

Developing and evaluating reformulated snack bars using ingredients available in The Gambia

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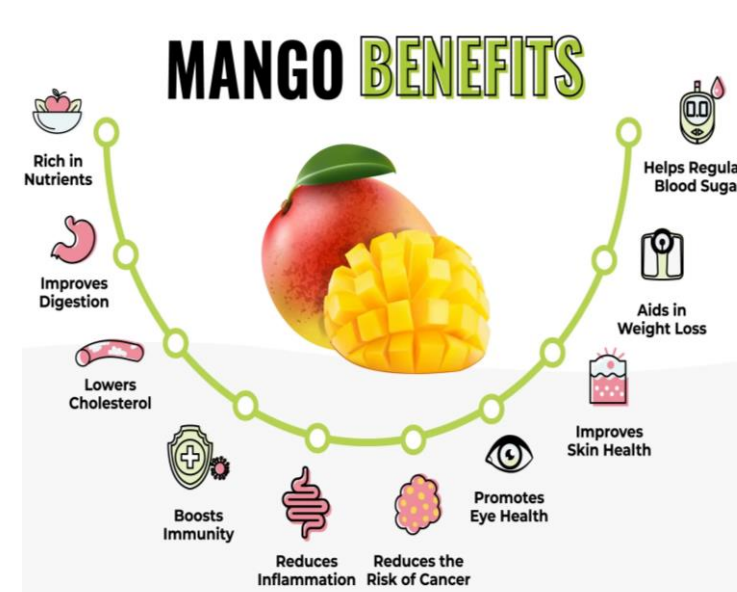
Background

- Malnutrition remains a major public health issue in The Gambia, driven by limited dietary diversity, low domestic food production and high reliance on imported foods (Carr, 2024).
- Dietary trends (1990–2017) show excessive intake of sugars and oil, inadequate fruit and vegetable consumption resulting in micronutrient deficiencies and rising obesity rates (Ali et al, 2023).



Study rationale

- Limited access to affordable, nutritious snacks in The Gambia.
- Study leverages health benefits of locally available ingredients such as baobab - rich in calcium and potassium (Kimani et al., 2022), and mango, which contributes natural sweetness, fibre, and electrolytes.
- Study is inspired by the Knowledge Exchange collaboration between OBU and the University of The Gambia.



Research question

How can a nutrient-rich snack bar be formulated using locally available ingredients (such as millet, baobab, and mango) in The Gambia to address nutritional deficiencies and understand consumer acceptability based on consumption habits, sensory evaluation, and food labelling preferences?



Mixed methods approach

Snacking behaviour survey

An online survey among Gambian adults (n: 30) explores snacking frequency, types of snacks consumed, reasons for snacking, and factors influencing choices, ensuring product development aligns with local dietary needs.



Snack bar reformulation

Experimental formulations of the snack bars will be developed, incorporating locally available ingredients in varying proportions to enhance nutritional content.

Proposed reformulations	
Group 1 - Control	
Group 2 - Reformulation 1: Baobab-focused Bar	Baobab: 15–20%, Millets: 50–60%, Mango: 20–25%
Group 3 - Reformulation 2: Millet-focused Bar	Baobab: 10–15%, Millets: 60–70%, Mango: 10–20%
Group 4 - Reformulation 3: Mango-focused Bar	Baobab: 10–15%, Millets: 40–50%, Mango: 30–40%

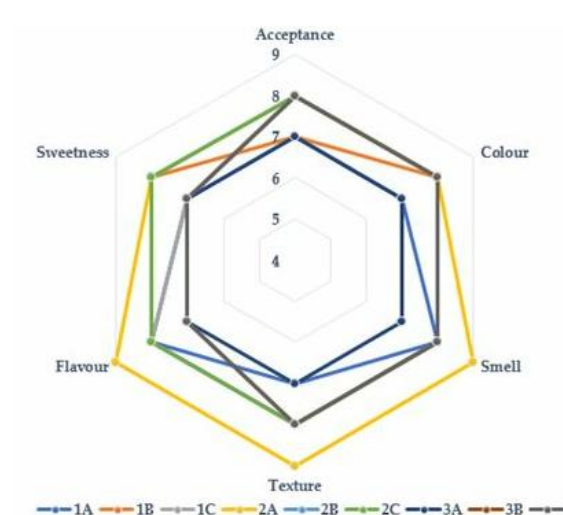
Nutritics assessment

Using Nutritics software, the macronutrient and micronutrient composition, including protein, fat, carbohydrates, vitamins, and minerals, will be calculated.



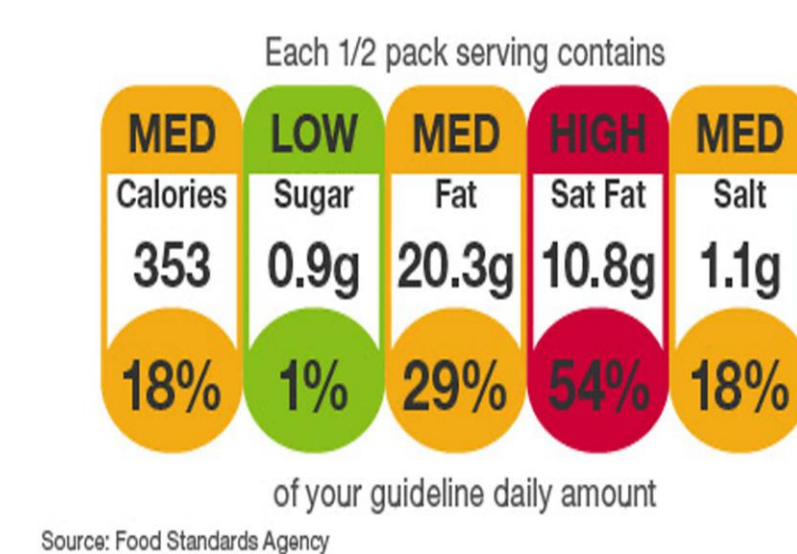
Sensory evaluation

Sensory evaluation with UK-based participants (n: 30) will assess taste, texture, aroma, and overall acceptability through statistical methods such as ANOVA or T-tests.



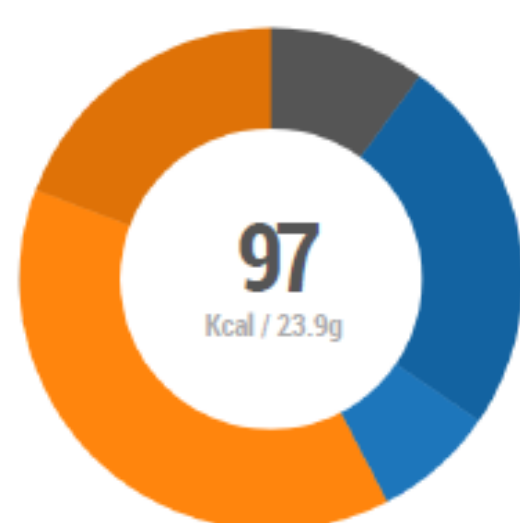
Traffic lights food labels survey

Second online survey in The Gambia and UK (n: 30) will explore consumer perceptions of traffic light labelling on snack bars, with responses analysed to determine the impact on purchasing decisions.



Initial findings

Control bar

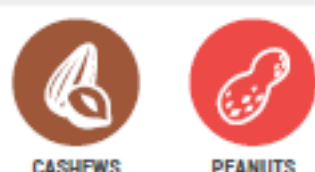


CALORIES:
32.3% Carbs
10.1% Protein
57.6% Fat

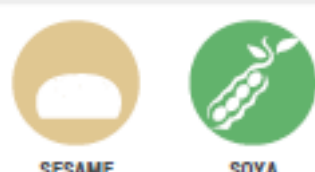
UK Label values per 23.9g serving:

	PER 23.9G	%RI
Energy(Kj)	415 kJ	5%
Energy(kcal)	100 kcal	5%
Fat	6.2 g	9%
of which saturates	2.1 g	11%
Carbohydrate	7.9 g	3%
of which sugars	6 g	7%
Fibre	1 g	4%
Protein	2.5 g	5%
Salt	0.04 g	1%

CONTAINS:



MAY CONTAIN:



Expected outcomes

- Reformulating snack bars with locally available, nutrient-dense ingredients can help combat malnutrition while highlighting their antioxidant and high-fibre benefits (Szydłowska et al., 2022).
- Ingredients like millet, baobab, mango, and cashew not only enhance nutrition but also encourage the use of underutilised, health-promoting crops.
- Producing these snacks within The Gambia can boost sustainable local economies, spurring opportunities in food innovation, and small-scale production (Dar et al., 2023).
- Study bridges gap between academic research and real-world product development, delivering locally-relevant, market-ready solutions to address nutritional challenges (Coello et al., 2022).

References

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