Feeding motivation in feedlot cattle

Jennifer M. Chen[1], Erin M. Mintline[1], Trevor J. DeVries[2], and Cassandra B. Tucker[1]

[1]Department of Animal Science, University of California, Davis, California, USA [2]Department of Animal Biosciences, University of Guelph, Ontario, Canada

HOW DO HIGH-CONCENTRATE DIETS AFFECT CATTLE?

48% of US feedlot cattle are fed finishing diets with >75% concentrate (dry-matter basis)

PRO: growth & production ↑

CON: diets high in fermentable carbohydrates can result in acute or subacute ruminal acidosis (SARA)

CON? time spent feeding & ruminating ↓

HOW CAN DIETARY FIBER ADDRESS THESE?

→ chewing ↑
→ saliva production ↑
→ improved rumen environment

Dietary fiber can potentially benefit both rumen pH & feeding behavior, whereas other buffers (e.g. sodium bicarbonate) only affect rumen pH

RESEARCH QUESTION: Do cattle fed a high-concentrate diet want to obtain dietary fiber?

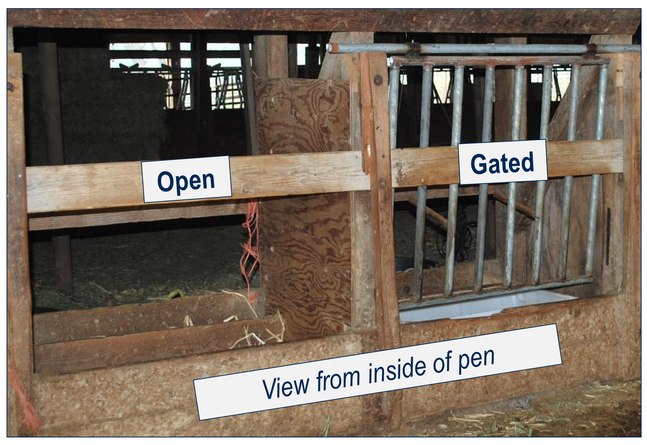
EXPERIMENTAL METHOD

Primary diets:

High concentrate
80% concentrate

High fiber
100% Sudan hay

- 12 Angus-Hereford cross heifers
- 1.1 ± 0.1 years old (mean ± SD)
- 6 cattle per primary diet, which was fed for 30 days before the study
- During the study, the **primary diet** was fed ad libitum in the **open bunk** with unrestricted access.

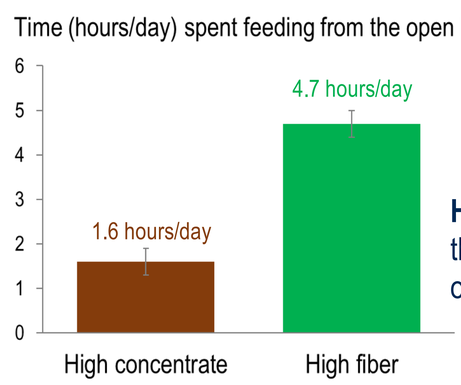


Cattle had to push the **gate** to access Sudan hay (7 oz./day)

Weight was added to the gate daily to increase the challenge of opening it

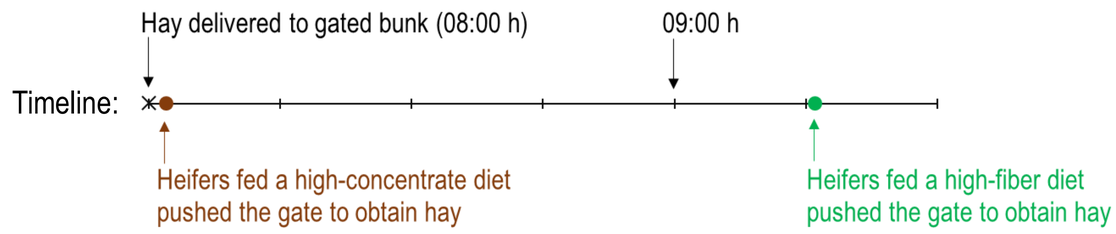
RESULTS

1 Feeding from the open bunk (primary diet)



Heifers fed a high-fiber diet spent more time feeding: they spent 3 times longer eating their primary diet from the open bunk vs. those fed a high-concentrate diet

2 Pushing the gate to obtain dietary fiber



Heifers fed a high-concentrate diet were more eager to obtain dietary fiber: they pushed the gate within 2 minutes after the hay was delivered vs. 76 minutes for those fed a high-fiber diet

- As the weight on the gate increased, heifers fed a high-concentrate diet continued to push immediately after hay delivery
- They compensated for the increasing challenge by consuming the hay more quickly

CONCLUSION

Cattle fed a high-concentrate diet were motivated to obtain dietary fiber

FOLLOW-UP RESEARCH QUESTIONS ABOUT RUMEN-BUFFERING AGENTS

When feedlot cattle are fed a high-concentrate finishing diet:

- How much dietary fiber or sodium bicarbonate is needed to improve the rumen environment and avoid SARA or acute acidosis?
- How much dietary fiber or sodium bicarbonate will cattle choose to consume? How much can be consumed without reducing growth?
- To what extent do cattle want to obtain dietary fiber or sodium bicarbonate? How does this depend on time after consuming a concentrate-rich meal?

Jennifer Chen: jmchen@ucdavis.edu
Cassandra Tucker: cbtucker@ucdavis.edu