Development and quality evaluation of instant rice noodles (cup noodles)

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ABSTRACT

Noodle is one of the main food item widely consumed throughout the world and their global consumption is second only to bread. The instant noodle market is growing fast in Asian countries and is gaining popularity in the western market. Wheat flour which is usually used for making instant noodles is poor in essential amino acid lysine. A few amount of instant rice noodles available in the Sri Lankan market but there are also not in the form of ready to use cup noodles. Sri Lankan rice self-sufficiency rate was increased within last five years due to excess paddy production. It is important to introduce rice based novel food items such as instant cup noodle which helps to process excess paddy harvest in Sri Lanka. Instant cup rice noodles could be a good solution for people with busy lifestyle to have nutritious meal in morning time since product can be prepared within 3 min by adding boiling water only. This study reveals that the product is at acceptable level 4.83 out of 5.00 in sensory evaluations and cooking loss was 10.18%.

Keywords: Instant rice noodles, cup noodle, rice based product

INTRODUCTION

Rice (Oryza sativa L.) is the staple food in Sri Lanka and it provides 45% calorie and 40% total protein requirement of an average Sri Lankan (Fari et al. 2011). Sri Lankan rice self-sufficiency rates were increased figure from 100.65% to 113.91% since 2005 to 2010 which show increment in self-sufficiency within five years (www.statistics.gov.lk). Paddy production in 2011 Yala season had been increased by around 12.4% and it was around 1.88 million metric tons which was a highest production ever recorded in any Yala season (www.cbsl.gov.lk). According to the statistic, the rice production is becoming a surplus, therefore, it is a must go for different foods based on rice.

Noodles are widely consumed throughout the world and their global consumption is second only to bread. The instant noodle market is growing fast in Asian countries and is gaining popularity in the western market. Wheat flour which is usually used for making instant noodles is poor in essential amino acid lysine (Jayasena et al. 2008).

Although the different kind of rice flour noodle available in Sri Lankan market, an instant cup noodle is not available. Therefore, this research project aims to fill this gap by developing an instant rice noodle that could be prepared within two minutes without boiling.
MATERIALS AND METHOD

Homogeneous bulk sample of long white type paddy (BG 358) was used for the experiment. The brown rice was obtained by de-husking paddy in a rubber roll sheller. Brown rice was polished by the combination of abrasive and friction polishers. The bran removal percentage was kept around 60% for the experiment. Polished rice was ground using abrasive stone horizontal mill and sieved with 120 μ vibro sifter. Salt and water were used to make the rice noodle dough. Laboratory scale noodle extruding machine (Omega J8004) was used for extrusion and laboratory scale deep fryer (Singer 2.5 L) was used for frying. Noodle extrusion was tested with three different dies in three pore sizes such as 1.0, 1.5 and 2.0 mm. Rice noodles were prepared in the laboratory using 500 g rice flour, 7.5 g table salt (1.5% flour base) and 425 ml potable water (85% flour base) according to preliminary studies.

First, mixture of rice flour (500 g) and salt (7.5 g) was prepared using a hand mixer. Dough was prepared gradually adding 425 ml of water to the flour mixture and kneaded well until water dispersed even in the dough. Two types of noodles in two diameters were prepared for testing using 1.5 and 2.0 mm dies since 1.0 mm die did not produce noodle in preferred quality. Noodles were steamed for 10, 20 and 30 min and kept in cold water at 20 °C for 5 min. Noodle strands were drained off and fried in a deep fryer for 45 seconds at 165 °C for all above treatments. Fried noodles were kept at 50 °C for 2 h in an oven for drying. The process diagram is shown in Figure 1.

Dried noodle were cooked adding boiling water and cooking time was determined placing the noodle strands between two glass plates until white core disappeared. Quality of the product under three different steaming conditions were evaluated for fat percentage, moisture content, colour, rehydration time and cooking loss. Sensory evaluation of cooked rice noodles were done by 30 untrained panelists.

RESULTS AND DISCUSSION

The results of quality evaluation of instant rice noodles are presented in Table 1. There were significant differences in color of uncooked noodles, fat percentage, and moisture percentage, rehydration time, cooking loss and overall acceptability of sensory evaluation after rehydration. According to the sensory evaluation, the acceptable level is highest in T₃. Compared to the 2.0 mm die size, the acceptability results in three treatments; 15, 20, 30 min steaming time are significantly different from the results obtained from 1.5 mm die. Therefore, among the three different dies i.e. 1.5 and 2mm, the best die size is 1.5 mm.

When consider the cooking loss, the lowest was recorded for 20 min steaming time (T₃). Similarly, best result for rehydration time is given for 20 min steaming time treatment among the 1.5 mm die (T₃). The moisture content is also in acceptable level in treatment ‘T₃’ and that is not significance from result in 1.5 mm die. Fat content and color value were not significant. According to literature, fat content for instant rice noodle is around
17%. The fat content of the studied samples were also in between 17.01 to 17.47%. Color value of uncooked noodles is a very important quality parameter for consumer attraction. Highest lightness value was recorded with 2.0 mm die and 15 min steaming time (T₁) which was not significant with the 1.5 mm die and 20 min steaming time in (T₃).

\[ \text{Rice Flour} + \text{Water} + \text{Salt} \]

\[ \rightarrow \text{Dough Preparation} \]

\[ \rightarrow \text{Extrusion} \]

\[ \rightarrow \text{Steaming} \]

\[ \rightarrow \text{Deep frying} \]

\[ \rightarrow \text{Cooling} \]

\[ \rightarrow \text{Drying} \]

Fig. 1. The process of developed instant noodles
Table 1. Quality evaluation of three different steaming times of noodles strands produced by 2.0 mm and 1.5 mm noodle dies

<table>
<thead>
<tr>
<th>Die Size (mm)</th>
<th>Steaming time (min)</th>
<th>Color (L*)</th>
<th>Fat (%)</th>
<th>MC (%)</th>
<th>RHT (min)</th>
<th>Cooking loss (%)</th>
<th>Overall acceptability</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.0</td>
<td>15 (T₁)</td>
<td>67.44a</td>
<td>22.88a</td>
<td>8.83a</td>
<td>7.00a</td>
<td>15.40a</td>
<td>2.76a</td>
</tr>
<tr>
<td></td>
<td>20 (T₂)</td>
<td>66.01b</td>
<td>22.17a</td>
<td>8.58b</td>
<td>6.00b</td>
<td>8.97de</td>
<td>3.66d</td>
</tr>
<tr>
<td></td>
<td>30 (T₃)</td>
<td>65.79b</td>
<td>21.77a</td>
<td>8.71ab</td>
<td>6.00b</td>
<td>9.79ed</td>
<td>3.90c</td>
</tr>
<tr>
<td>1.5</td>
<td>15 (T₄)</td>
<td>65.08b</td>
<td>17.47b</td>
<td>8.16b</td>
<td>4.00b</td>
<td>10.95b</td>
<td>4.66ab</td>
</tr>
<tr>
<td></td>
<td>20 (T₅)</td>
<td>65.39b</td>
<td>17.09b</td>
<td>7.76c</td>
<td>3.00d</td>
<td>10.18bc</td>
<td>4.83b</td>
</tr>
<tr>
<td></td>
<td>30 (T₆)</td>
<td>64.05b</td>
<td>17.01b</td>
<td>7.88bc</td>
<td>3.00d</td>
<td>8.39c</td>
<td>4.63b</td>
</tr>
</tbody>
</table>

MC: moisture content, RHT: rehydration time; means within the same column bearing different superscripts are significantly (p<0.05) different. T₁, T₂, T₃ - three different steaming times of 2.0 mm die and T₄, T₅, T₆ - three different steaming time of 1.5 mm die.

CONCLUSION

This study reveals that using a Sri Lankan paddy variety as the raw material, an instant cup noodle could be performed in acceptable level. It may guide to introduce a new product development in commercial scale and solution for the rice surplus in Sri Lanka.

REFERENCES


