THE EFFECT OF BOVAER® SUPPLEMENTATION (3-NITROOXYPROPANOL) ON THE EATING QUALITY OF BEEF

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I. INTRODUCTION

The use of Bovaer or "3-nitrooxypropanol" (3-NOP) as a methane (CH_4) inhibitor in ruminant livestock is projected to become common practice in beef cattle feedlots in the coming decade. Ultimately, the meat quality and consumer satisfaction of grain fed beef is of paramount importance and cannot be negatively impacted by feed additives. Metabolites that result from 3-NOP breakdown in the rumen are rapidly metabolised and lead to no effect on the animal besides methane reduction [1]. In studies by Vyas et al. [2] and Vyas et al. [3] it was reported that no effect on animal performance, live weight or carcass phenotype was observed when crossbred steers were supplemented with 3-NOP in a barley-based high-grain diet, which suggests that beef eating quality traits for tenderness, juiciness, flavour and overall liking will be unaffected. Currently no research has investigated the effect of 3-NOP on the eating quality of beef. The objective of this study was to determine the effect of Bovaer 10® on the intrinsic eating quality of beef.

II. MATERIALS AND METHODS

An 84-day feeding trial was conducted with 48 *Bos taurus* milk tooth steers that were randomly assigned to control and Bovaer 10® (100 mg 3-NOP/ kg DM) treatment groups (n = 24 per treatment; 4 pens of 12 animals per pen). The steers were adapted to a grain finisher ration over 28 days and Bovaer 10® supplementation started on day 10. At 24 hours post-mortem, the carcasses were graded and the *M. longissimus lumborum* (striploin) and *M. gluteus medius* (rump) muscles from each animal were collected. The meat was processed into 25mm steaks for consumer testing. Two samples from each cut were aged for 14 and 35 days. The ageing periods were rotated between the anterior and posterior positions of each primal. The samples used for sensory testing followed the protocol presented by Watson et al. [4]. Following processing, the samples were vacuum packed and frozen at -20 °C until required. Samples were defrosted 24h before the sensory session. The samples were grilled on a Silex grill (Type S-161K OV, Arnsberg, Germany) for 5 minutes (top plate 195 °C and bottom plate 210 °C) to reach a desired internal temperature of 67°C or medium doneness. The steaks were assigned to consumers in a 6x6 latin square design so that the order of sample presentation did not impact the sensory scores. Ten untrained consumers assessed each sample for tenderness, juiciness, flavour and overall liking using a 100 point scale line. In total 480 untrained consumers were used to assess all samples. Consumer meat quality score (MQ4) is a weighted index score of tenderness (30%), juiciness (10%), flavour (30%) and overall liking (30%). The MQ4 score was analysed using linear mixed effect models in R [5] with treatment, cut and ageing period as fixed effects and animal within pen as the random term.

III. RESULTS AND DISCUSSION

There was no effect of 3-NOP supplementation on live animal performance or carcass phenotypes ($P>0.05$). The interaction between treatment (Control or Bovaer 10®), cut (striploin or rump) and days aged (14- and 35- days) was not significant ($P>0.05$) for MQ4 score. There was no effect of Bovaer 10® supplementation on MQ4 score in the striploin (*m. Longissimus lumborum*) or rump (*m. Gluteus medius*) at 14 or 35 days ageing (Figure 1). The MQ4 was significantly affected by days aged ($P= 0.039$). The MQ4 score was 4.25 points lower at 14 days ageing compared to 35 days ageing for the

striploin and rump (Figure 1). MQ4 score was also significantly affected by cut (P=0.014) with the rump being 6.04 points lower than striploin (Figure 1) at both 14 and 35 days ageing.

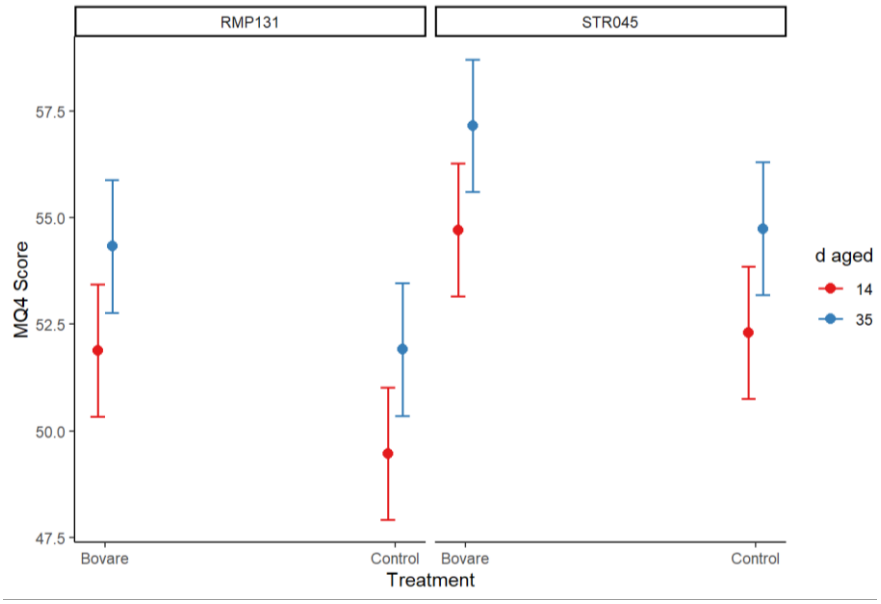

Figure 1. The estimated marginal means with 95% confidence intervals for eating quality score (MQ4) for striploins (STR045) and rump (RMP131) from animals not supplemented (Control) and supplemented with Bovaer 10® (100mg 3-NOP)/ kg DM) at two different post-mortem ageing periods (14 and 35 days)

IV. CONCLUSION

In this study the inclusion of Bovaer 10® (100mg 3-NOP/ kg DM) into high-grain feedlot rations for beef steers had no impact on the intrinsic eating quality of beef for the striploin and rump muscles after 14 and 35 days ageing. A reduced carbon footprint beef product has the potential to lead to greater consumer satisfaction if marketed effectively as a credence quality attribute of beef, however the size of impact of extrinsic marketing on the neurograstronomy of consumers could be beneficial and needs further investigation.

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