

The effect of feed processing of novel, low trypsin inhibitor, whole soybeans on the performance of turkey hens reared from 0-21 days.

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Background: Soybeans

- Used extensively in animal feeds
 - High protein level and balanced amino acid profile
- Extensive processing required to reduce anti-nutritional factors in the raw bean
 - Flaking, solvent extraction, toasting, grinding

Background: Soybeans

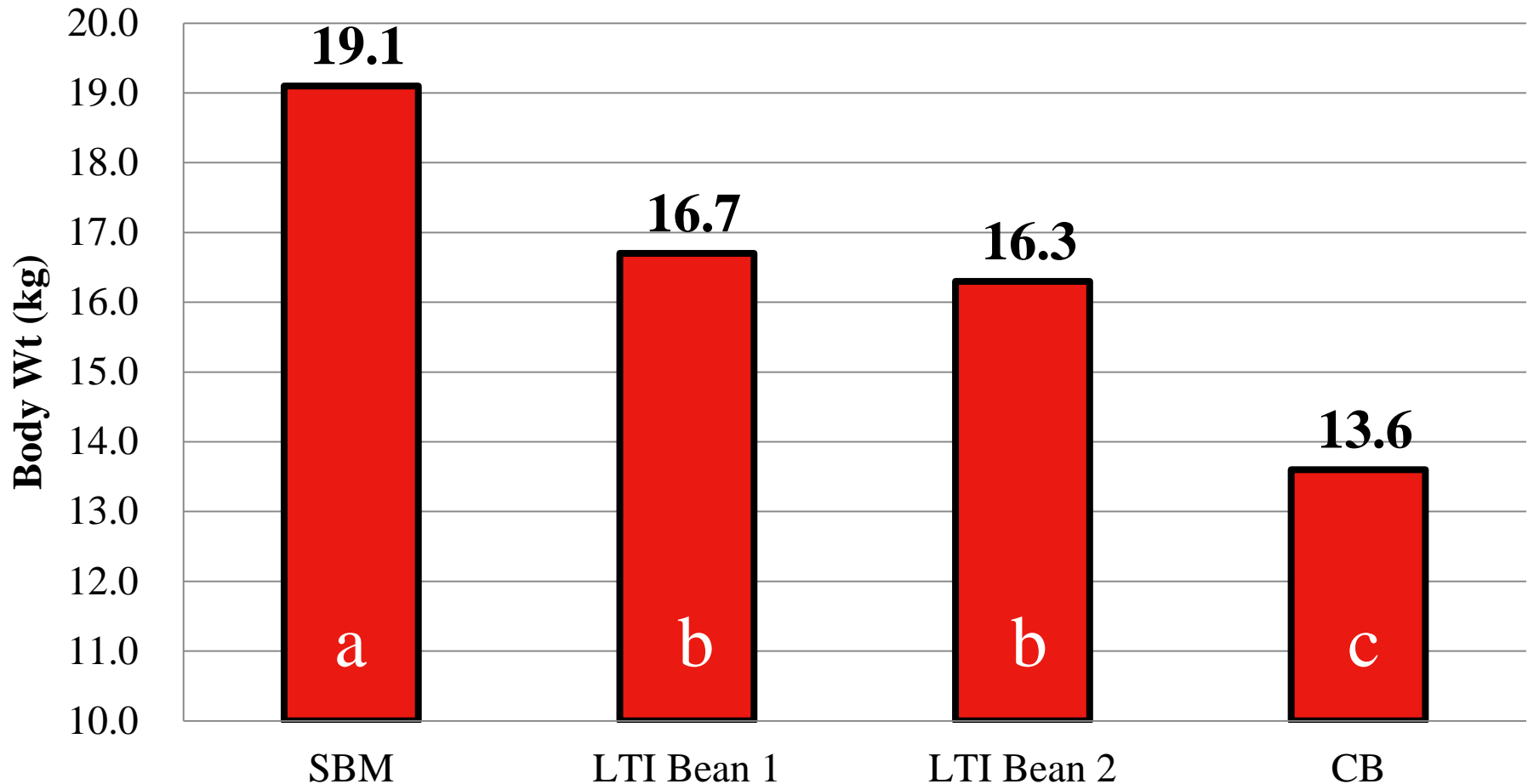
- Toasting, a method of heating the raw beans, is responsible for denaturing several anti-nutritional factors including trypsin inhibitor
- Soybeans contain high levels of natural trypsin inhibitor (TI), also referred to as serine protease inhibitors
 - Inhibitors control the activation and catabolism of proteins through the inhibition of trypsin proteases

Background: Soybeans

- Recently non-GMO lines of soybeans have been developed that have naturally low levels of trypsin inhibitor
- This new line of soybeans could potentially eliminate the need for further processing
 - Reducing cost and improving efficiency

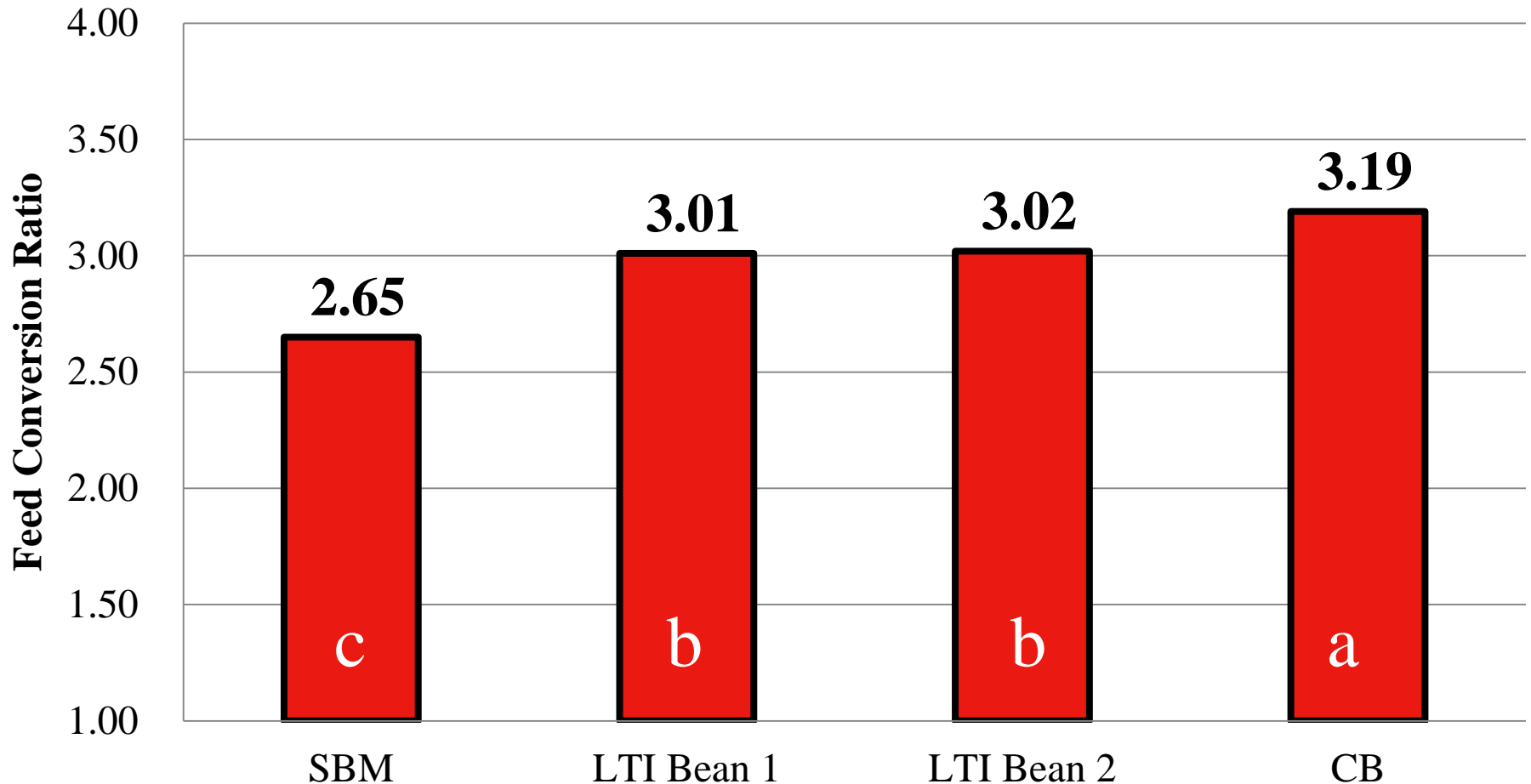
Background: Previous Study

19wk Body Weight



Background: Previous Study

Feed Conversion Ratio



Hypothesis

- The inclusion level of raw unheated, **low trypsin inhibitor** soybeans can be increased in starter turkey diets through pelleting.

Objectives

- To evaluate a novel, low trypsin inhibitor, unheated soybean for its efficacy as a feedstuff for young turkeys.
- To determine the optimal inclusion level and feed form of the novel, low trypsin inhibitor, unheated soybean when included in turkey diets.

Materials and Methods

- 336 hen poults raised from hatch to 21 days
- Two Alternative Design battery cages
 - 48 pens total
 - 8 pen replicates per diet
 - 7 poults per cage



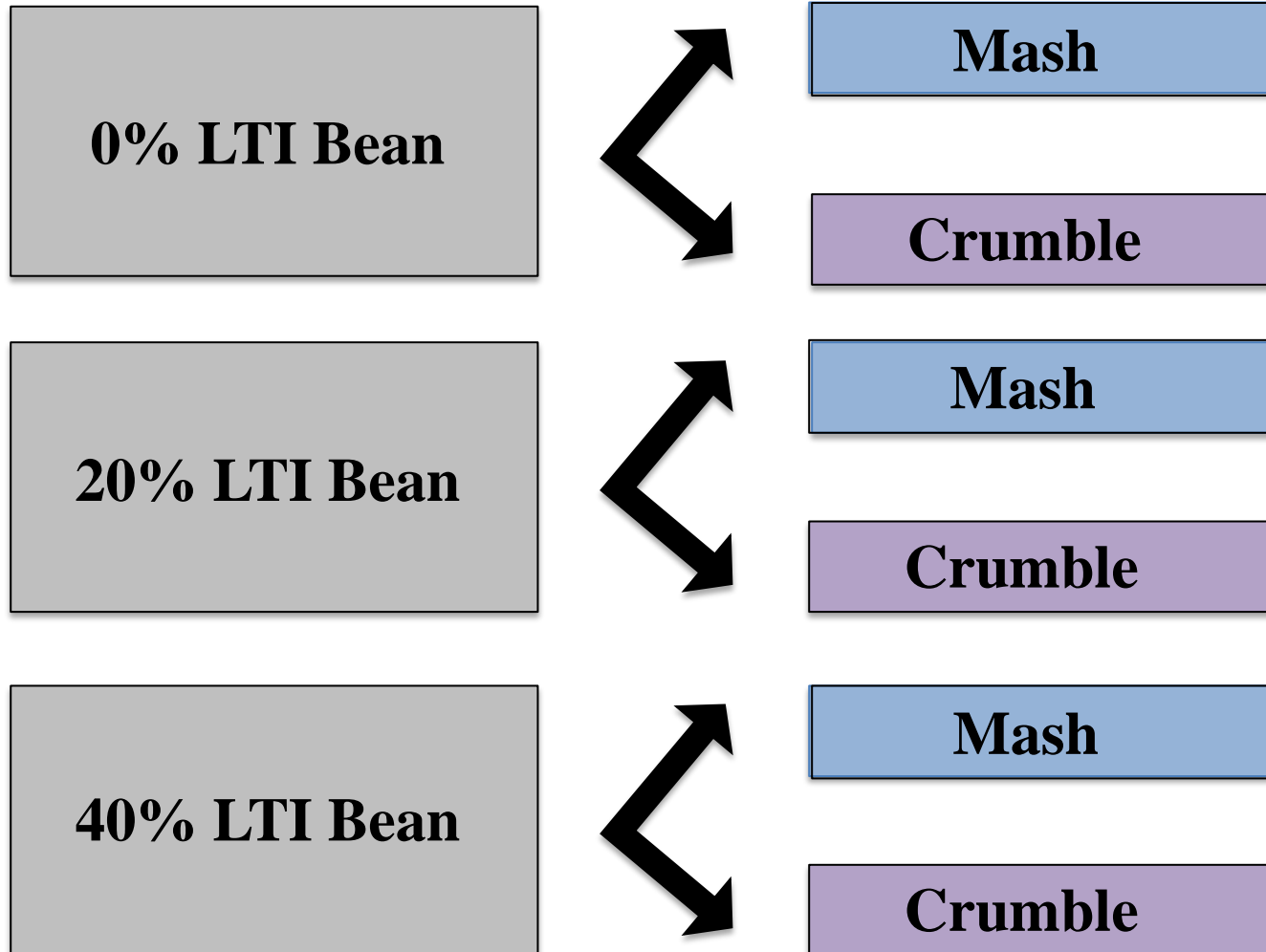
Materials and Methods

- Birds and feed weighed
 - 7, 14, and 21 days
- Pancreas sampled and weighed to determine pancreas body weight ratios (PBWR)
 - 21 days
- Excreta samples taken to determine apparent metabolizable energy (AMEn) and apparent lipid digestibility (ALD)
 - 21 days

Materials and Methods

- Randomized block design
- Conducted as 3 x 2 factorial
 - 3 diet formulations: 0, 20, and 40% LTI bean
 - 2 feed forms: coarse mash and pelleted crumble

Treatment Variables



Dietary Formulations

Ingredient (%)	Diet 1	Diet 2	Diet 3
Corn	30	30	30
SBM	52.70	36.99	21.29
Whole Bean	0	20	40
Soy Oil	7.15	3.87	2.25
Celite	1.70	1.70	1.70
Crude Protein	28.1	28.1	28.1
ME (kcal/kg)	2890	2890	2890

Statistical Analysis

- Data were analyzed using JMP10
- LS means determined and treatment effects significant at $P \leq 0.05$

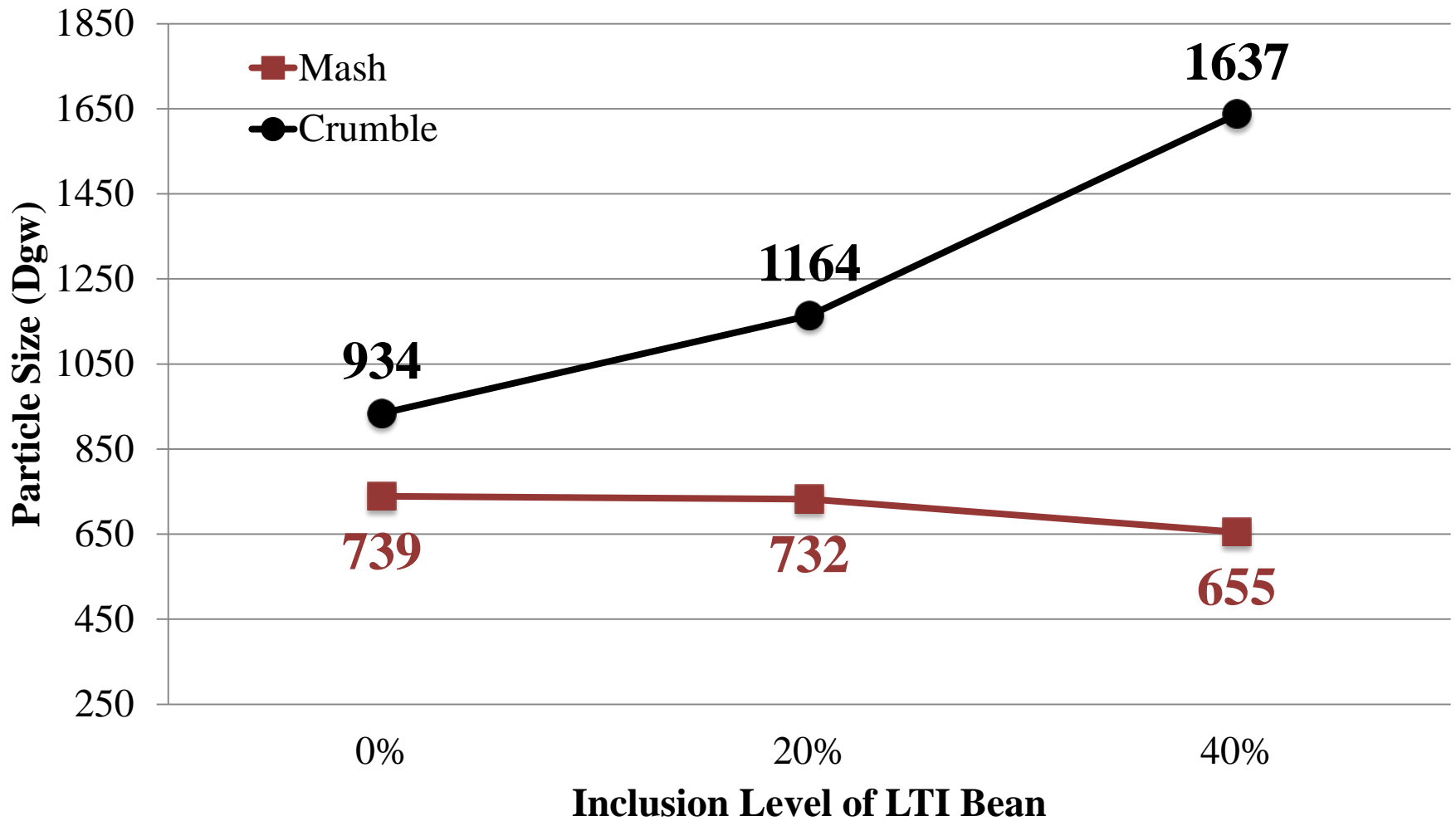
Results

- Major effects observed for both inclusion level and feed form
- Interaction effects observed throughout

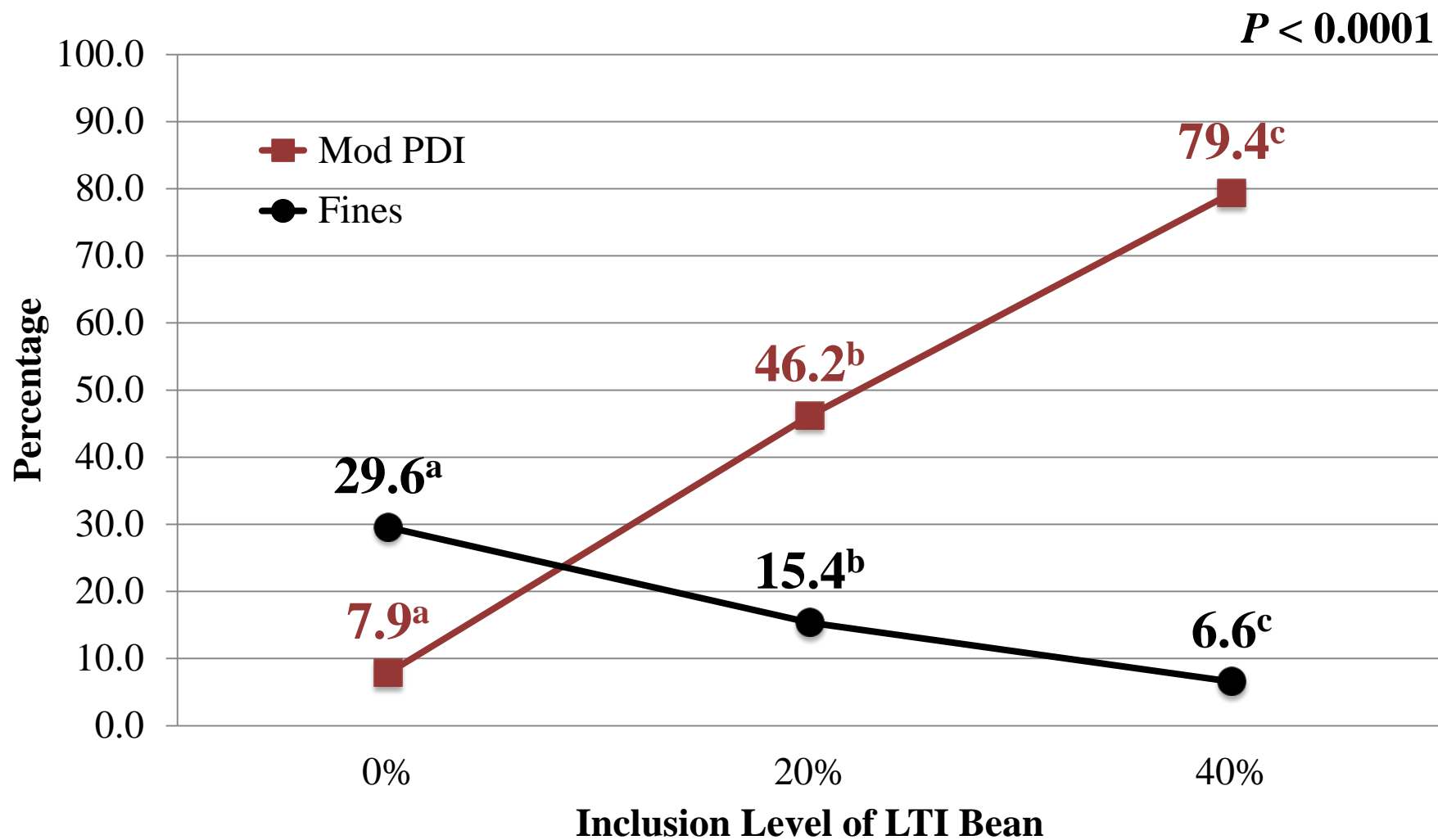


RESULTS: FINISHED FEED

Particle Size



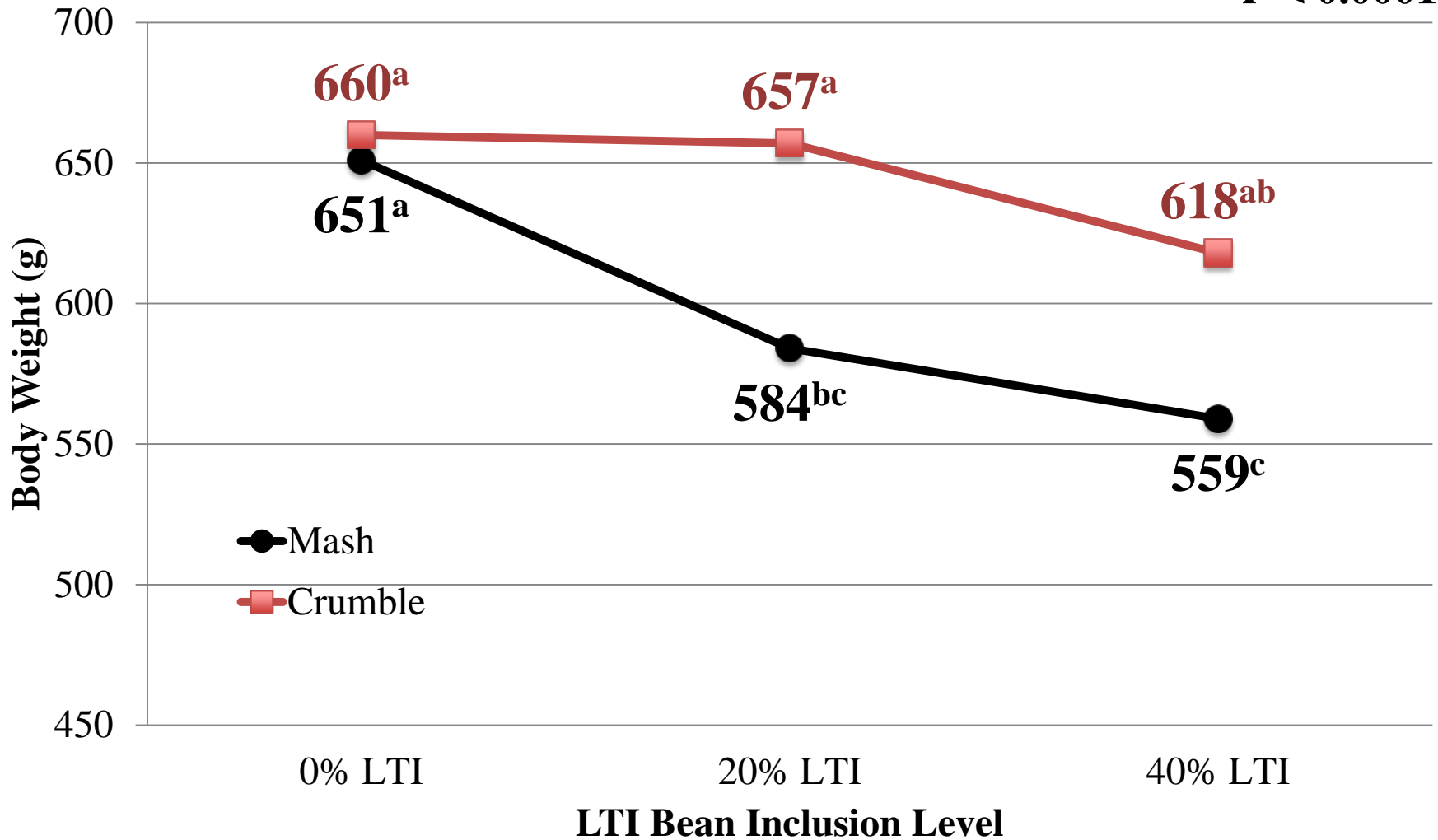
Pellet Durability Index



RESULTS: LIVE PERFORMANCE

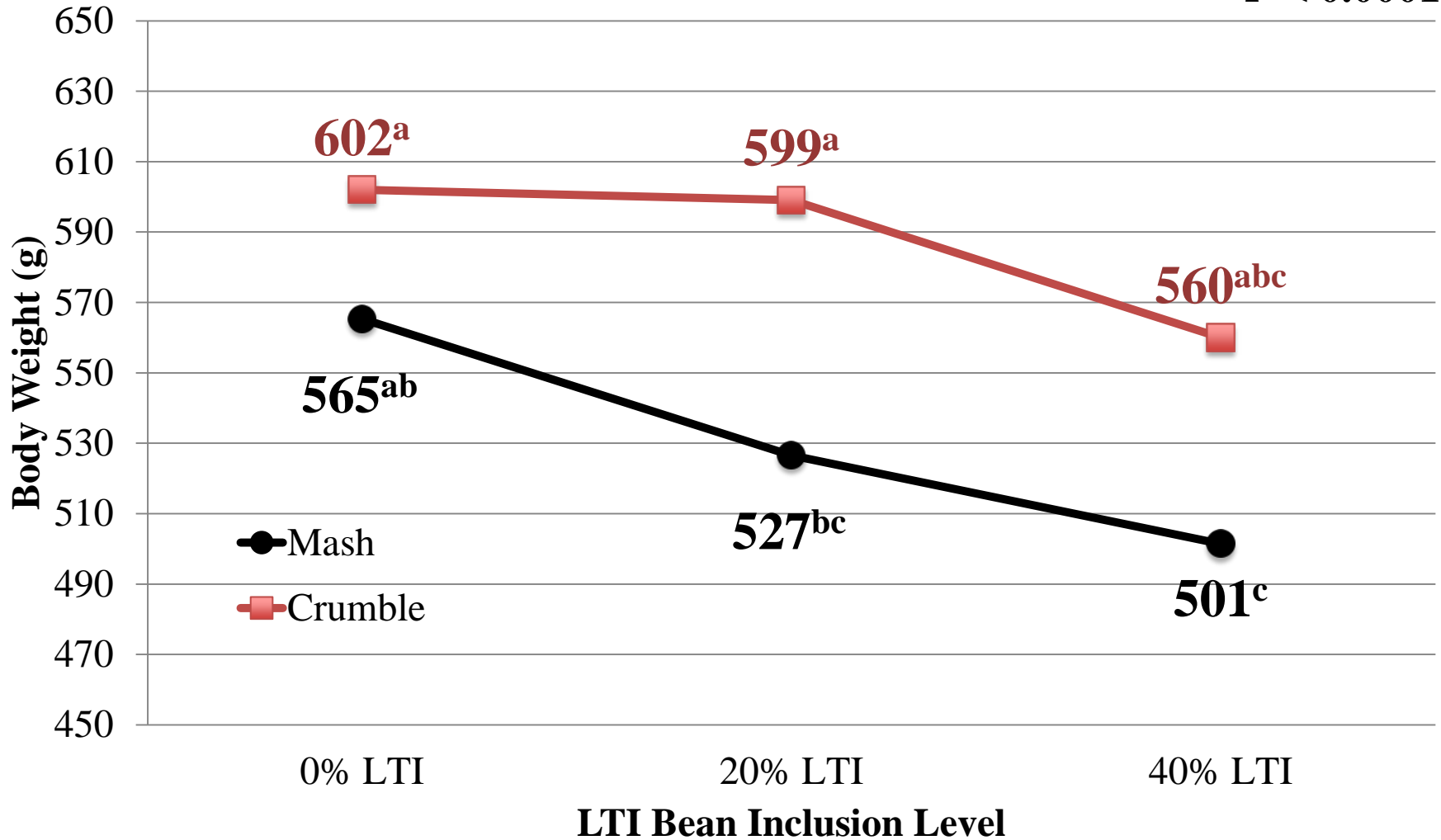
Body Weight (21d)

P < 0.0001

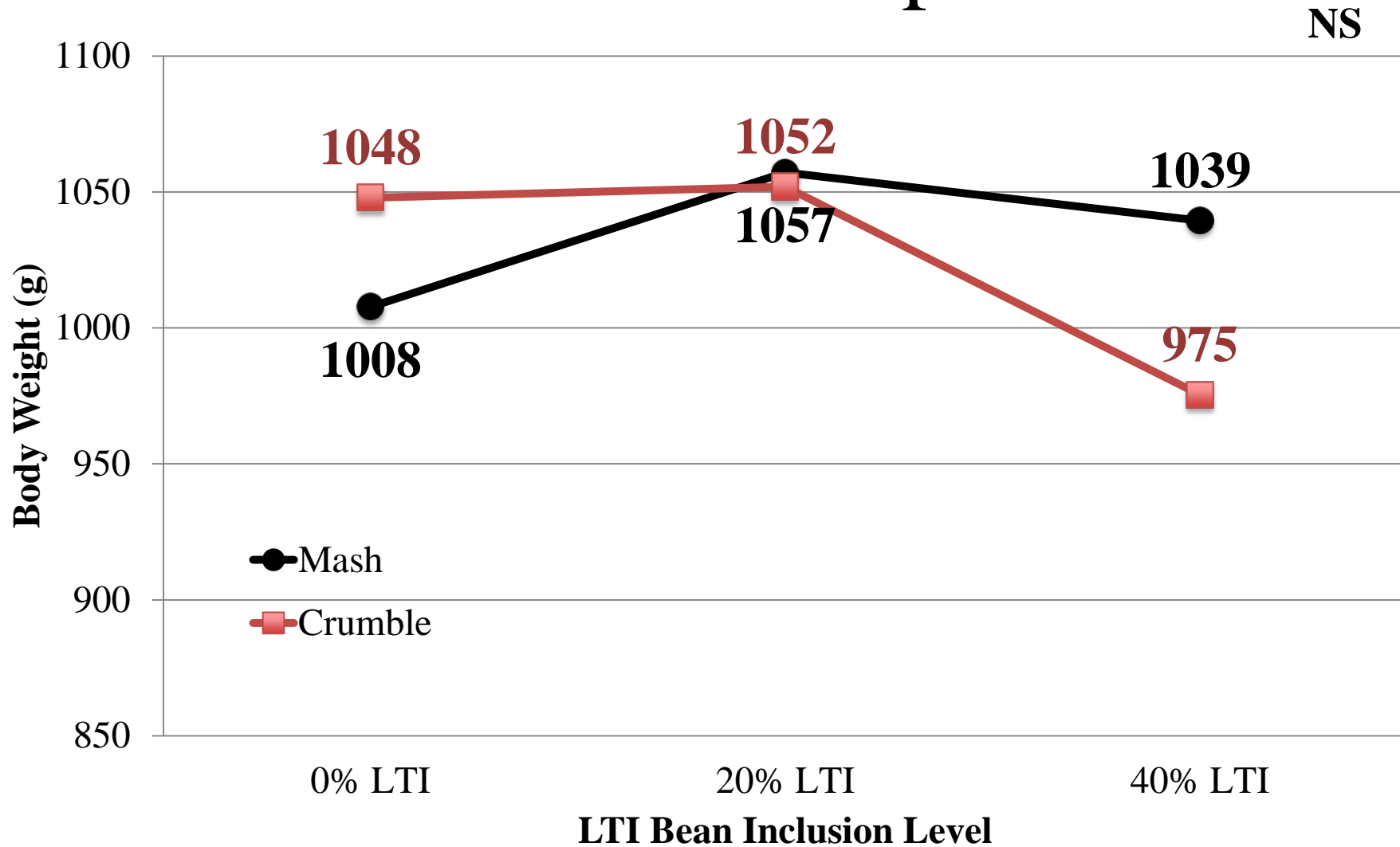


Body Weight Gain

P < 0.0001

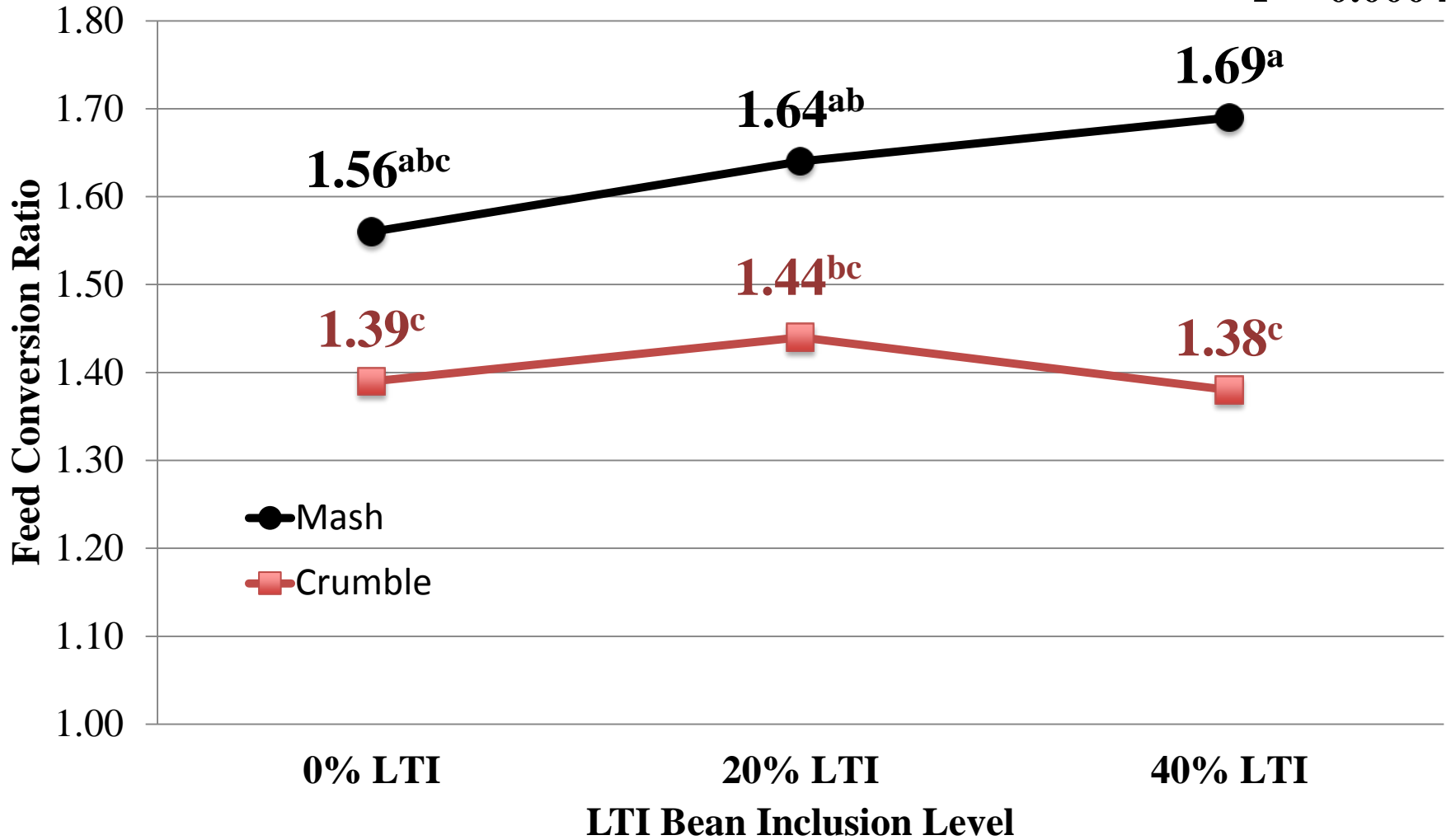


Feed Consumption



Feed Conversion Ratio

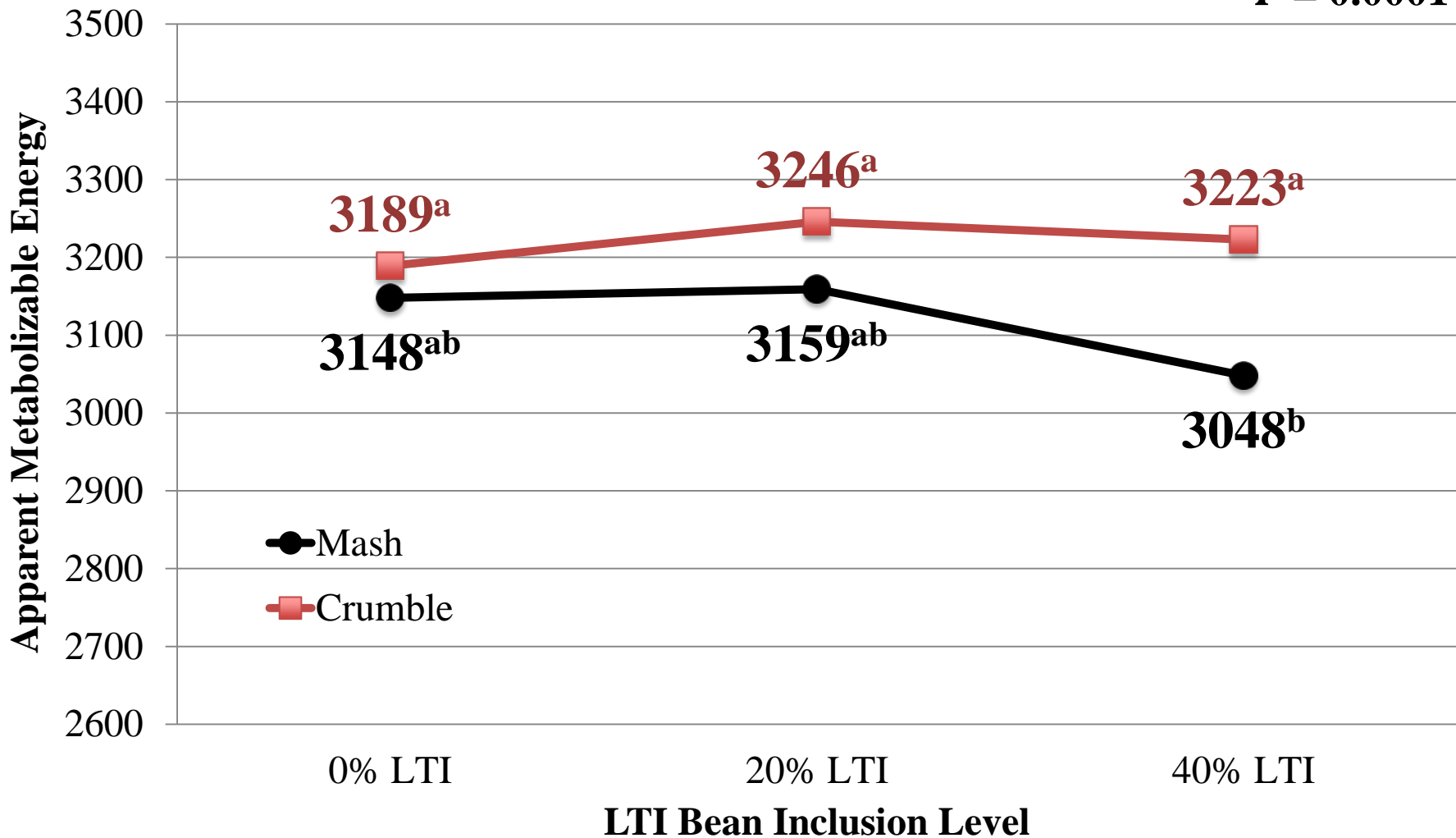
P = 0.0004



RESULTS: DIGESTIBILITY

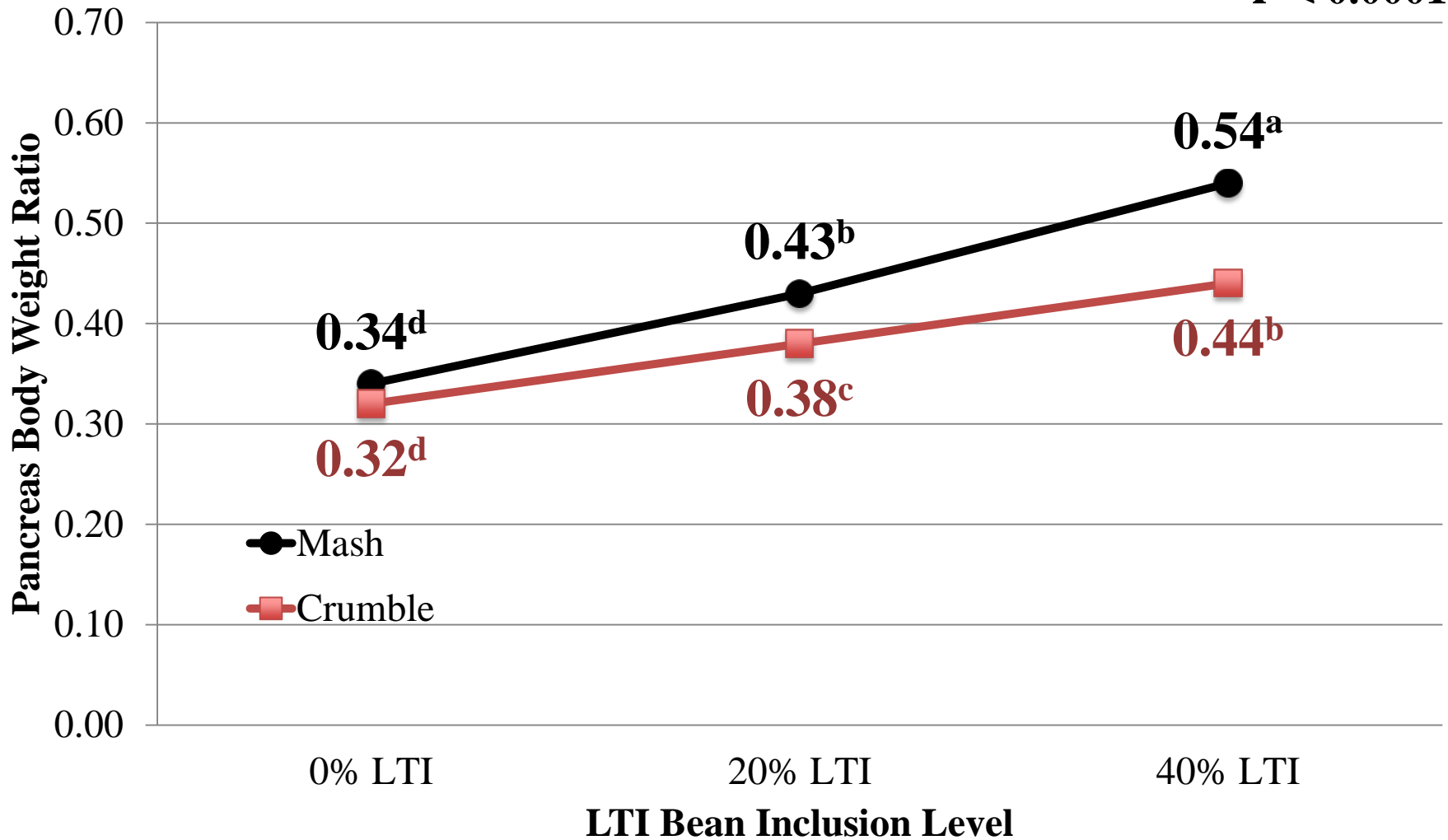
Apparent Metabolizable Energy

$P = 0.0001$

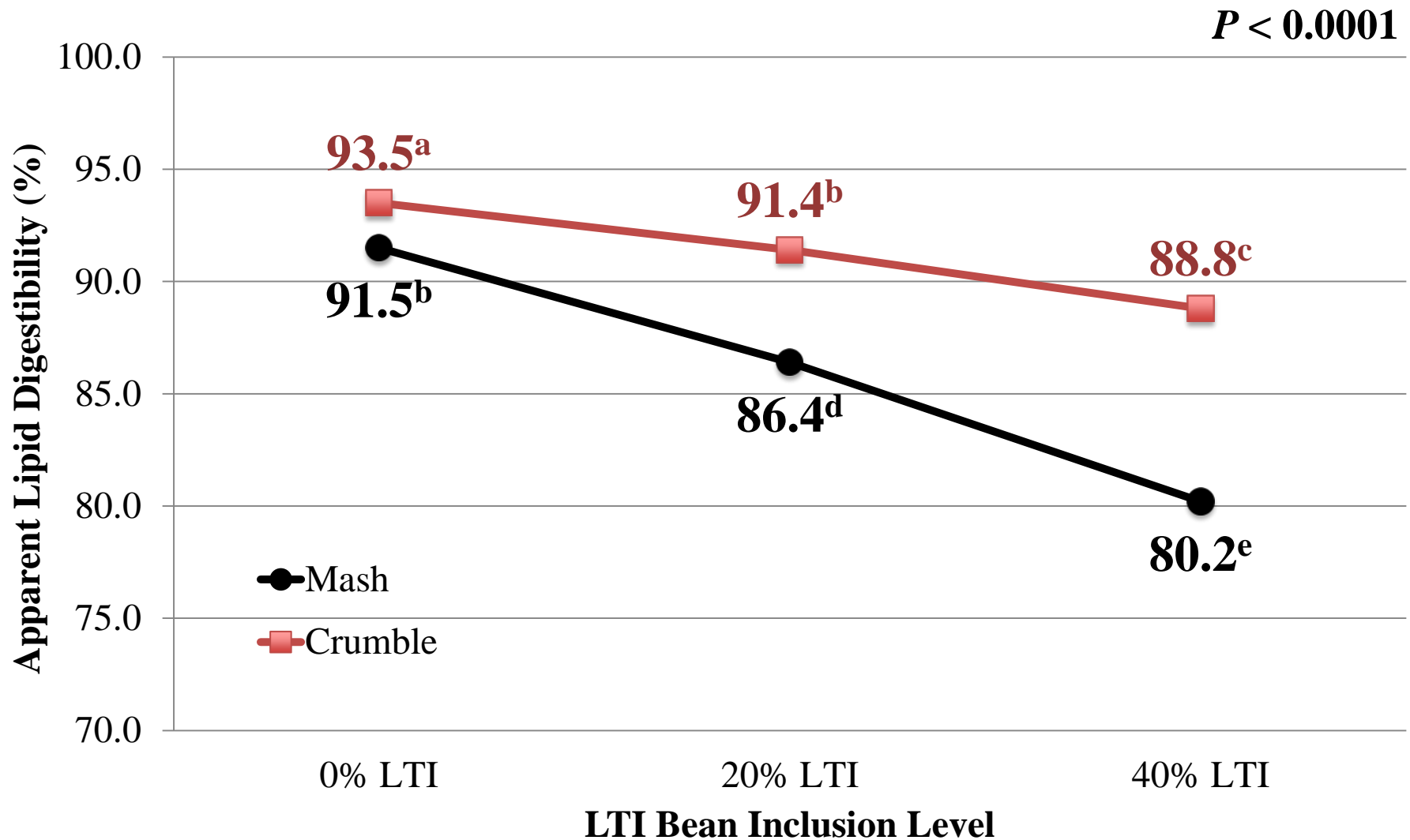


Pancreas Body Weight Ratio

P < 0.0001



Apparent Lipid Digestibility



Results Summary

- Including the LTI bean increased PDI and decreased % fines when compared with a traditional SBM starter diet
- Inclusion of the LTI bean in mash starter diets yielded similar FCR to the mash SBM control
- Pelleting the LTI bean increased body weight and AMEn, while reducing FCR at both the 20 and 40% inclusion levels

Hypothesis

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 **Accept Hypothesis**

Conclusion

- The LTI soybean is a strong natural pellet binder, showing improvement with levels as low as 20%
- It is feasible to use the novel LTI whole bean in turkey starter diets
- Pelleting the novel LTI bean improves performance and allows for increased inclusion in turkey starter diets

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