

Design and fabrication of mould suitable for traditional  
sweetener (mazankwaila), in kaduna state, Nigeria.

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INTRODUCTION & AIM

INTRODUCTION

Traditional Mazankwaila (sugarcane sweetener) production in Northern Nigeria is manual and artisanal, resulting in inconsistent quality, shape, and efficiency. Amid rising refined sugar prices, this product is crucial for low-income households, but lack of standardization hinders its marketability and scale. This study integrates engineering with indigenous knowledge to provide a localized, hygienic, and scalable solution for artisanal producers.

AIM

To design and fabricate a cost-effective steel mould that ensures product uniformity, increases production efficiency, and preserves traditional preparation methods.

METHOD

METHOD

Key Procedure and Design

- Fieldwork (Dan Damisa village) informed design parameters (consumption rate, efficiency).
- Panel Testing (N=24 people) determined the optimal cube mass for sweetness: 30g per cube.
- Bulk Density was measured (591.93 kg/m³) to inform the precise design of the mould volume.
- Mould fabricated (mild steel) with dimensions 75cm ×75cm ×75cm (Batch capacity: 16.875 liters).

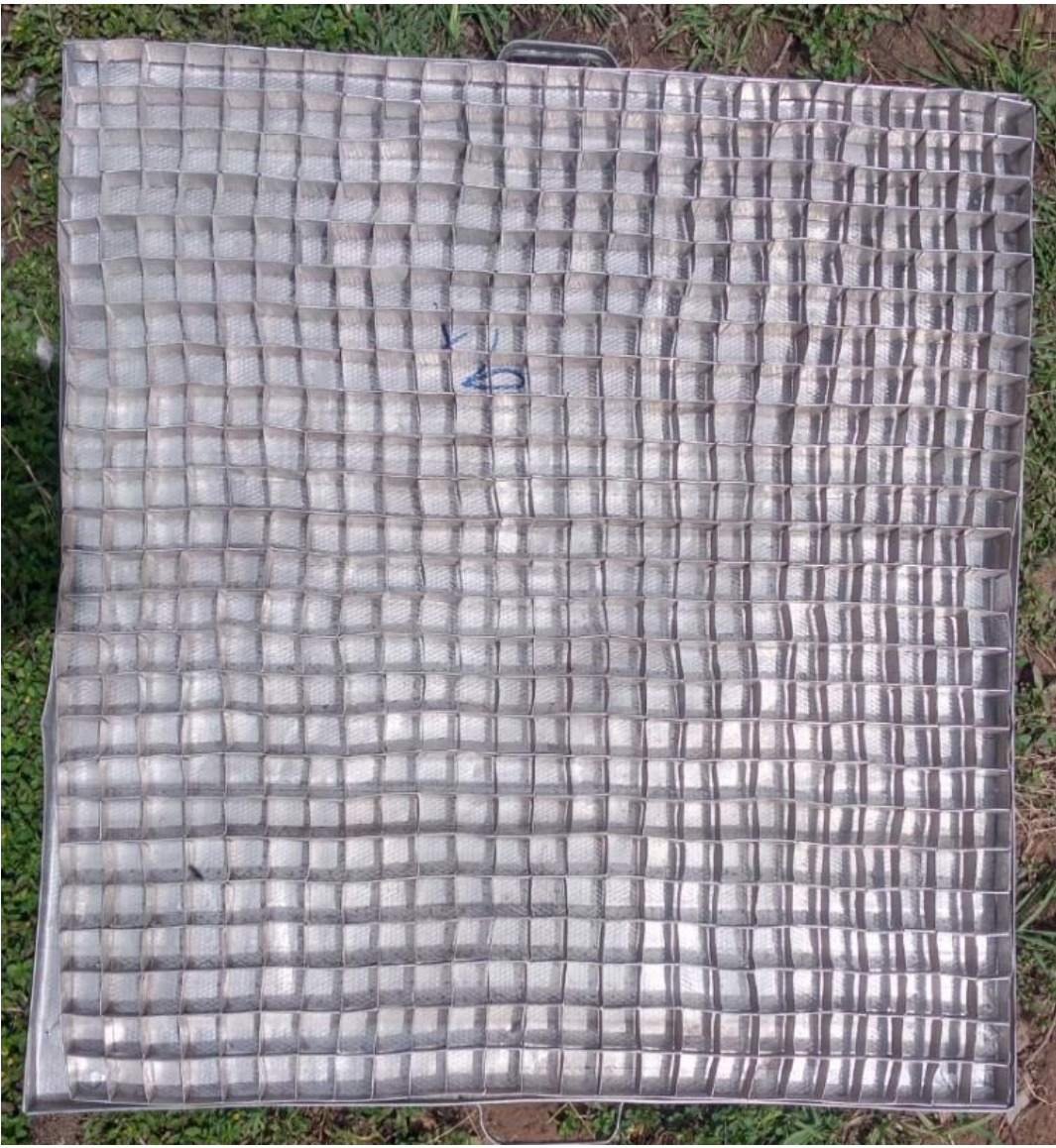


Fig 1: Fabricated Aluminium mould



Fig 2: Fabricated Mould with sweetener

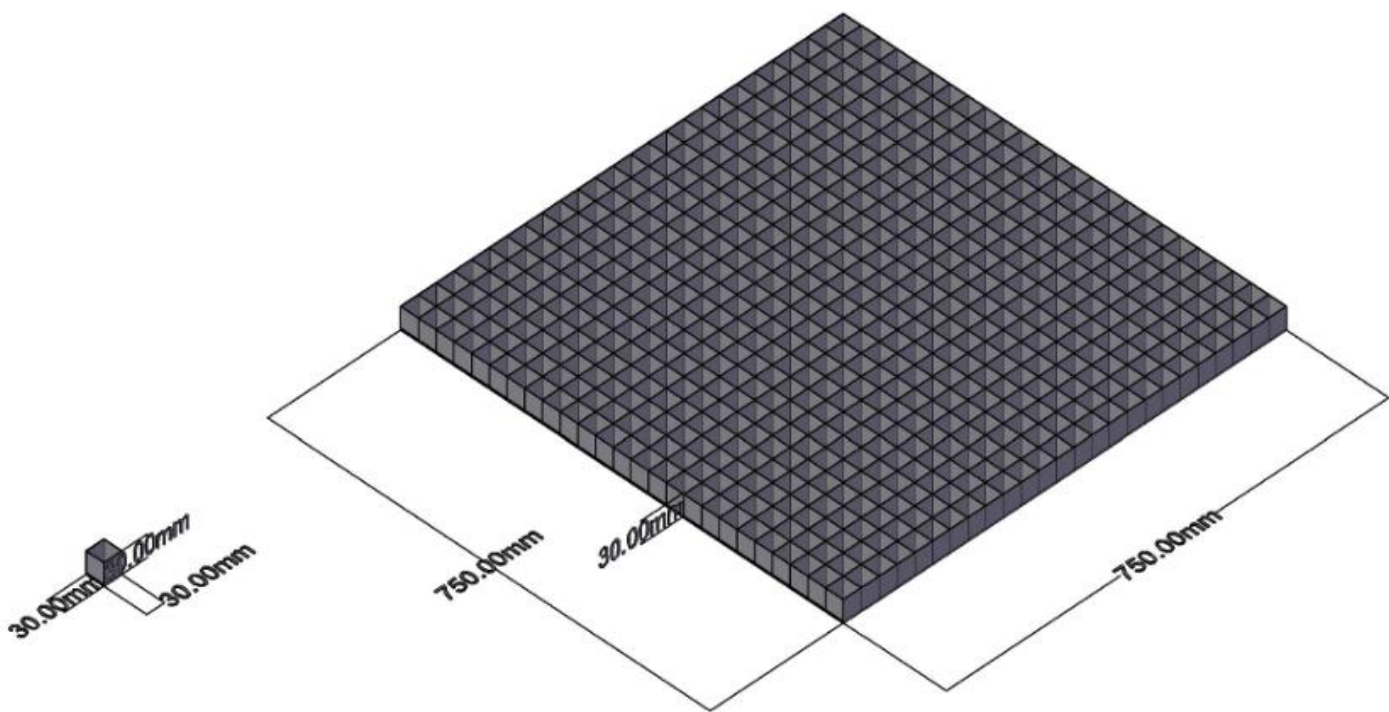


Figure 3: AutoCAD Design of Mould.

RESULTS & DISCUSSION

RESULTS

The mould's design is scalable: Daily output was tracked over five shifts, consistently yielding 500 liters per day.

- Producers reported improved handling and efficiency.
- The material used (Aluminium) is consistent with NAFDAC-compliant hygienic standards.

S/N	Age(years)	Comments
1	27	Normal taste
2	28	Normal taste
3	48	Normal taste
4	58	Medium taste
5	58	Very low taste
6	60	Normal taste
7	65	Too sweet
8	65	Very high taste
9	66	Normal taste

Table 1: Results about the taste and the consumption rate



Fig 4: Determination of the mould efficiency using Vernier caliper

DISCUSSION

- The mould achieved the primary goal of standardization without changing the core traditional process.
- This approach provides a cost-effective and sustainable alternative to refined sugar, directly supporting rural livelihoods and local agribusiness development

CONCLUSION

The designed and fabricated mould successfully standardizes Mazankwaila production, ensuring uniformity, efficiency, and food safety compliance. This study provides a practical, scalable model for integrating local engineering with indigenous knowledge for sustainable food security.

FUTURE WORK / REFERENCES

FUTURE WORK

The mould should be modify for large-scale industrial production

REFERENCES

Salami, A. (2006). The role of agriculture in Nigeria's economic growth.  
Yar'adua, S. M., et al. (2019). Assessment of Brown Sugar Processing in Kaduna State.