

IMPACT OF SPRAY DRIED PLASMA PRODUCTS ON TEXTURE AND PALATABILITY OF BISCUITS

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BACKGROUND INFORMATION

Baked biscuit integrity, palatability, and product quality are influenced by the various ingredients utilized. Alternative functional ingredients to enhance or impact texture and palatability can be useful for manufacturing biscuits. Functional ingredients such as spray dried plasma (SDP) can be utilized to enhance product quality [1] and are commonly used as a binder in wet petfood along with increasing palatability [2].

STUDY OBJECTIVE

The objective was to evaluate SDP, Cravings (hydrolyzed plasma), and Savorings (partially hydrolyzed plasma) impact on baked wheat and non-wheat biscuit texture and palatability.

EXPERIMENTAL PROCEDURE

Studies were conducted using both wheat and non-wheat biscuit formulations. Study 1 evaluated texture with 1, 3, or 6% SDP or Cravings replacing up to 100% vital wheat gluten. Study 2 evaluated palatability and texture of biscuits utilizing 1% SDP or Cravings to replace wheat gluten. Study 3 evaluated texture with 1.5 or 3% SDP or Savorings replacing chicken meal or egg in respective non-wheat control formulas.

Palatability testing was conducted with 20 beagle dogs for a 2-day test at a commercial kennel. Dogs were offered control and test biscuits side by side for 5 min. to simulate treat consumption for pal on day 1 and switched position on day 2.

Both wheat and non-wheat biscuits were made by preparing the dough with a standard kitchen mixer, manually rolling the dough to a set depth and size, and then baking to < 10% moisture. Three or four replicate batches of each formula were completed for texture analysis. Texture was measured on a TA.XT Plus utilizing an adjustable bridge with a rounded-end knife probe for a 3-point bend. Baked wheat (2 x 7 cm) or non-wheat biscuits (5 x 5 cm) were placed on the bridge spaced 2.5 cm apart to measure maximum force (hardness) and fracturability to determine texture. Depending on the study, five or ten biscuits per treatment were analyzed for texture from each replicate batch.

Data were analyzed using PROC GLM procedure of SAS, with significance set at P < 0.05.

SUMMARY

In conclusion, SDP, Cravings and Savorings can be incorporated into baked biscuits as a processing aide to impact hardness depending on ingredient matrix and target, while palatability can be neutral or improved depending on the formula and ingredients replaced. Overall, SDP, Cravings and Savorings can be alternatives to vital wheat gluten, chicken meal or egg to maintain or enhance product texture quality.

STUDY ONE RESULTS: TEXTURE

1% INCLUSION	CONTROL	SDP	CRAVINGS	SEM
Hardness	14820 ^a	13985 ^a	16305 ^b	435
Fracturability ¹	300 ^b	326 ^b	248 ^a	0.14
3% INCLUSION				
Hardness	14241 ^a	12859 ^a	16608 ^b	493
Fracturability	3.44 ^b	3.09 ^b	1.98 ^a	0.13
6% INCLUSION				
Hardness	16566 ^b	16295 ^b	13494 ^a	421
Fracturability	2.70 ^b	2.64 ^b	1.24 ^a	0.12

References: [1] Campbell and Henry (2024) J. Anim. Sci. 102(Suppl. S3): 572. [2] Polo et al. (2005) Anim. Feed Sci. Tech. 122:331-343.

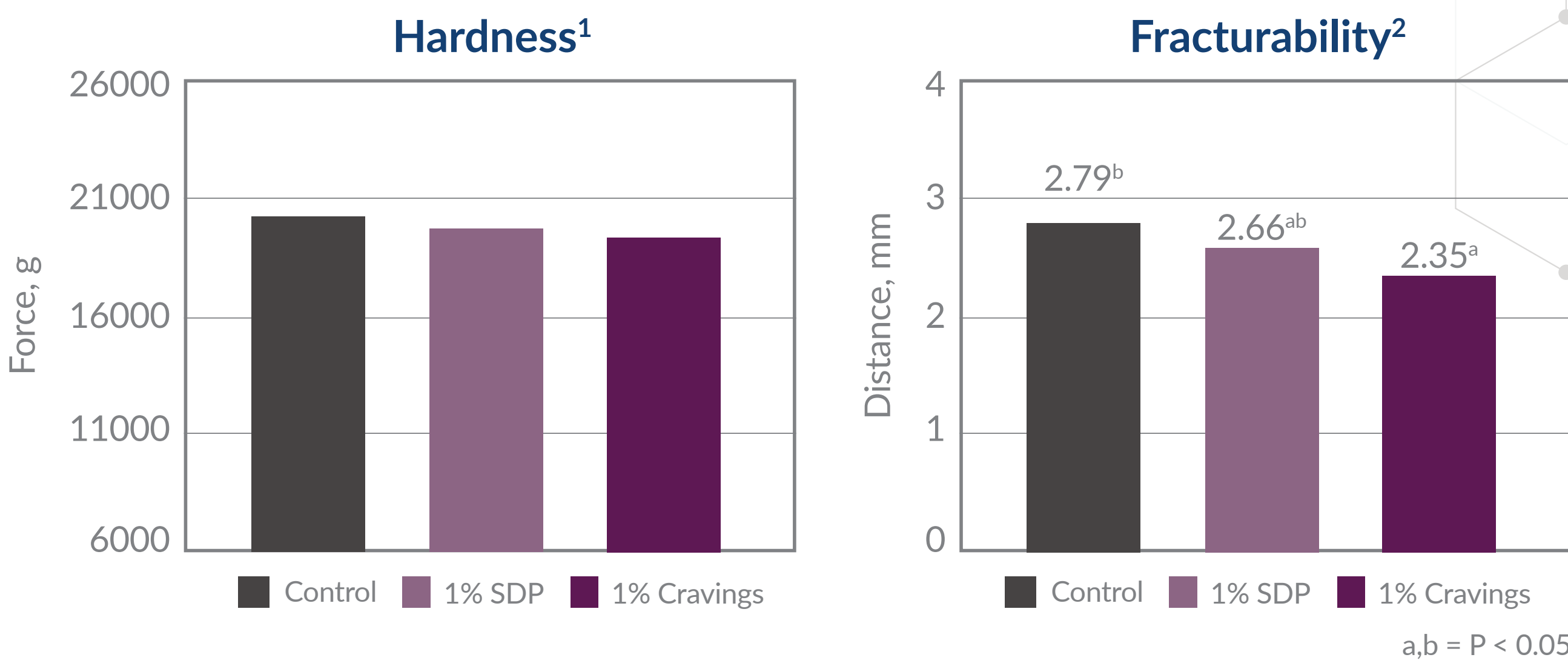


Study 1 & Study 2

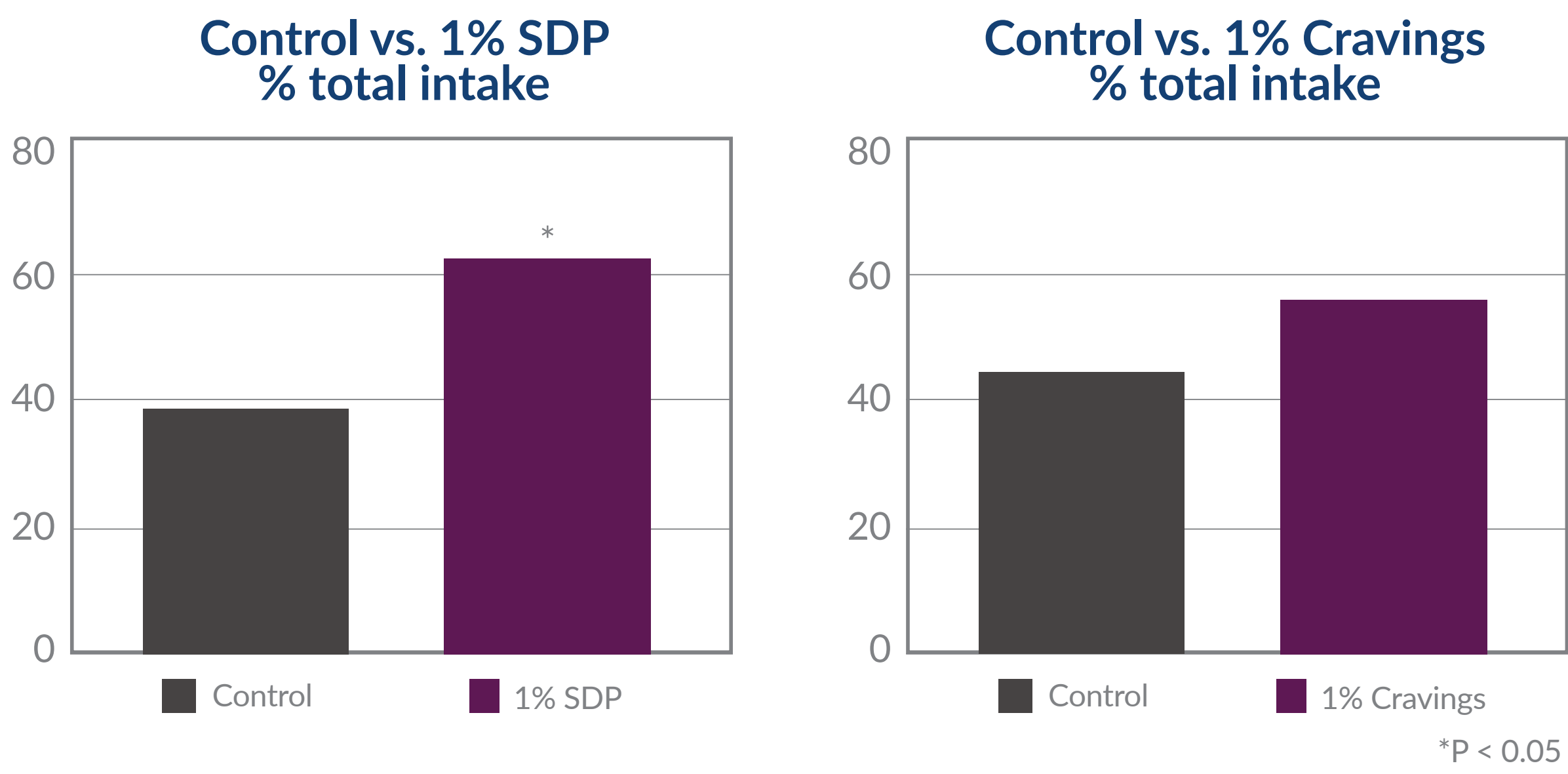


Study 3

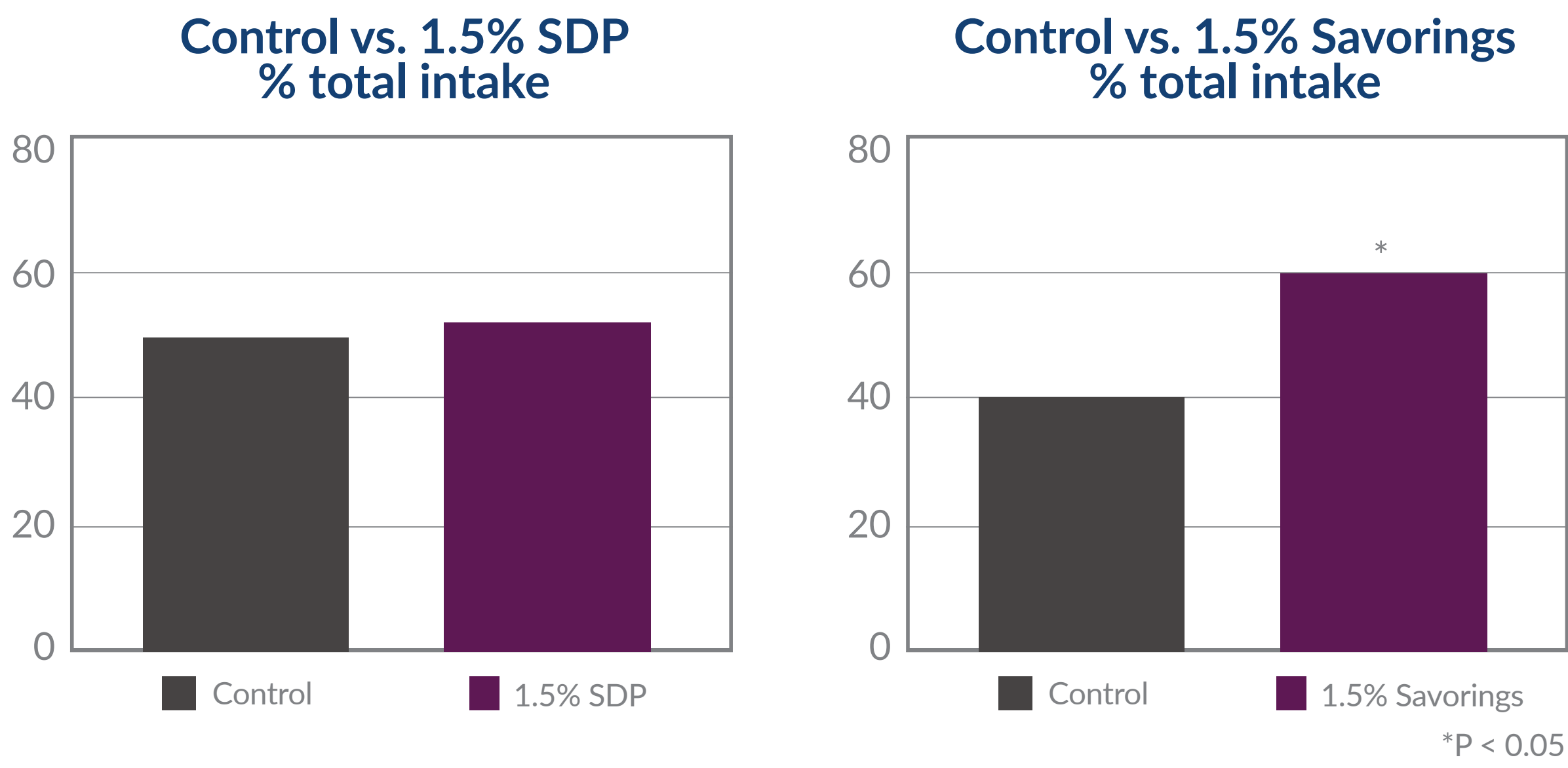
STUDY TWO RESULTS: TEXTURE



STUDY TWO RESULTS: PALATABILITY



STUDY THREE RESULTS: PALATABILITY REPLACING CHICKEN MEAL



STUDY THREE RESULTS: HARDNESS¹

CHICKEN MEAL	CONTROL	1.5%	3.0%	SEM	QUAD
SDP	11873	14528	15838	432	<0.0001
Savorings	11873	13707	16042	376	<0.0001
EGG					LINEAR
SDP	11931	14204	15281	401	<0.0001
Savorings	11931	14438	16572	356	<0.0001

STUDY THREE RESULTS: FRACTURABILITY²

CHICKEN MEAL	CONTROL	1.5%	3.0%	SEM	QUAD
SDP	1.28	1.38	1.30	0.043	0.07
Savorings	1.28	1.25	1.62	0.056	0.0038
EGG					LINEAR
SDP	1.29	1.34	1.42	0.049	0.0625
Savorings	1.29	1.41	1.43	0.039	0.0093

¹Hardness: Force required to break biscuit.; ²Fracturability: Distance knife travels through biscuit before breaking. Lower number means easier to break.

