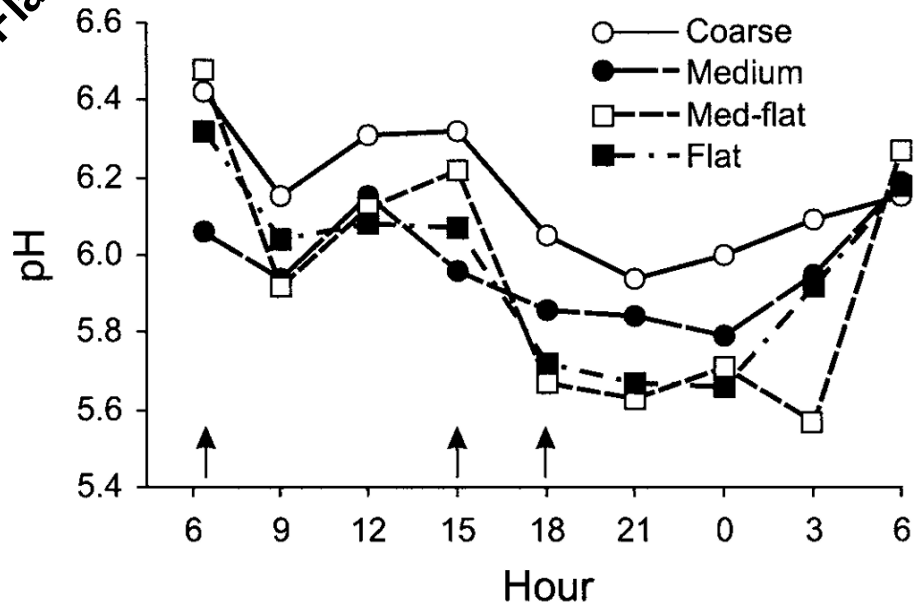
- Inadequate processing leads inadequate starch utilization
- Over-processing may increase risk for ruminal acidosis







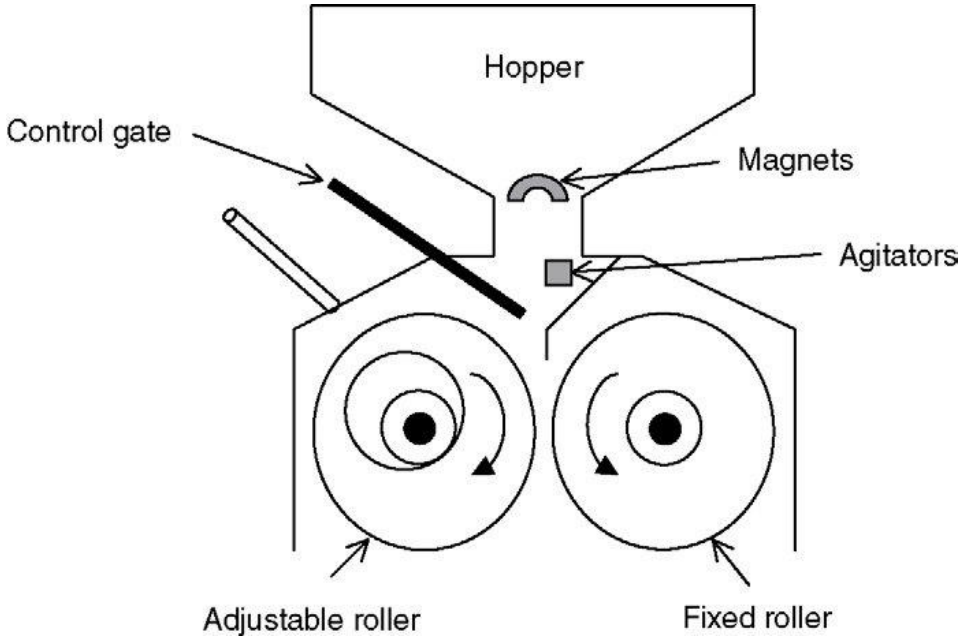


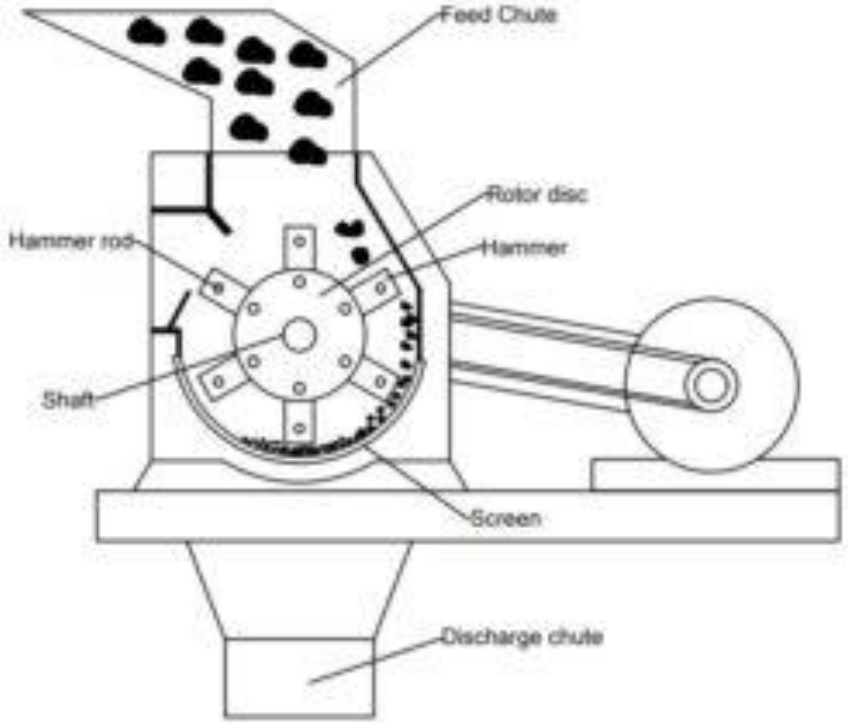


Yang et al., 2000; Journal of Dairy Science

Methods of processing

- Dry rolling
- Grinding (hammer mill or disc mill)
- High-moisture barley

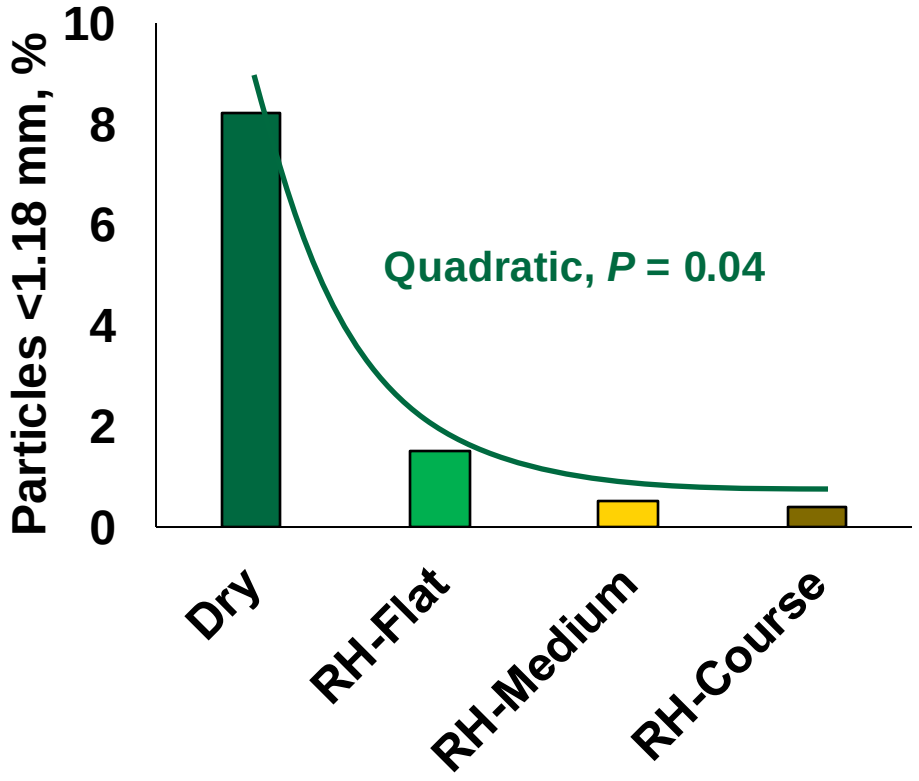




Lynch et al., 2024; Journal of Dairy Science

High moisture processing

- Advantages
  - Less production of fine particles / dust
  - Less wear on equipment
- Disadvantages
  - Stability of the product
    - Used immediately or ensiled
  - Processing throughput is reduced
  - Must have scrapers on rollers



University of Saskatchewan

Research question

- Does the method of barley grain processing and severity of processing affect feed intake, ruminal fermentation, and milk and milk component yields?

- Eight ruminally cannulated cows (138 ± 41 DIM)

- Treatments
  - Dry rolled barley **- DR**
  - Ground barley (hammer mill with a 4-mm screen) **- HM**
  - Reconstituted high moisture barley coarsely rolled **- RC**
  - Reconstituted high moisture barley finely rolled **- RF**

University of Saskatchewan

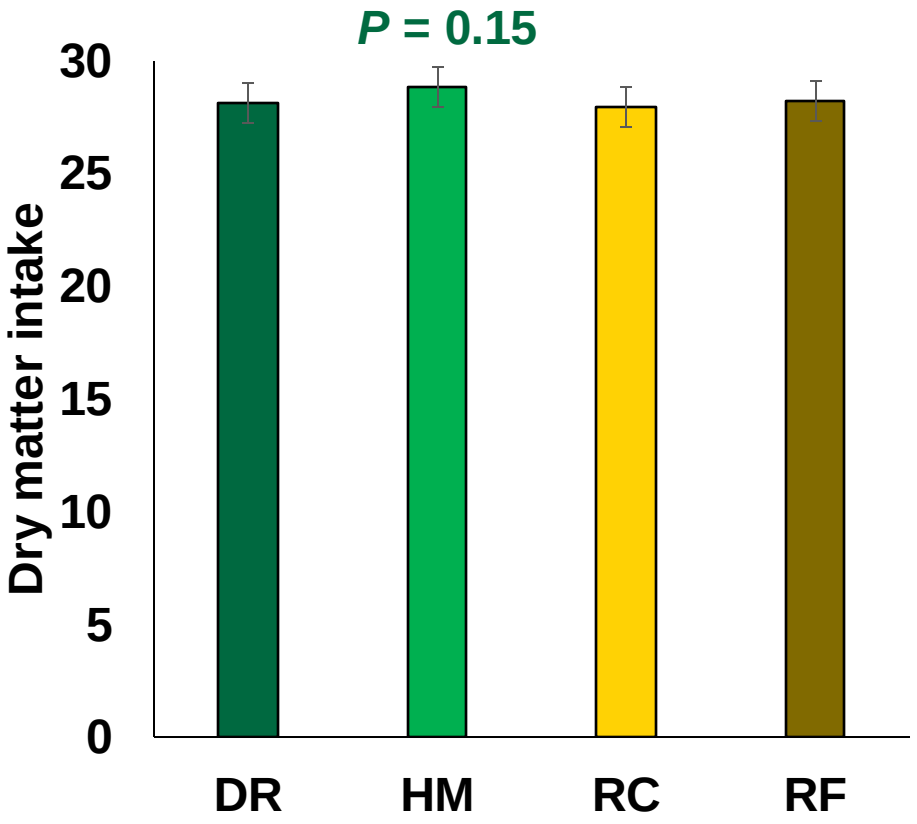
Dietary treatments

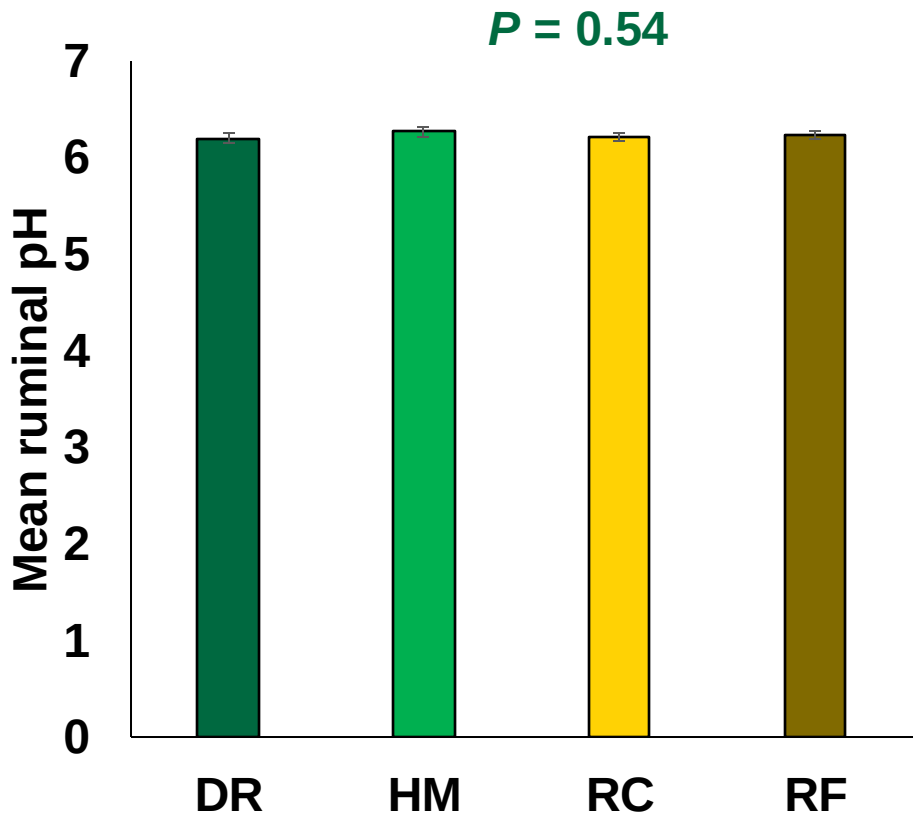
Ingredient, % DM	DR	HM	RC	RF
Barley silage	46.4	46.4	46.4	46.4
Barley grain	7.8	7.8	7.8	7.8
DR	31.8	-	-	-
HM	-	31.8	-	-
RC	-	-	31.8	-
RF	-	-	-	31.8
Protein mix	9.6	9.6	9.6	9.6
Mineral and vitamin	3.2	3.2	3.2	3.2
Palmitic acid	1.3	1.3	1.3	1.3

Chemical composition, % DM	DR	HM	RC	RF
CP	16.9	16.9	17.1	17.1
NDF	28.6	28.7	27.9	27.8
Starch	25.5	25.4	25.9	25.5
Ether extract	3.9	3.9	3.9	4.0

UNIVERSITY OF SASKATCHEWAN

Processing did not affect DMI or rumen pH

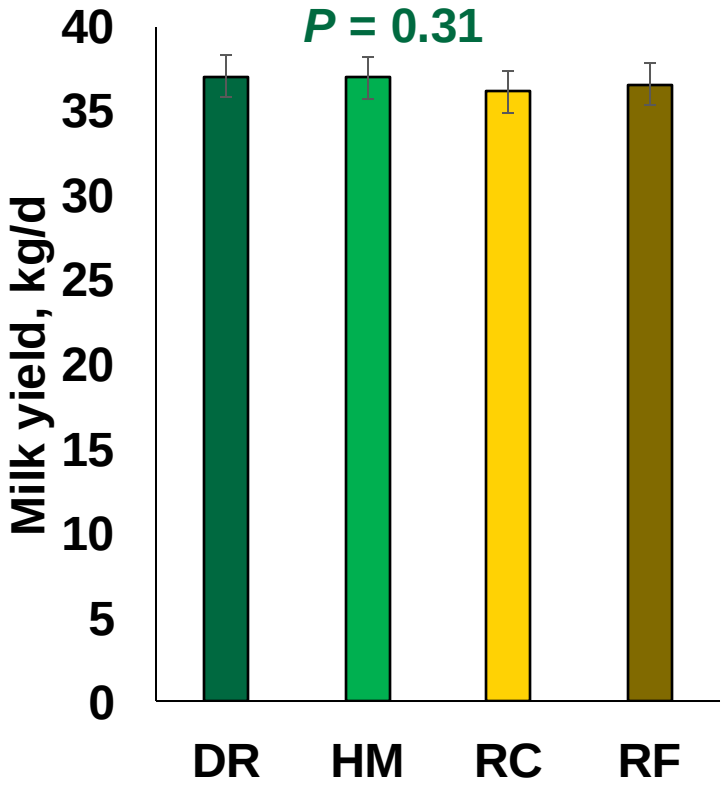


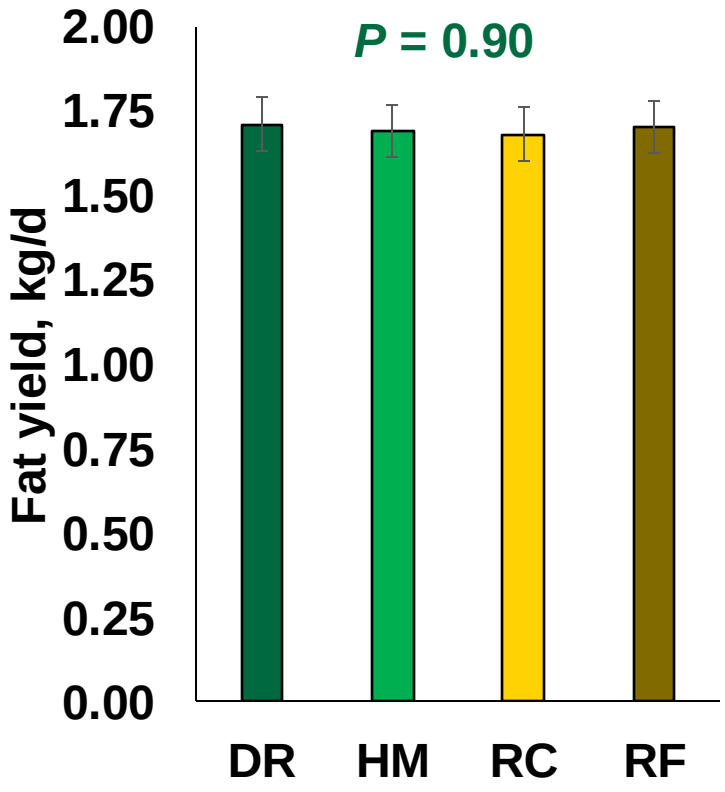


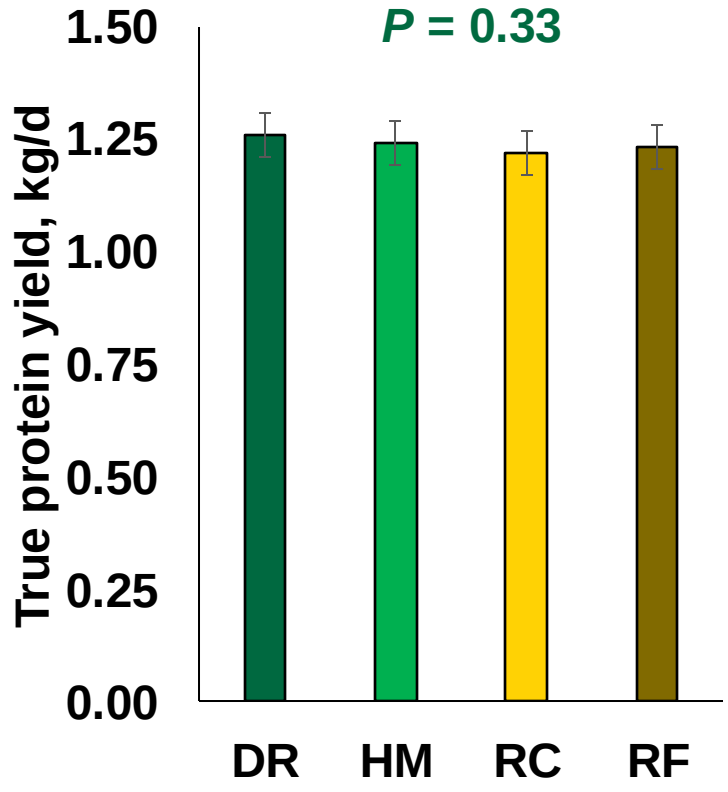
Starch digestibility was not affected and very high: >98%

UNIVERSITY OF SASKATCHEWAN

Processing did not affect milk or milk component yields







What does this mean?

- With moderate starch diets (~25% of DM), there appears to be little effect for the method of barley grain processing

- Questions still remain for:
  - Situations where dietary starch is greater
  - Situations with a change in dietary starch
    - Cows that transition from close-up to fresh or lactating diets

Acknowledgements

Through the SaskMilk/USASK quota agreement, every 1$ from SaskMilk resulted in $22 of funding!