Proceedings of the Nutrition Society (2024), **83 (OCE2)**, E212 doi:10.1017/S0029665124004361

Winter Conference 2023, 5-6 December 2023, Diet and lifestyle strategies for prevention and management of multimorbidity

Degree of hydrolysis of chicken versus plant-based chicken analogues: An *in vitro* digestion comparison

M. Saleh Alotaibi[1], S. Eldeghaidy[1], M. Muleya[1], C. Hoad[2] and A. Salter[1]
[1]*Division of Food, Nutrition & Dietetics, School of Biosciences, University of Nottingham, UK*
[2]*Sir Peter Mansfield Imaging Centre, School of Physics and Astronomy, University of Nottingham, UK*

The adoption of plant-based meat analogues is increasing as an alternative to real meat products among consumers because they offer a more ecologically friendly and sustainable source of protein while also alleviating the ethical concerns related to livestock rearing and slaughter [(1).] However, there are concerns regarding plant-based meat analogues in terms of its nutritional quality, particularly their protein digestibility. This study aims to compared between chicken and plant-based chicken analogues in terms of nutritional composition and degree of protein hydrolysis.

Proximate analyses were performed for raw and cooked samples to assess protein, fat, and energy concentrations in two chicken samples (breast and thigh) and four commercial plant-based chicken (P-C1[Wheat Protein 37%, Pea Protein 10%], P-C2 [Soya Protein 63%], P-C3 [Soya and Wheat Protein 83%], and P-C4 [Soya Protein 30%, Pea Protein 2%]). As a first step, the proximate analyses were assessed for the averaged samples, then the product-cooking interactions was assessed using a one-way ANOVA followed by Tukey test ($p < 0.05$). *In vitro* digestion was performed following the INFOGEST harmonised static *in vitro* digestion model [(2)] for cooked samples. After digestion, o- Phthaldialdehyde (OPA) assay was carried out to measure the degree of protein hydrolysis for each sample, and two-way ANOVA test was performed.

Protein content of chicken was higher compared with the plant-based chicken, whereas fat content and energy concentrations were higher in plant-based chicken. The protein content of chicken was higher for raw and cooked samples (raw: 19.8 ± 0.38 g/100 g; cooked: 30.55 ± 4 g/100g), compared with plant-based chicken (raw: 13.8 ± 5.3 g/100 g; cooked: 23.4 ± 4.5 g/100g). Plant-based chicken have a higher fat content and energy concentrations for raw and cooked samples (raw:6.52 ± 1.5 g/100 g; cooked: 9.6 ± 3.17 g/100g) and (raw:189.4 ± 28.1 g/100 g; cooked: 291.3 ± 48.1 g/100g) respectively; compared to chicken fat content (raw:4.6 ± 2.7 g/100 g; cooked: 6.1 ± 4 g/100g) and energy concentration (raw:150.9 ± 25.4 g/100 g; cooked: 228.3 ± 20.7 g/100g). The product-cooking interactions showed a significant increase ($P \leq 0.0001$) in the protein content (raw: 15.6 ± 2.3g/100g to 19.8 ± 0.74 g/100g; cooked: 21.4 ± 0.55 g/100g to 33.06 ± 0.71 g/100g), and fat content $P<0.001$ (raw: 2.7 ± 0.06 g/100g to 8.3 ± 0.27 g/100g; cooked: 3.29 ± 0.19 g/100g to 13.22 ± 0.33 g/100g) in both chicken and plant-based chicken samples. No significant product-cooking interactions on energy content was found. The results from a two-way ANOVA test of the OPA and the degree of hydrolysis analyses demonstrated a significant increase in the degree of hydrolysis of chicken samples compared with plant-based chicken ($P<0.0001$).

The degree of hydrolysis and digestibility of chicken and chicken analogues was influenced by protein type, nutrient composition, and processing. These findings would provide substantial information for the improvement of plant-based chicken products with enhanced nutritional profiles. This work will be extended to investigate the availability and digestibility of individual amino acids.

Acknowledgments
Princess Nora bint Abdul Rahman University, Riyadh, Saudi Arabia.

References

1. Zhang & Tianyi (2021) *Trends in Food Science & Technology* **109**, 702–710.
2. Brodkorb & André (2019) *Nature Protocols* **14**(4), 991–1014.