Comparative study on the physicochemical properties of extruded fortified rice kernels produced from different rice varieties with their corresponding rice varieties

Fortified Rice Kernels

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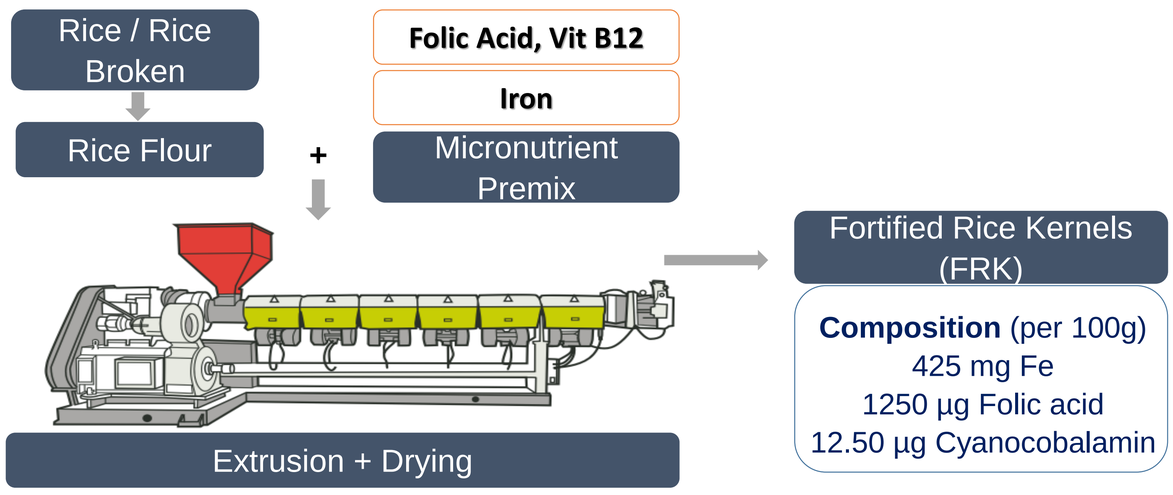
Introduction

Fortified Rice Kernels

Fortified rice kernels (FRK) are extruded rice-shaped kernels manufactured by blending rice flour with micronutrient premix



Unique Selling Points

Fortification of staple: Address nutrition insecurity

Value addition to broken rice: By-product utilization

Uses extrusion technology: Cost-effective option

Challenges

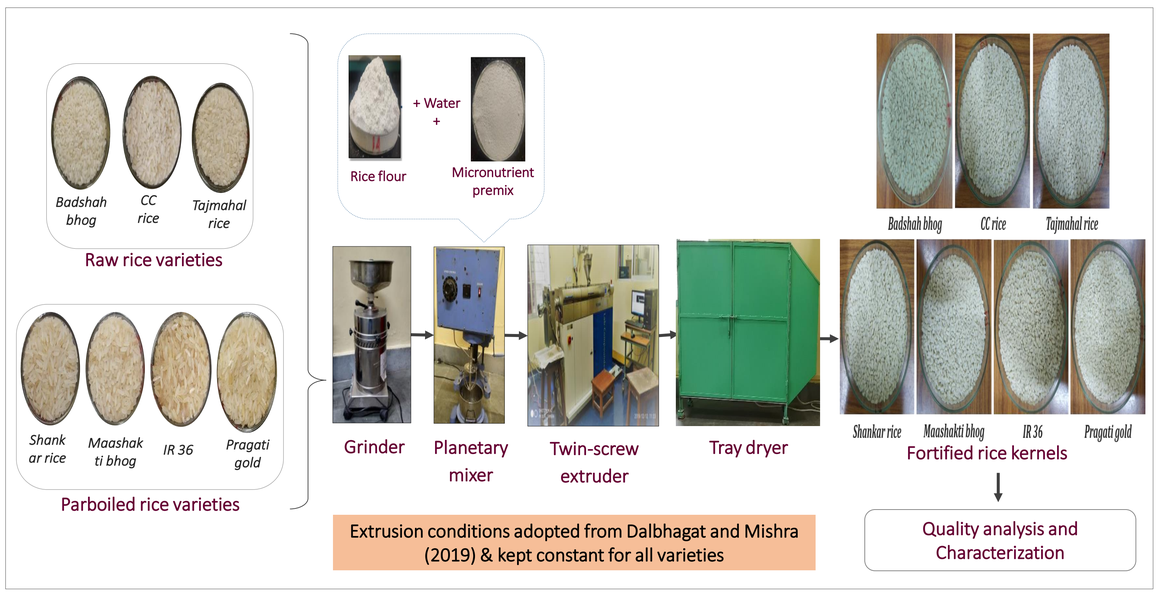
- FRK should match the physio-chemical and cooking characteristics of normal rice
- Different rice varieties with different starch composition in rice brokens collected from mills
- Extrusion process condition and FRK quality affected by feed composition

- It is necessary to understand the effect of rice varietal difference on the physio-chemical and cooking properties of FRK
- Also to understand the difference in physio-chemical and cooking properties of normal rice and FRK

Objectives

In this study four parboiled and three raw rice varieties were collected and processed to produce FRK. The FRK's apparent amylose content (AAC), color, density, functional properties, and cooking time were compared with that of the corresponding native rice variety (NR).

Methodologies



Quality parameters

Apparent amylose content – using UV spectrophotometer

Colour

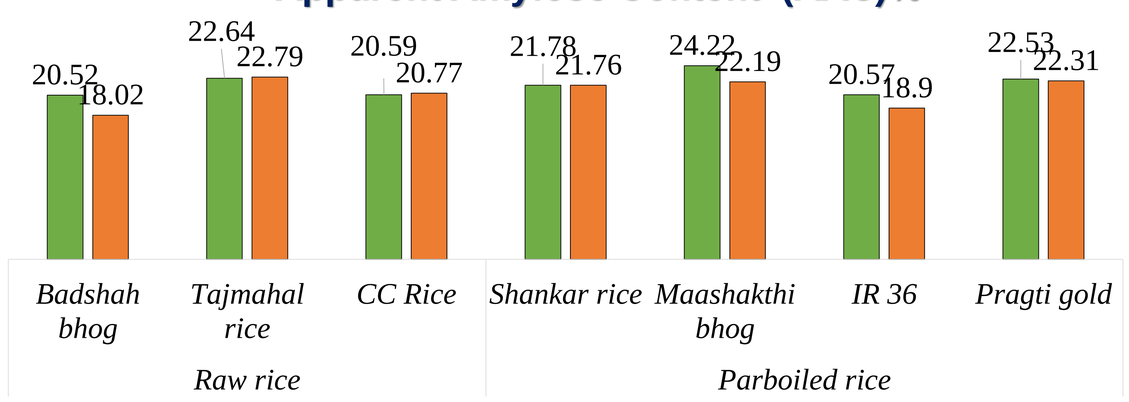
Functional Properties – WAI & WSI

Bulk density

Cooking time

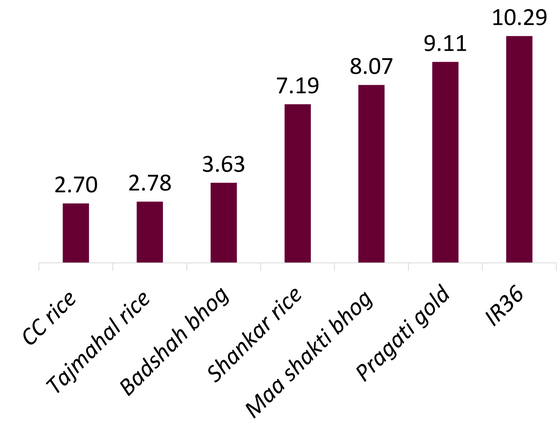
Results & Discussions

Apparent Amylose Content (AAC)%

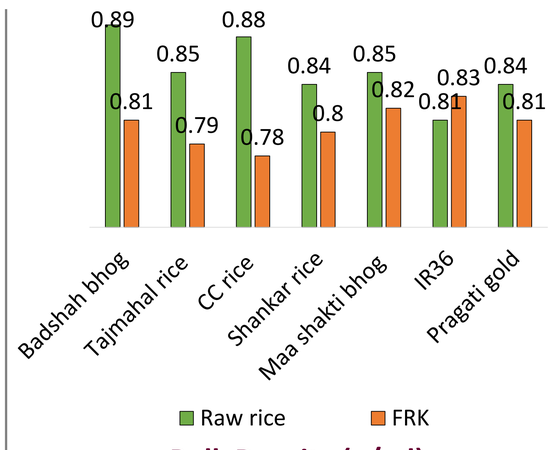


All rice varieties belonged to intermediate amylose varieties.
AAC of FRK were lower than that of corresponding NR.

Physical Properties



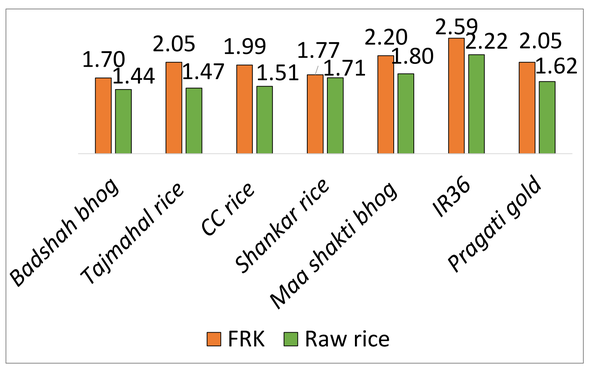
Colour: Delta E value of normal rice and FRK



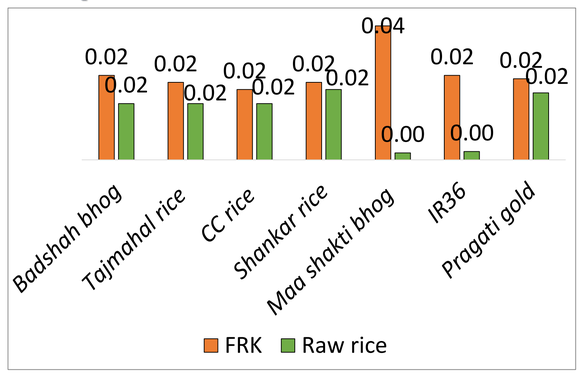
Bulk Density (g/ml)

- Lightness values of FRK reduced compared to NR except for parboiled varieties. Redness and yellowness of FRK were higher than NR which is reflected in Del E
- Bulk density of FRK was lesser than NR

Functional Properties



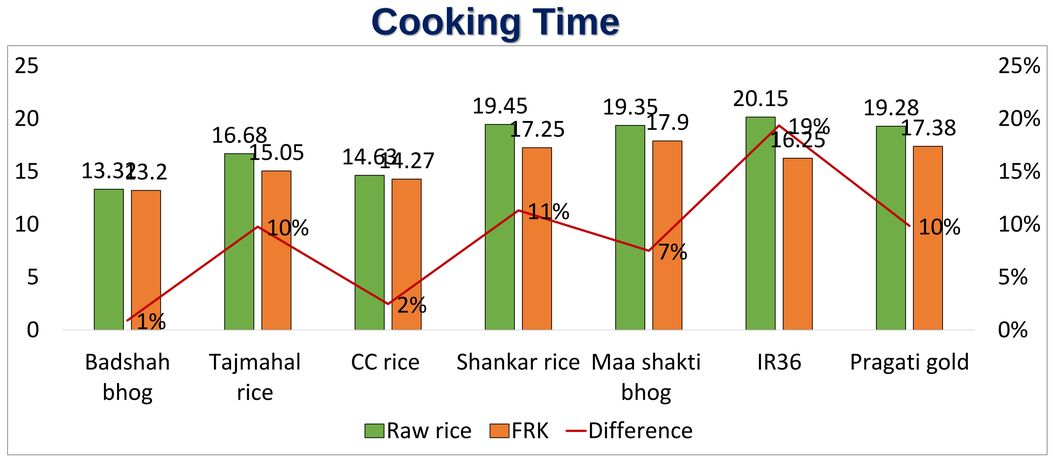
WAI



WSI

- The WAI and WSI of FRK were significantly different between each rice varieties
- WAI and WSI of FRK were higher than that of the NR due to starch modification

Cooking Time



Conclusions

- Properties of FRK were significantly influenced by the native rice variety
- Differences were observed between FRK properties and its corresponding native rice properties
- Furthers studies on optimization of the processing conditions for rice varieties based on amylose: amylopectin ratio is required to produce FRK that matches the properties of native rice.