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The acceptability and sensory attributes of plant-based burger products under open and closed label conditions

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Extensive evidence suggests reduced meat and increased plant consumption is desirable to support healthier, more sustainable food systems [1]. Plant-based meat alternatives (PBMAs) offer a steppingstone towards this. The plant-based industry is expanding rapidly to meet demand for PBMAs mimicking organoleptic properties of meat[1,2]. However, consumer acceptance is limited and creating a desirable sensorial experience is challenging for manufactures [3,4].

We aimed to characterise the acceptability and sensory characteristics of PBMAs versus meat-based equivalents accounting for product familiarity and labelling exposure. Product heatmapping identified six nutritionally comparable plant- versus meat-based burgers (n = 3, respectively). Naïve assessors (n = 38) were recruited into a pilot sensory evaluation to assess burger products under open and closed label conditions. A 9-point hedonic scale measured product acceptability. Participants were presented with sensory attributes and asked to Check-All-That-Apply for each sample. Repeated measures ANOVAs compared overall acceptability between products, conditions (open/closed label) and familiarity (habitual/non-habitual consumers of PBMAs).

Whilst meat- versus plant-based burgers were rated more acceptable in closed (mean = 5.94 s.d = 1.34 Vs mean = 4.86 s.d = 1.39) and open label conditions (mean = 5.82 s.d = 1.44 Vs mean = 4.74 s.d = 1.33), this may be driven by variation in acceptability within the plant-based burgers. Burger product significantly affected acceptability ($F(5,32) = 10.378$, $p = <0.001$). *Post hoc* analysis (Bonferroni correction) revealed plant-based burger 3 was perceived significantly less acceptable than plant-based burger 1 ($p < 0.001$) and all 3 meat- based samples (all $p < 0.001$). However, there were no significant differences in product acceptability between plant-based burger 1 and all meat-based burger products ($p > 0.05$). Familiarity and condition had no significant impact upon product acceptability. Pearson Chi-squared tests revealed that for the attributes "dry", "juicy", "granular", "greasy", "off-flavour", "meaty", "wheaty", "light brown colour", "dry appearance" and "oily appearance" it is likely that real differences exist between the sensory profile of plant- versus meat-based burgers under both conditions (all $p < 0.05$). Whilst this was observed for "dark brown colour" and "smoky/grill flavour" under closed label conditions, it was not apparent under open label conditions. Conversely, "easy to cut", "difficult to cut", "hard", "soft", "sweet", "peppery" and "uneven colour" weren't perceived differently between the plant- versus meat-based burgers under closed label conditions, although differences were observed under open label conditions. Notably, between product differences in perceived level of "processed appearance" were unlikely in either condition ($p > 0.05$), possibly because burgers are generally perceived as processed.

Further investigation, including in other PBMA categories is warranted. The development of more acceptable PBMAs may require particular focus on attributes typically associated with meat. Such evidence-based practice may accelerate sustained consumer adoption, further supporting the public health and climate change agenda.

References

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