

Moisture and fat content of extra crispy fried chicken skin from breast, thigh, drum and wing

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Introduction

Fried chicken is a popular choice at fast food restaurants. The USDA National Nutrient Database for Standard Reference (SR) currently does not contain any nutrient profiles for fast food fried chicken. In view of the fact that this product is frequently consumed, it is important to have accurate and current data for the different products sold. A collaborative study was conducted by scientists at the USDA and Texas Tech University to examine variability in fat and moisture content of skin from four parts of extra crispy fast food fried chicken. This study was a subset to a larger study where the USDA and Texas Tech University analyzed 96 nutrients in the flesh of breast, drumstick, thigh, and wing, as well as skin.

Nutrient profiles of fast food extra crispy fried chicken will be released in SR as skin only, skin and flesh; and flesh-only items. Nutrient profiles of chicken parts with skin entered into SR will be derived by calculating the nutrient contribution of both skin and flesh to the totality of the part. The nutrient profile for the flesh is determined by analysis of each part (i.e. breast, wing, thigh, and drumstick), while the nutrient profile for skin could be based on the analysis of a single composite of skin removed from all parts.

Objectives

➤ To compare the moisture and fat content of skin from each of four parts of extra crispy fried chicken skin (i.e. breast, thigh, drumstick, and wing).

➤ To determine the feasibility of using a single representative nutrient profile for skin derived from the analysis of a composite of skin from all parts.

Methodology

Sampling: Samples of breast, drumstick, thigh, and wing were purchased from a national fast food chain at 12 fast food outlets nationwide in accordance with a probability sampling plan prepared for the National Food and Nutrient Analysis Program (Pehrsson et al., 2003).¹ Prepared extra crispy fried chicken skin (including batter and breading) samples were derived from a subset of five randomly selected outlets. Five samples of breast, thigh, drumstick, and wing (flesh only) from each of the five locations were prepared for analysis. Skin and breading were dissected from the flesh of each part and homogenized for subsequent fat and moisture analysis.

Analyses: Total fat was determined by using semi-continuous solvent extraction, Soxhlet Method, (AOAC Method 960.39)² with petroleum ether as solvent. Moistures were determined by the oven drying method at 100°C for 16 to 18 hours (AOAC Method 950.46)² until aliquots reached a constant weight.

Quality Control: Analytical quality assurance was monitored through the use of certified reference materials, in-house control materials, and random duplicate sampling as part of the sample stream.

Statistics: Data were evaluated using the Proc Mixed procedure of SAS.³ The pair-wise test of differences was used to determine significant differences among parts. The mixed model analysis of variance contained Part as a fixed effect, while State and State*Part were included as random effects. Tests of the Part mean difference from the average of all parts and the differences between part were completed with the t test. To examine the representativeness of a single skin composite, differences between the fat content of individual parts and the mean fat concentration were evaluated by Tukey-Kramer (critical value was set at p< 0.05).

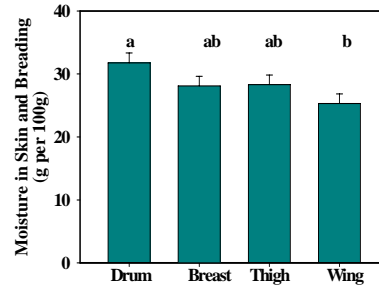


Fig. 1 Moisture content of skin from extra crispy fried chicken parts. Bar height represents Least Square Means ±SEM. Comparisons among parts were evaluated by a pair-wise test of differences in moisture concentration of the skin for the four parts. Bars with similar letters are not significantly different at p< 0.05.

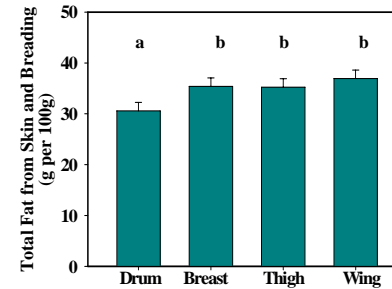


Fig. 2 Fat content of skin from extra crispy fried chicken parts. Bar height represents Least Square Means ±SEM. Comparisons among parts were evaluated by a pair-wise test of differences in fat concentration of the skin for the four parts. Bars with similar letters are not significantly different at p< 0.05.

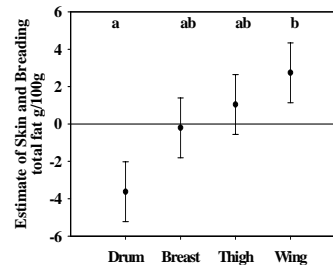


Fig. 3 The line of identity represents average total fat for the skin taken from all parts (34.2 g/100g skin). The mean deviation and standard error are shown for each part.

Table 1. Comparison of Fat Content Among Skin and Breading Derived from Extra Crispy Fried Chicken Parts

Comparison of Parts	Differences of LS Means by Part	Standard Error of LS Means	P Value Tukey-Kramer Test
Breast to Drum	3.4205	1.7263	0.2478
Breast to Thigh	-1.2450	1.7263	0.8868
Breast to Wing	-2.9423	1.7263	0.3632
Drum to Thigh	-4.6654	1.7263	0.0788
Drum to Wing	-6.3627	1.7263	0.0143
Thigh to Wing	-1.6973	1.7263	0.7615

Results

Moisture: Residual variability in moisture content of skin differed among parts. While the overall test of significance did not indicate a difference in moisture content among parts (p= 0.07), the mean comparison procedure indicated a significant difference (p<0.04; Tukey-Kramer test) between drum skin and wing skin, 31.8% vs. 25.3%, respectively (Fig. 1).

Total fat: ANOVA indicated differences among parts for skin fat content (p< 0.02). Fig. 2 shows that mean fat content of drum skin (30.6%±1.7%) was significantly less than that for breast, thigh, and wing (range 35.2-36.9%; p< 0.05).

Estimate: The pair-wise test of differences between parts indicates that fat content of drum and wing are significantly different (p <0.02). Differences between other parts were not significantly different (Fig. 3, Table 1).

Discussion

Further research should be conducted to validate these preliminary findings and to determine if a combined composite is feasible with other cooking procedures such as broiling, pan-frying, and roasting. Inconsistent amounts of adhering batter and breading combined with the chicken's natural fat deposits, may have contributed to a lower fat absorption in the drumstick.

Conclusion

➤ A single combined composite of skin with associated batter and breading was not totally representative of the skin from all the parts. There is a difference in moisture content of extra crispy fried chicken skin derived from the four chicken parts (p <0.05).

➤ The drumstick is the only part that differs significantly from the average of all parts in fat content (p <0.05).

➤ Results indicate that skin from extra crispy fried chicken drumsticks should be analyzed and reported separately from the skin of other parts.

➤ Utilizing the fat content of the skin derived from a single composite from all parts may result in a slight underestimation of the fat content for a whole bird with skin.

References

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