

Leuconostoc mesenteroides induced fermentation in reducing anti-nutrients of neglected legume

Tee Ann Jo, Lim Yin Sze, Festo Massawe, John Brameld, Tim Parr, and Andrew Salter

School of Biosciences

Introduction

- **Bambara groundnut** remains neglected due to presence of **anti-nutrients**
- **Common food processing** methods (e.g. autoclaving, canning, milling) lower anti-nutrient levels but **cause inevitable nutrient losses**¹
- **Fermentation** reduces anti-nutrients without adversely altering food nutritional value while conferring preservative effect²
- **Aim:** To investigate the effect of *L. mesenteroides* TAPS 3 induced fermentation on anti-nutrient and proximate composition of Bambara groundnut

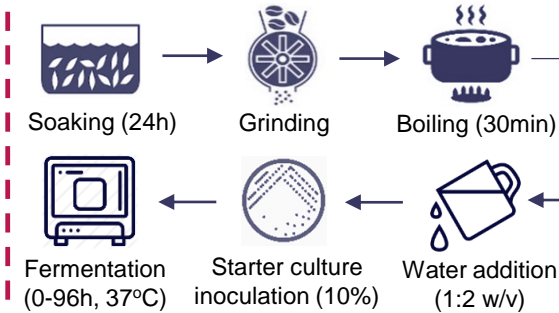
Methodology

Isolation of starter culture & sample preparation

- *L. mesenteroides* TAPS 3 was isolated from fermented glutinous rice using MRS medium
- Carbohydrate fermentation pattern & identity of starter culture were determined using API 50 CHL kit
- Bambara groundnut (CLBE; cream colour) was provided by Dr Sean Mayes from UoN

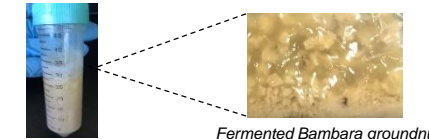


Bambara groundnut fermentation by *L. mesenteroides* TAPS 3



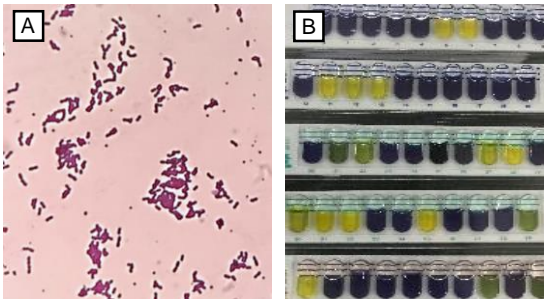
Microbiological & chemical analysis

- At each time interval (0-96h), samples were withdrawn to determine:
- Bacterial cell growth
 - Anti-nutrient content → tannin, phytate, trypsin inhibitor
 - Proximate composition



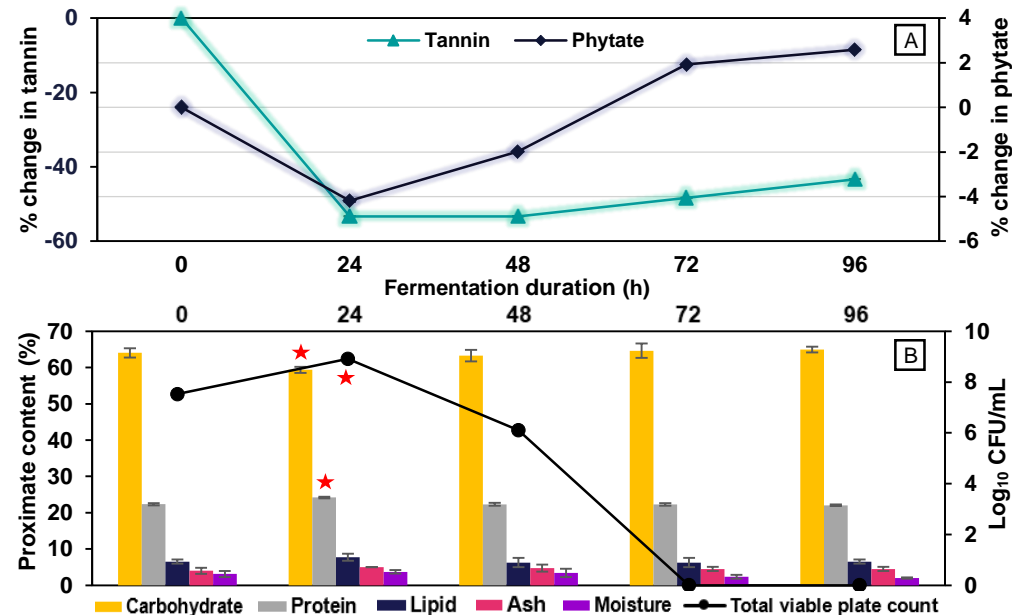
Results & Discussions

Figure 1: (A) Gram stain and (B) API 50 CHL results of *L. mesenteroides* TAPS 3



- *L. mesenteroides* TAPS 3 → Gram +ve long chain cocci → 99.9% API ID
- It achieved 8.82 Log₁₀ CFU/mL after 24h incubation (37°C) in MRS broth
- It showed ability to ferment carbon sources e.g. ribose, xylose, glucose, fructose, sucrose, mannose etc.

Figure 2: Effect of *L. mesenteroides* TAPS 3 induced fermentation on (A) anti-nutrient contents, (B) bacterial growth and proximate composition of Bambara groundnut



- Tannin content sig. reduced by 44 – 53% after fermentation
- Maximum phytate reduction of 4.2% after 24h-fermentation
- Trypsin inhibitor was non-detectable
- 24h-fermentation showed maximum cell growth of 8.91 Log₁₀ CFU/mL, carbohydrate reduction of 7.3% & protein increment of 8.2%

Conclusions

- *L. mesenteroides* TAPS 3 induced fermentation reduced 44 – 53% tannin
- 24-48h fermentation reduced 2 – 4.2% phytate BUT prolonged fermentation caused 1.8 – 2.6% phytate increment
- Fermented Bambara groundnut with reduced anti-nutrients will enhance its digestibility by human & animal

Acknowledgements

This project is funded by Future Food Beacon, UoN

References

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- Anal, A.K. (2019) Quality Ingredients and Safety Concerns for Traditional Fermented Foods and Beverages from Asia: A Review. *Fermentation* 5(1).