

Evaluation of probiotic fermentative capability of Sri Lankan traditional rice variety, “*Sudu Heenati*”: Compositional and physico-chemical characterization

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INTRODUCTION & AIM

- ✓ The **concept of functional food** is an emerging trend among consumers
- ✓ Functional foods boost consumer’s health and functionality
- ✓ **Rice** as a cereal is prominent in production of probiotic functional foods
- ✓ An Asian crop and staple food in Sri Lanka
- ✓ Varieties passed from generation to generation are known as “traditional” rice varieties
- ✓ The “*Sudu Heenati*” is a traditional rice variety with high nutrients

- Contains resistant starch which enhances the growth of probiotics
- Effective for non communicable diseases
- “Live microorganisms that, when administered in adequate amounts, confer health benefits on the host”



Sudu Heenati



Probiotic *Lactobacillus acidophilus* LA - 5

**FERMENTED
SUDU HEENATI
SUBSTRATE**

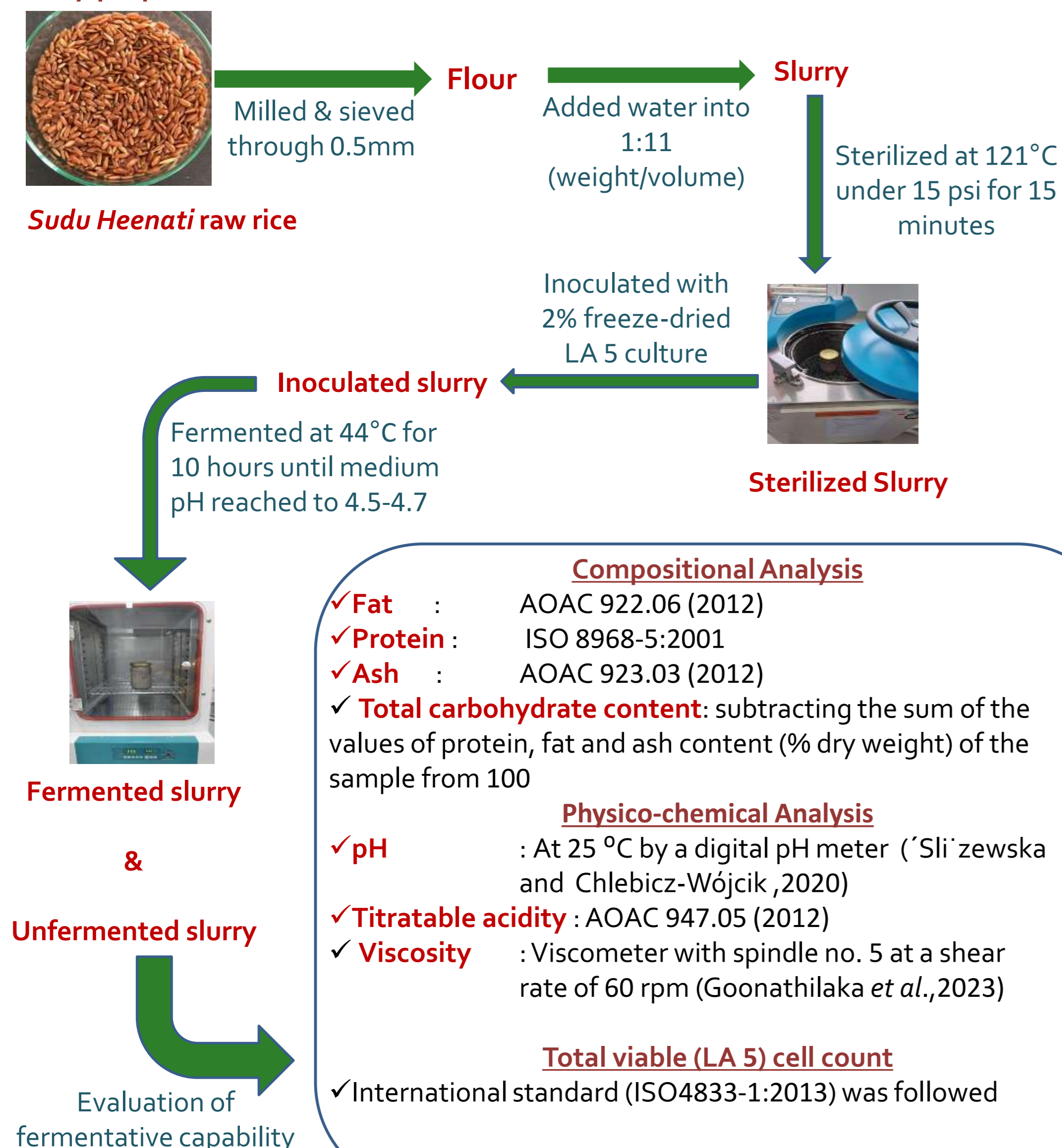
Main objective:

Evaluation of probiotic fermentative capability of “*Sudu Heenati*”

METHOD

Materials : “*Sudu Heenati*” raw rice and **LA-5** freeze-dried probiotic *L.acidophilus* culture were purchased from a local farmer and the local supplier of CHR.Hansen Private Limited, Denmark, respectively.

Slurry preparation and fermentation:



- Compositional Analysis**
- ✓ **Fat** : AOAC 922.06 (2012)
 - ✓ **Protein** : ISO 8968-5:2001
 - ✓ **Ash** : AOAC 923.03 (2012)
 - ✓ **Total carbohydrate content**: subtracting the sum of the values of protein, fat and ash content (% dry weight) of the sample from 100
- Physico-chemical Analysis**
- ✓ **pH** : At 25 °C by a digital pH meter (Śliżewska and Chlebicz-Wójcik, 2020)
 - ✓ **Titrateable acidity** : AOAC 947.05 (2012)
 - ✓ **Viscosity** : Viscometer with spindle no. 5 at a shear rate of 60 rpm (Goonathilaka et al., 2023)

- Total viable (LA 5) cell count**
- ✓ International standard (ISO4833-1:2013) was followed

Statistical Analysis - SPSS version 20.

RESULTS & DISCUSSION

Table 01: Viable cell count and mean comparison of physico-chemical and compositional parameters between fermented and unfermented “*Sudu Heenati*” slurries

| Parameter | Fermented slurry | Unfermented slurry | P value of paired t-test |
|---|------------------|--------------------|--------------------------|
| Viable cell count (log ₁₀ cfu/g) | 9.26 ± 0.43 | - | - |
| pH at 25°C | 4.71 ± 0.00 | 6.62 ± 0.00 | 0.000* |
| Viscosity (cP) | 1701.70 ± 3.12 | 818.26 ± 6.01 | 0.000* |
| Lactic acid content (%) | 0.14 ± 0.01 | 0.09 ± 0.00 | 0.014* |
| % Carbohydrate (Dry basis) | 88.19 ± 0.57 | 89.95 ± 1.42 | 0.275 |
| % Protein (Dry basis) | 5.68 ± 0.13 | 5.33 ± 0.26 | 0.104 |
| % Fat (Dry basis) | 2.72 ± 0.07 | 2.82 ± 0.24 | 0.406 |
| % Ash (Dry basis) | 2.45 ± 0.17 | 1.89 ± 0.04 | 0.019* |

The results are expressed as mean ± Standard Deviation, n=3

*Indicates the mean values between fermented and unfermented slurries significantly different at p<0.05

Viable probiotic cell count

- ✓ During the fermentation, LA-5 has grown effectively achieving the final viable cell count **9.26 ± 0.43 log₁₀cfu/g**, revealing the prebiotic potential and fermentative capability of “*Sudu Heenati*” rice variety (ISO29981:2010)

Physico-chemical Analysis

- ✓ Titrateable acidity, viscosity (EPS production) were **significantly increased** (p<0.05) and pH was **significantly decreased** (p<0.05) in fermented slurry compared to unfermented due to the production of organic acids which reduces the medium pH (Navyashree et al., 2022 and Salazar et al., 2016)

Compositional Analysis

- ✓ **Ash content (% weights in dry basis) was significantly increased** (p<0.05) from **1.89 ± 0.04 to 2.45 ± 0.17** and protein, carbohydrate, fat were not significantly changed in fermented slurry

CONCLUSION

- ✓ Fermented slurry has achieved viable cell count >8.0log₁₀cfu/g
- ✓ Since, significant variations (p<0.05) were observed in physico-chemical properties and in ash content, the “*Sudu Heenati*” variety is a suitable substrate for the LA 5 incorporated probiotic functional foods with favorable technological properties

FUTURE WORK / REFERENCES

- ✓ Resistant starch contain will be studied in fermented and unfermented slurries
- ✓ Technological properties suitable for a product development
- ✓ Śliżewska, K. and Chlebicz-Wójcik, A., 2020. Growth kinetics of probiotic *Lactobacillus* strains in the alternative, cost-efficient semi-solid fermentation medium. *Biology*, 9(12), p.423.