

Manpreet Kaur Mujral¹, Gulshanara Begum¹, Mohammed G Zariwala¹, Ayazullah Safi², Lewis R Mattin¹



¹ University of Westminster, School of Life Sciences, London, United Kingdom. ² Birmingham City University, Department of Life & Sport Sciences, Birmingham, United Kingdom.

Background

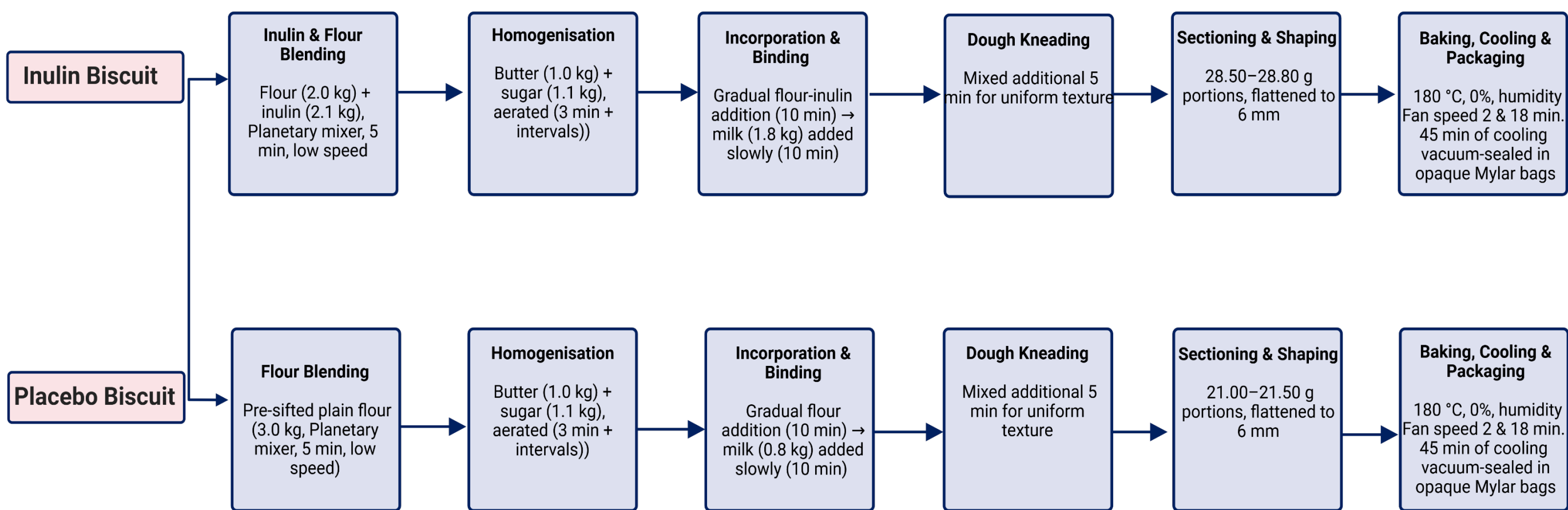
- The sensory characteristics of functional foods and nutraceuticals are critical for shaping participant acceptance and adherence in clinical research. The 9-point hedonic scale remains a widely used method for assessing palatability (Wichchukit & O'Mahony, 2015).
- Ensuring adherence to oral nutritional supplements in trials is challenging, with palatability, method of consumption, and product familiarity identified as key determinants of compliance (Lester et al., 2022).
- Where compliance relies on regular intake, poor sensory appeal can reduce consumption, leading to poor adherence and potentially compromising the validity of study outcomes (Lester et al., 2022).

Aim

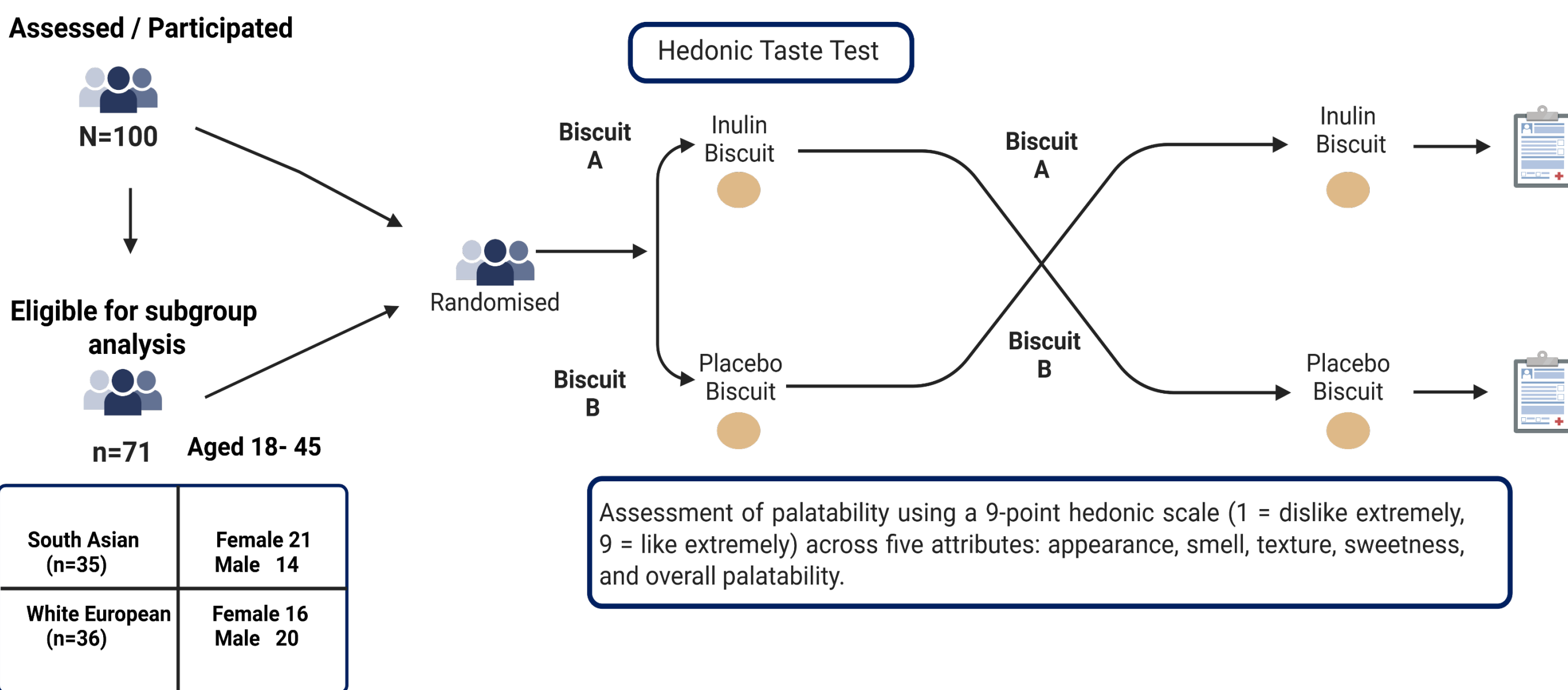
To evaluate palatability and sensory hedonic perceptions of inulin-enriched biscuits versus placebo, using the 9-point hedonic scale, and determine whether inulin biscuits differ significantly in acceptability.

Methods

Biscuit Production Methodology



A Double-Blind, Randomised, Placebo-Controlled Crossover Trial Investigating Sensory Hedonic Perceptions of Inulin-Enriched Biscuits versus Placebo Biscuits in Male and Female Participants



Results

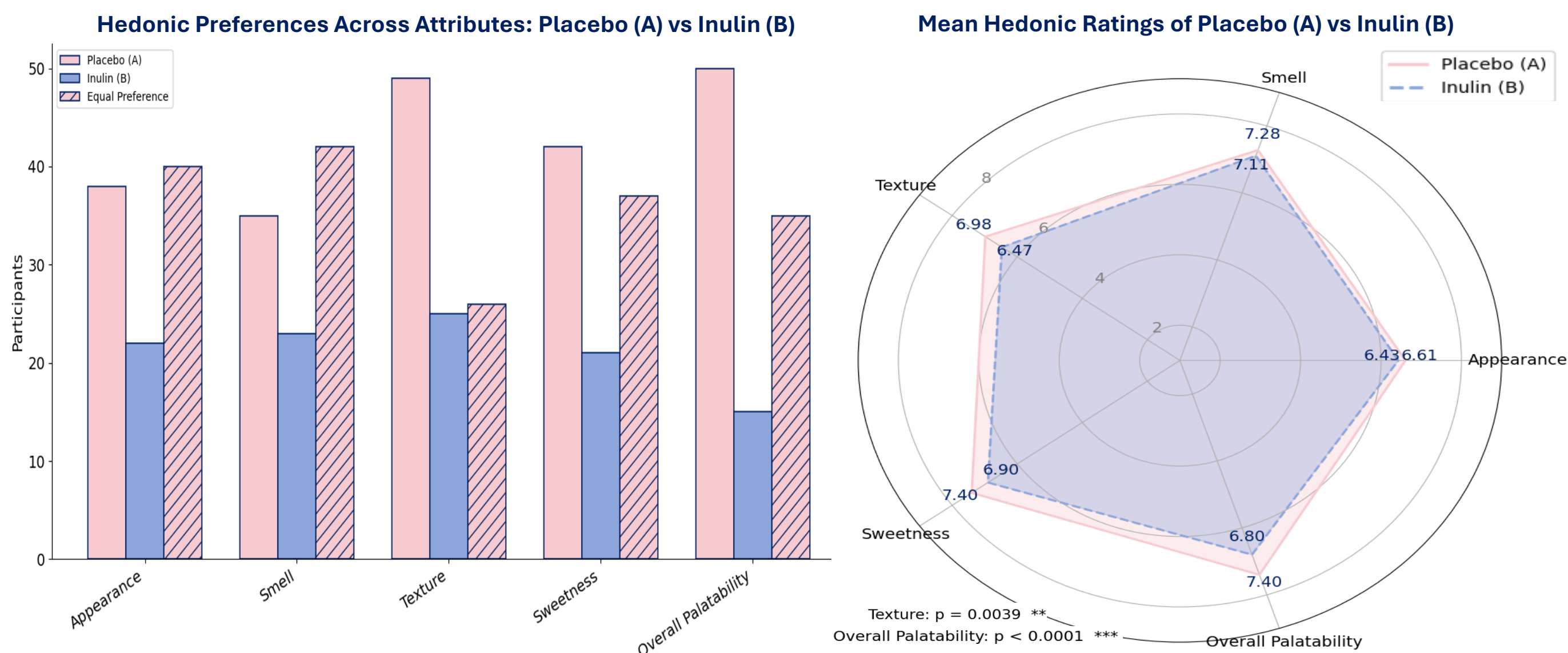


Figure 1. Grouped bar chart of participant preferences for placebo (A) vs inulin-enriched (B) biscuits ($n = 100$). Bars indicate the number of participants rating each attribute higher for placebo, higher for inulin, or equally (Equal Preference) across appearance, smell, texture, sweetness, and overall palatability.

Figure 2. Radar plot of mean hedonic ratings for sensory attributes assessed on a 9-point scale ($n = 100$). Wilcoxon Signed-Rank Test revealed significant differences for texture ($p = 0.0039$), sweetness ($p = 0.0013$), and overall palatability ($p < 0.0001$), whereas appearance and smell showed no significant differences.

	Statistic	Age	Appearance	Smell	Texture	Sweetness	Overall Palatability
Inulin Biscuit	Mean $\pm$ SD	35.22 $\pm$ 12.14	6.41 $\pm$ 1.64	7.08 $\pm$ 1.33	6.38 $\pm$ 1.89	6.92 $\pm$ 1.62	6.72 $\pm$ 1.68
	Min	18	3	5	1	4	2
	Max	45	9	9	9	9	9
Placebo Biscuit	Mean $\pm$ SD	35.22 $\pm$ 12.14	6.49 $\pm$ 1.82	7.31 $\pm$ 1.52	6.77 $\pm$ 1.87	7.37 $\pm$ 1.54	7.34 $\pm$ 1.43
	Min	18	2	3	2	3	3
	Max	45	9	9	9	9	9

Table 1. Descriptive statistics (mean $\pm$ SD, min, and max) for hedonic ratings of inulin-enriched and placebo biscuits from 71 eligible participants (21 South Asian females, 14 South Asian males, 16 White European females, 20 White European males). This cohort met the predefined inclusion criteria for the INSIGHT trial and was used for assessing the suitability of the biscuits for use in the study.

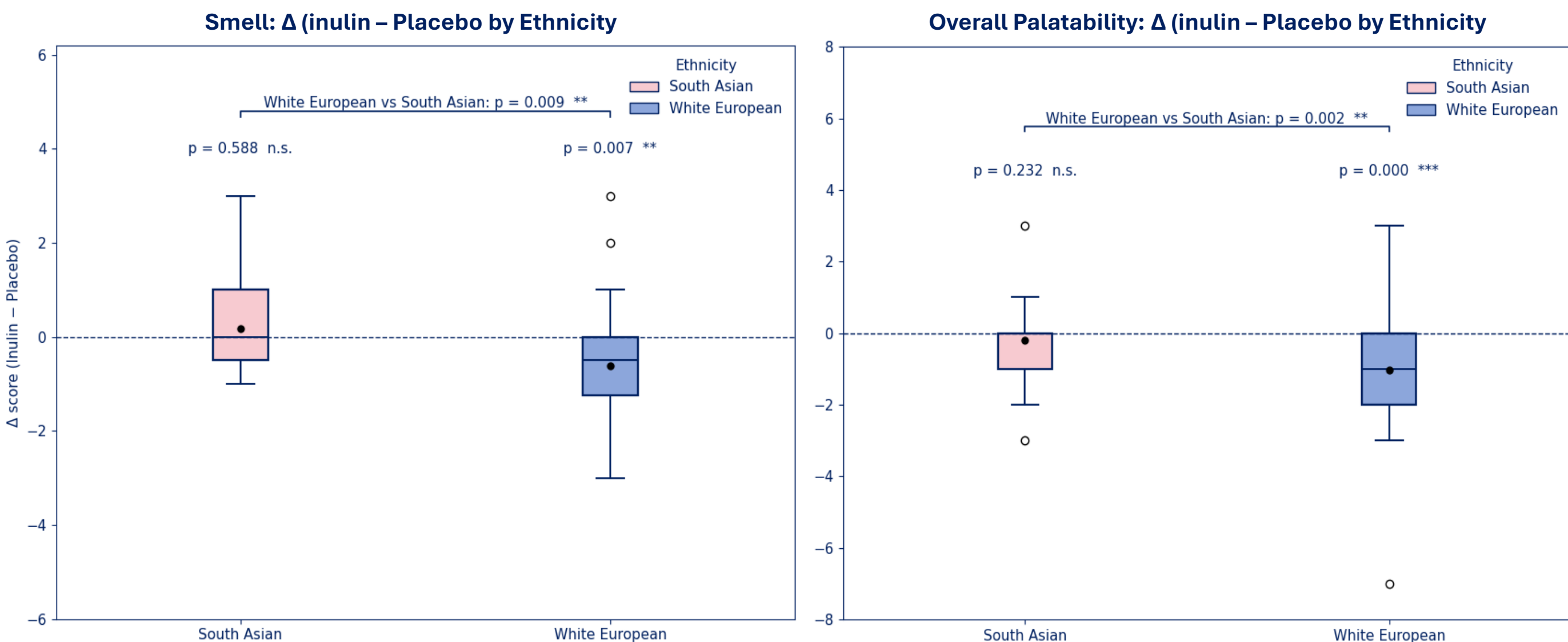


Figure 3. Change in hedonic rating for smell stratified by ethnicity ($n = 71$; 35 South Asian, 36 White European). White Europeans rated inulin biscuits significantly lower than placebo ($p = 0.007$), whereas South Asians showed no difference ($p = 0.588$). Between-group comparison also showed a significant difference ($p = 0.009$). However, both groups rated the biscuits highly in the hedonic category for smell.

Figure 4. Subgroup analysis by ethnicity showing change in overall palatability ratings ($n = 71$; 35 South Asian, 36 White European). White Europeans rated inulin biscuits less palatable than placebo ($p < 0.001$), while South Asians showed no significant difference ($p = 0.232$). Between-group comparison showed a significant difference ($p = 0.002$). However, both ethnic groups rated the biscuits as highly palatable overall.

Conclusions

- Both biscuits received high hedonic ratings (Placebo Biscuit A: 7.34 ± 1.43 ; Inulin Biscuit B: 6.72 ± 1.68), confirming overall palatability.
- Statistically significant differences were observed for texture, sweetness, and overall palatability, with the placebo biscuit (A) favoured ($n = 100$). However, subgroup analysis ($n = 71$) identified smell and overall palatability as statistically significant.
- Subgroup analysis by gender showed no significant differences in hedonic ratings between male and female participants.
- Despite these differences, both biscuits were broadly acceptable across all sensory attributes.
- The placebo biscuits appeared well-matched to the inulin biscuits, as both were rated highly palatable. This supports their suitability for use in blinded nutritional intervention trials and highlights their potential to enhance adherence in future studies.

References

Wichchukit S, O'Mahony M. The 9-point hedonic scale and hedonic ranking in food science: some reappraisals and alternatives. *Journal of the Science of Food and Agriculture*. 2015;95(11):2167-2178. doi:10.1002/JSFA.6993

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M.Mujral@westminster.ac.uk

