



Effects of altering bone growth rate through diet on consumer preference and instrumental colour evaluations of bone-in chicken thighs

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Introduction

➤ The **black bone defect** has been observed in chickens world-wide.

Black bone defect:

dark burgundy colour stain caused by blood leaching from the femur while cooking; most commonly found in cooked thighs.



- Poultry industries are concerned as appearance is recognized as a key component influencing consumer liking for meat.
- Bone porosity in growing birds have been linked to an increased chance of blood leakage, thus, increasing the likelihood of the black bone defect. Altering bone growth rate through diet may improve bone porosity.
- Little is known about the effects of an altered diet on the sensory characteristics of the meat

Specific objectives :

- 1) Determine consumer liking for the sensory characteristics of bone-in chicken thighs from birds fed either a control, HyD supplemented or slow growth diet.
- 2) Determine the effects of bone growth rate on bone discolouration.

Our Approach

➤ This study was approved by the UofA human and animal welfare research ethics boards.

Bird Production:

➤ Male birds (Ross 308) were obtained and housed at the PRC at day of age. Birds (n=360) were fed one of 3 diets: control, HyD supplemented or diluted wheat bran diet (slow growth) and were harvested on days 39 and 40. Thighs were stored at -18°C for approximately 10 days.

Consumer Panel:

- Thighs were cooked at 176°C for 30 minutes to an internal temperature of 75°C.
- Consumers (n=107) evaluated the appearance (external & internal), flavour, texture and overall liking of bone-in chicken thighs; one thigh per treatment in a randomized block design.
- Thighs were evaluated using a 9-point hedonic scale: (1="dislike extremely" and 9="like extremely") and consumer comments were invited.

Instrument colour evaluations:

- A Konica Minolta Colorimeter (Konica Minolta Sensing, Inc) was used to measure L*a*b* values.
- Colour was assessed at 2 femur sites.



Data analysis:

➤ Statistical Analyses were performed using SAS (version 9.1). Significant differences among feed treatments for consumer scores and colour readings were determined by ANOVA (P<0.05). Tukey's post hoc procedure was used for further analysis of significantly different values.

Our Observations

- No significant differences were observed between consumer scores for any sensory trait (P>0.05). All scores averaged 6, "like slightly".
- Consumer comments revealed more insight on the effects of diet on the sensory characteristics:
 - HyD supplement had a negative impact on flavour.
 - The slow growth diet had a negative impact on external appearance but improved the texture quality.

Control	HyD	Slow growth
-"Appearance of some bloody vessels is alarming" -"Delicious but the texture was not the best" -"Not as tasty as the [wheat bran] but still way better than [HyD]"	-"Bleeding inside"; "blood clot inside thigh" -"Little chewy"; "hard to cut, firmer" - "not very flavourful"; "flavour is too mild"; "taste is a bit watery"	-"Initial appearance not good, but flavour and texture made up for it" -"Texture was great, nice and moist" - "better, more flavour, still pretty average"

Fig 1. Images of femur bone for each diet treatment and examples of consumer comments.

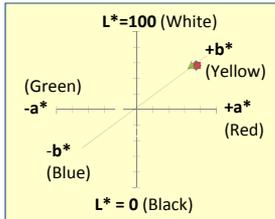


Fig 2. Graph representing L*a*b* color scale



Fig 3. Median scores of L*a*b* values for mid-section colorimeter readings

- L*a*b* values for slow-growth were all significantly different (P<0.05) from others at the mid-section (Fig 3).
- Only the L* value of the upper femur in the slow growth diet was significantly different from others (P<0.05) indicating a lighter colour. No significant differences in colour values were observed between the control and HyD diets at any site (P>0.05).

Conclusion

Altering bone growth rate through diet significantly affects bone colour when using a slow growth diet but not with HyD. Although colour differences exist, only the texture and flavour evaluation scores were affected. Overall, it appears that black bone colour defects do not significantly impact consumer preferences for the sensory qualities of bone-in chicken.

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