

Live Yeast Supplementation and Heat Stress on Ruminal *Fusobacterium necrophorum* Counts

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Introduction

Reduced average daily gains and feed efficiencies, as well as liver condemnations associated with severe liver abscesses in feedlot cattle, are economic liabilities to producers and packers. *Fusobacterium necrophorum*, a Gram-negative ruminal bacterium, is the primary etiological agent of liver abscesses in grain-fed cattle. *F. necrophorum* survives elevated rumen temperatures during heat stress and exploits ruminal acidosis in conjunction with rumenitis as an opportunity to invade ruminal epithelium and enter portal circulation to reach the parenchyma of the liver. Live yeast supplementation has been shown to stabilize ruminal pH levels away from acidotic conditions during heat stress in dairy cattle.

Objective

Investigate the effects of live yeast supplementation on ruminal *F. necrophorum* counts in heat-stressed cattle fed a grower diet.

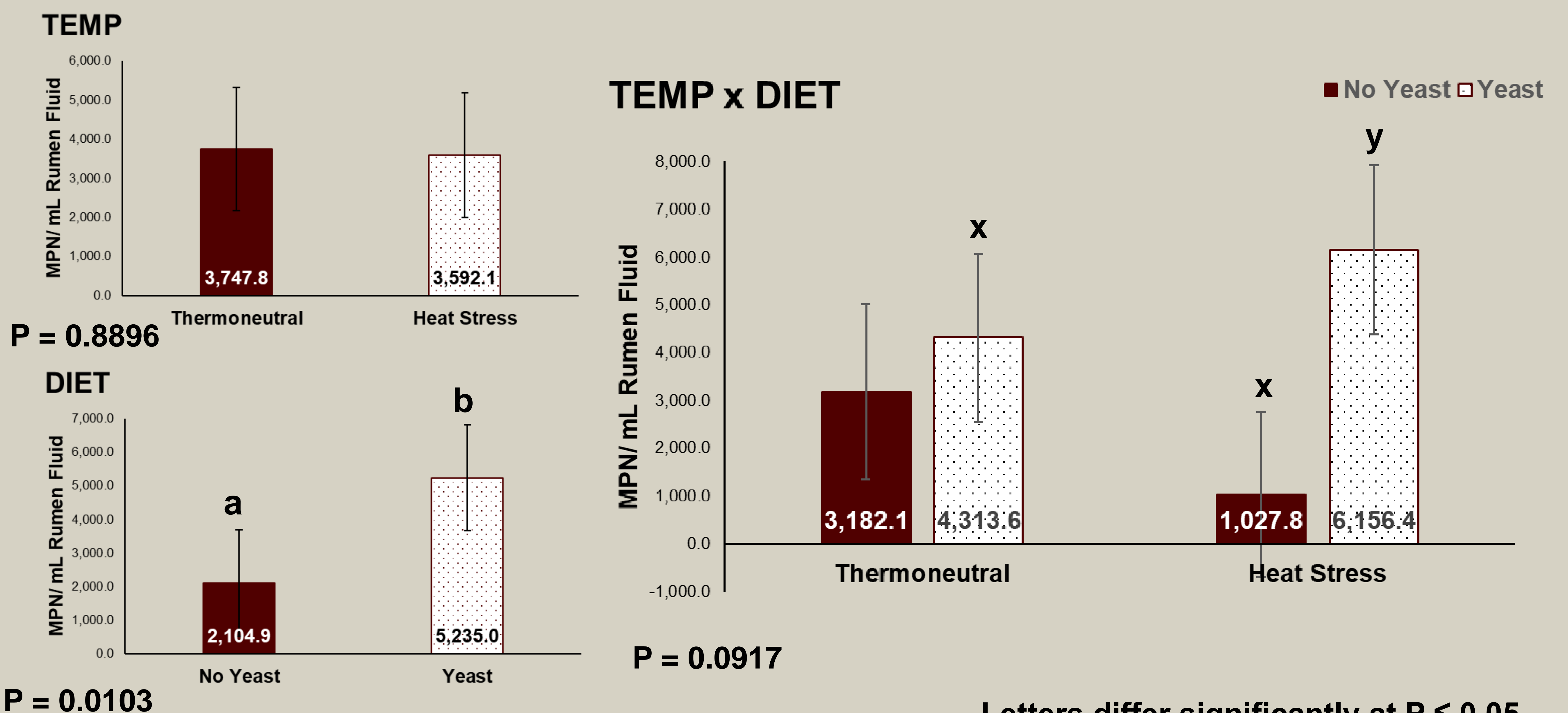
Methods

- Eight Angus crossbred steers (365 ± 32 kg, 41 mo of age) were randomly assigned into pairs. Animals were limit fed a grower diet (DIET) at 1.2% SBW with no live yeast supplementation or a grower diet top-dressed with 10 g of live yeast/d for 14 days (1.2 x 10¹² CFU/d).
- On days 13 and 14, animals were subjected to two temperature conditions (TEMP) [thermoneutral or heat stress] in two, side-by-side, single-stall open-circuit, indirect respiration calorimetry chambers.
- Rumen contents were collected via esophageal tubing and subjected to the enumeration of *F. necrophorum* by the Most-Probable-Number (MPN) method.
- Samples were serially diluted, inoculated into a modified lactate medium in quadruplicate, and growth of *F. necrophorum* was identified by detecting indole production with Kovac's reagent.

Statistical Analysis

- Data were analyzed using a 2 x 2 crossover design, balanced for variance, with a random coefficients model.
- TEMP, DIET, TEMP x DIET were considered fixed effects.
- Carryover interactions were evaluated and removed from the model if not significant.
- Least square means and SEM are reported.
- Statistical significance is set at P ≤ 0.05.

Results



Letters differ significantly at P ≤ 0.05.

Conclusion

Although increase of temperature did not directly increase ruminal *F. necrophorum* counts, the addition of live yeast to the diet increased the MPN, especially during heat stress. This can be attributed to the ability of the LY supplement to mitigate the ruminal effects of heat stress for lactate-utilizing bacteria, like *Megasphaera elsdenii* and *Selenomonas ruminantium*, and possibly *F. necrophorum*. Further research needs to be done to understand the relationship of the yeast supplement and *F. necrophorum* and if the increase in the rumen during heat stress has negative implications on liver health.

