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The nutritional profile of plant-based meat alternatives vs. traditional plant proteins: A product audit

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Plant-based meat alternatives (PBMAs) are products made from manufactured ingredients such as protein isolates, to replicate the organoleptic and functional properties of meat[(1)]. Traditional plant proteins (TPPs) such as tofu, tempeh and legume-based dishes are whole plant foods and have been longstanding components of the protein group of food-based dietary guidelines (FBDGs)[(2)]. PBMAs have been added to some recently revised FBDGs[(3,4)], however, with considerable differences in ingredient composition, the objective of this study was to evaluate if these products are similar in terms of energy and macronutrients content.

An online audit of PBMAs available in Tesco and Sainsbury's was completed (November 2023January 2024). On-pack information was extracted, and similar products were grouped. Within eligible categories (burgers, beef-style dishes and seafood), products were further grouped according to their classification as a PBMA or TPP. Categories such as tofu and tempeh were combined and compared with PBMA chicken fillets/chunks and beef/pork products separately. Mean energy and nutrient contents were compared using independent sample t-tests, with P values ≤ 0.05 considered statistically significant. A-scores from the UK's Nutrient Profiling Model[(5)] were calculated and the EU threshold for protein claims (≥12% energy from protein)[(6)] was applied to determine the proportion of products within each category considered a protein source.

Within the burger category, PBMAs (n = 43) had a significantly higher mean energy (206.8 vs. 197.4 kcal/100g, P = 0.008), total fat (11.2 vs. 8.4 g/100g, P = 0.05), and saturated fat content (2.5 vs. 0.8 g/100g, P = 0.02), and significantly lower carbohydrate content (10.4 vs. 23.5 g/100g, P = 0.002) than TPPs (n = 14). Within the seafood category, PBMAs (n = 11) had a significantly lower total fat content (9.9 vs. 11.4 g/100g, P = 0.001) and significantly higher protein (6.6 vs. 4.5 g/100g, P = 0.04) and salt content (1.0 vs. 0.8 g/100g, P = 0.03) than TPPs (n = 5). PBMAs within the beef-style dishes category (n = 19) were significantly higher in energy (174.2 vs. 111.5 kcal/100g, P = 0.003) than TPPs (n = 20).

When PBMA chicken (n = 81) and beef/pork (n = 20) were compared with tofu, tempeh and jackfruit (n = 17 and 20 respectively), PBMA chicken had a significantly higher carbohydrate content (12.2 vs. 2.6 g/100g, P<0.001) and PBMA beef/pork had a significantly higher protein content (17.2 vs. 13.1 g/100g, P = 0.005). PBMAs had higher mean A-scores (6.4 - 8.5) than TPPs (3.2 - 6.6) in 4/5 categories indicating they are 'less healthy.' Very few TPPs within the burger and seafood categories met the protein threshold compared to PBMAs.

Differences in energy, macronutrient content and A-scores, mean PBMAs and TPPs cannot be considered nutritionally equal.

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