Formulation and Characterization of Nutritious Instant Congee from Gamma-aminobutyric acid (GABA) rice as Calamity Food

Introduction
Through the years, food innovation has brought a wider selection of products where consumers can satisfy their hunger while keeping them healthy. This is through instant foods:

- affordable and shelf-stable
- accessible
- convenient
- suitable for emergencies, disasters, and crises

Did you know?
- GABA rice is good for our body because it is energy-dense, health-promoting, and enhances gut health.
- GABA rice is good for our farmers because value adding at the producers' end will bring better agricultural benefits to increase farming profits for market customers, especially suburban rice farmers who commercialize their rice to increase their income.

Objectives
- Characterize functional properties of GABA rice
- Outline instant GABA rice congee formulation
- Access eating quality and consumer acceptability of instant GABA rice congee
- Determine the nutritional value and nutritional contribution of instant GABA rice congee

Methodology

1. GABA Rice Production
2. Functional Property Analysis
3. Process Optimization
4. Microbial Analysis
5. Sensory Evaluation
6. Nutritional Analysis

GABA Rice
- White and brown rice
- Rice : Water Ratio (1:3)
- Soak for 24-48 hours
- Soak and cook cheddar cheese

Instant GABA Rice Congee
- Forms of Rice: soaked and pre-cooked
- Processed in 1-minute
- Laboratory panel (n=12)
- Consumer panel (n=40)

Methodology:
- Water absorption index (WAI)
- Water solubility index (WSI)
- Gelation power index (GPI)
- Thermal properties (TPI)
- Ash, Protein, Fat
Results

Functional Properties of GABA Rice

GABA rice had high water absorption (13.69%g/g) and low absorption (8.14%g/g), low water solubility index (0.03%) and minimal swelling power (2.02/g/g). Results implied that GABA rice could be used as a base ingredient for the production of instant GABA rice congee.

Evaluation of Instant GABA Rice Congee

- Low water activity (0.677), indicating high stability against microbial spoilage
- High yield (93.8%) and rehydration rate (77.8%) due to its high water uptake
- Safe to consume due to low b-glucan (0.197%), long and short (1.59% and 1.11%)
- Good source of nutrients, such as protein (20.4%), fiber (5.4%) and minerals

Sensory Attributes of Instant GABA Rice Congee

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Color</th>
<th>Aroma</th>
<th>Taste/Flavor</th>
<th>Texture</th>
<th>Smoothness</th>
<th>Off-odor</th>
<th>Off-Taste</th>
<th>General Acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st hour</td>
<td>3.94</td>
<td>3.81</td>
<td>4.08</td>
<td>5.64</td>
<td>0.04c</td>
<td>1.11</td>
<td>7.73</td>
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<tr>
<td>2nd hour</td>
<td>3.90</td>
<td>4.03</td>
<td>4.69</td>
<td>5.01</td>
<td>0.01c</td>
<td>1.35</td>
<td>10.18</td>
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</tr>
<tr>
<td>3rd hour</td>
<td>3.23</td>
<td>3.21</td>
<td>3.57</td>
<td>3.99</td>
<td>0.03c</td>
<td>1.64</td>
<td>10.19</td>
<td></td>
</tr>
<tr>
<td>4th hour</td>
<td>3.46</td>
<td>3.34</td>
<td>4.44</td>
<td>5.45</td>
<td>0.04c</td>
<td>2.21</td>
<td>11.89</td>
<td></td>
</tr>
<tr>
<td>5th hour</td>
<td>3.86</td>
<td>3.69</td>
<td>4.77</td>
<td>5.82</td>
<td>0.04c</td>
<td>2.42</td>
<td>11.58</td>
<td></td>
</tr>
</tbody>
</table>

All treatments had comparable color, aroma, taste/flavor, smoothness and texture. Instant GABA rice congee from treatments 1 and 2 had the highest general acceptability.

Consumer Acceptability of Instant GABA Rice Congee

- Color: 80%
- Aroma: 78%
- Mouthfeel: 72%
- Taste: 75%
- Overall acceptability: 70%
- Frequency: 60%

Freshly cooked brown rice congee and reconstituted instant GABA rice congee had comparable color, aroma, and taste. Although the devided instant GABA rice congee had high consumer acceptability (72%), its value was lower than the control.

Conclusions

- Based on its functional properties, GABA rice is suitable for instant GABA rice congee production.
- Instant GABA rice congee at 1:6 rice to water ratio had the highest rating quality among the treatments and is acceptable to the consumers.
- Instant GABA rice congee is safe for consumption based on its acceptable water activity and microbial quality.
- Instant GABA rice congee can be an alternative to instant noodles and can serve as disaster food as it can provide nutrients that our body needs.

Recommendations

- For the further improvement of the study, the following activities are recommended:
  - Determine the shelf-life stability of the product.
  - Parry the developed products with other healthy vegetables.
  - Develop other functional foods from GABA rice.

“Through the development of rice-based functional food products using Philippine varieties, we can uplift the nutritional status of Filipinos while providing better agricultural livelihood to our local farmers.”

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