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Physicochemical Properties of Chicken Meatballs Fortified with Flaxseed Oil and Cooked in Water-bath

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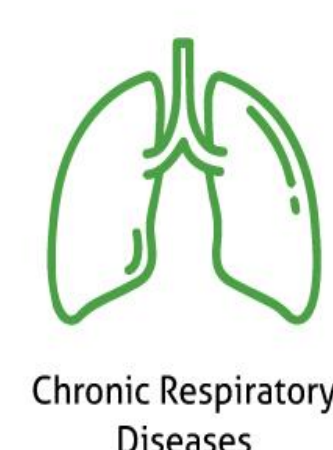
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ABSTRACT

Flaxseed oil is a plant source of n-3 FA which contains 53% α -linolenic acid. Omega-3 fatty acids (n-3 FA) offer many advantages including cardiovascular health and prevention of autoimmune disorders, diabetes, and some types of cancer. However, despite its widely known benefits, the daily consumption of n-3 fatty acids is still low among consumers in the US. Data from NHANES reveals pregnant women and women of childbearing age have lower intakes of n-3 fatty acids. Meanwhile, the consumption of chicken products is high due to their low cost, ease of preparation and accessibility. This has stimulated interest in incorporation of n-3 FA into regularly consumed chicken product such as chicken meatballs. There were no significant ($p>0.05$) differences in texture parameters among all three treatments except hardness and chewiness. Moisture and protein content increased ($p<0.05$) with increasing flaxseed oil composition in samples. Furthermore, the incorporation of flaxseed oil did not have any negative impact on lightness (L^*). However, a^* (red) and b^* (yellow) values reduced significantly ($p<0.05$). Fat content measured in samples were between the ranges of 6.29%-19.41%.

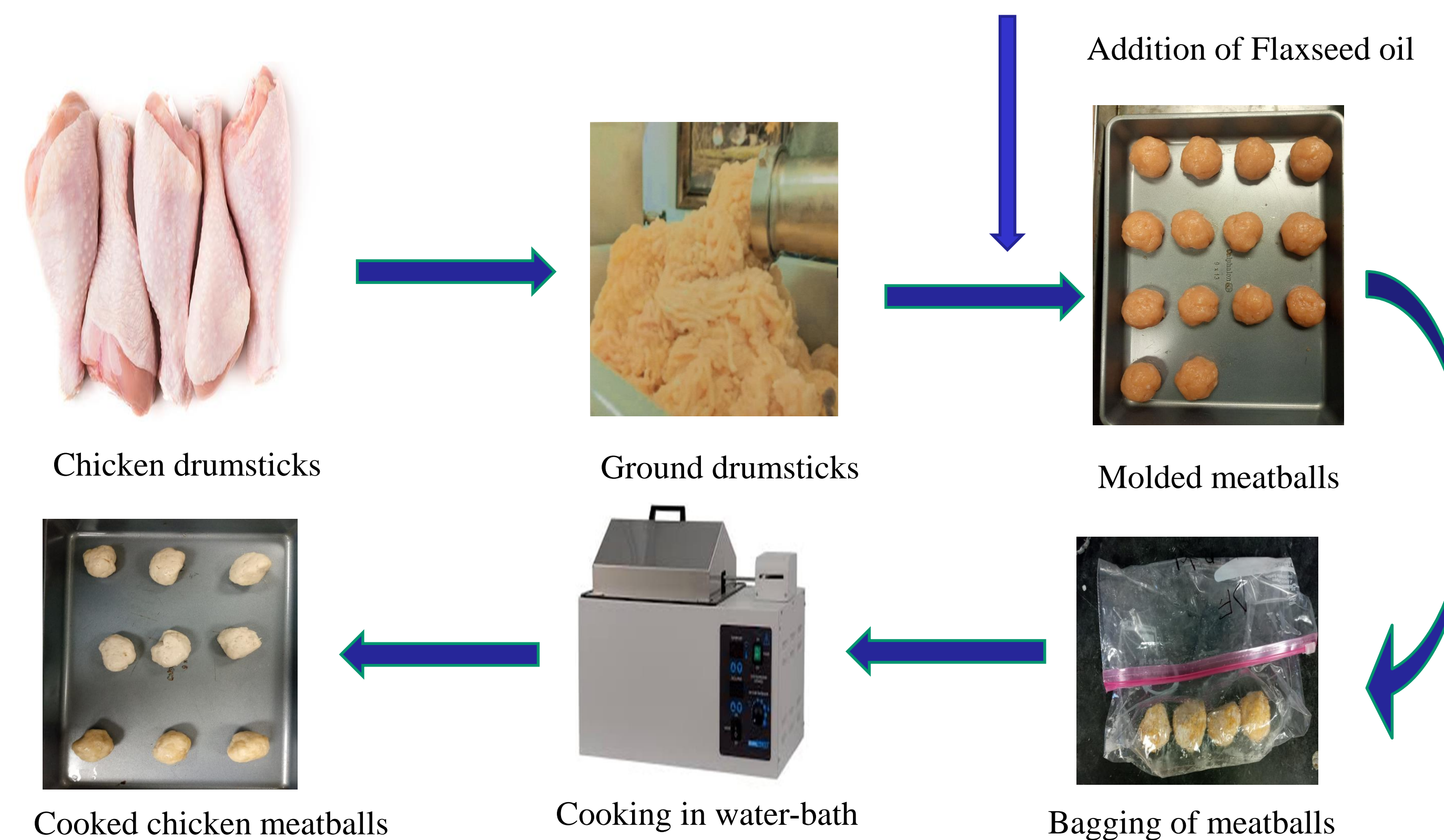


AIM/OBJECTIVE

The objective of this study was to determine the color, texture and proximate composition of cooked chicken meatballs fortified with flaxseed oil.

METHODOLOGY

Flaxseed oil at various concentrations (0%, 5%, and 10%) was incorporated into ground chicken. Sodium chloride was added to all treatments at a constant rate of 1% and water was added to adjust the moisture. The minced meat was molded into balls of equal weights and cooked at 90° C for 15 minutes.



RESULTS

Table 1. Texture parameters of cooked meatballs

Flaxseed Oil (g/500g)	Hardness	Chewiness	Resilience	Cohesion	Gumminess
0	2947.42±347.15 ^a	1235.37±225.57 ^a	15.24±0.3 ^a	0.40±0.02 ^a	1209.86±221.55 ^a
25	2785.27±573.48 ^a	609.41±84.26 ^a	15.31±1.67 ^a	0.29±0.09 ^a	782.07±78.26 ^a
50	9960.47±23.6 ^b	3107.17±253.5 ^b	16.05±0.5 ^a	0.38±0.03 ^a	2935.57±1010.79 ^a

Table 2. Color, moisture content, fat, and pH of cooked chicken samples

Flaxseed Oil (g/500g)	L^*	a^*	b^*	Moisture Content (%)	%Fat	pH
0	51.17±8.64 ^a	0.77±0.15 ^a	15.78±1.97 ^a	29.71±1.04 ^a	6.29±0.84 ^a	6.36±0.04 ^b
25	65.53±1.12 ^a	0.23±0.1 ^b	10.68±0.6 ^b	33.48±1.51 ^{ab}	19.41±1.21 ^b	6.11±0.01 ^a
50	63.91±4.78 ^a	-0.25±0.11 ^c	12.07±1.34 ^b	36.74±3.8 ^b	14.18±1.0 ^c	6.3±0.01 ^b

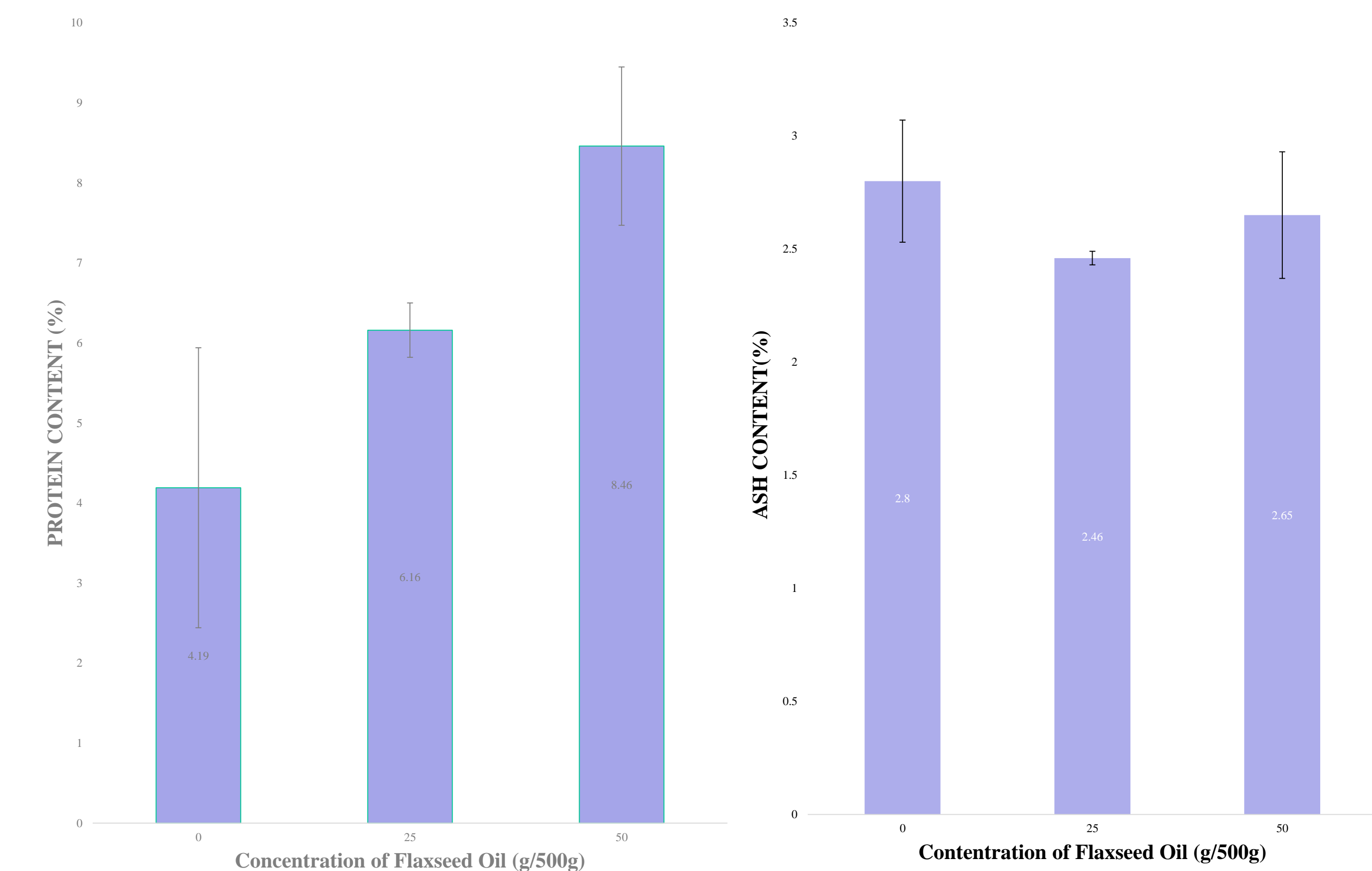


Fig. 1. Protein content of cooked meatballs

Fig. 2. Ash content of cooked meatballs

DISCUSSION & CONCLUSION

- TPA parameters suggest no significant difference in textural properties.
- Increasing concentration of flaxseed oil elevates protein content and moisture content in meatballs
- Measured ash contents in all treatments showed no significant difference.
- These results suggest that the incorporation of flaxseed oil may allow manufacturers to fortify chicken meatballs with health beneficial n-3 fatty acid-rich oil.

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