A rapid method for amylose measurement

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Background

Amylose content
- Long-grain cultivars: 19-23%
- Medium-grain cultivars: 11-19%

Background

Iodine-amylose complex: deep blue color

Objectives

- To develop a rapid colorimetric method to predict AC of head rice based on instrumental color measurement of the amylose-iodine 65 complex
- To investigate the effect of milling duration, staining duration and pH on color development

Wet chemistry method

Amylose content of samples determined by a wet chemistry method (Juliano 1971)
Standard curve for amylose content using rice flours

Cultivars, harvest seasons and % AC of rice used in the study

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Harvest season</th>
<th>Amylose Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waxy</td>
<td>2009</td>
<td>0.1</td>
</tr>
<tr>
<td>Junior</td>
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</tr>
<tr>
<td>STG2378</td>
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<td>11.8</td>
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<tr>
<td>STG2379</td>
<td>2009</td>
<td>11.2</td>
</tr>
<tr>
<td>Neptune</td>
<td>2009</td>
<td>13.7</td>
</tr>
<tr>
<td>Nepalese</td>
<td>2009</td>
<td>13.1</td>
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<tr>
<td>NC250</td>
<td>2009</td>
<td>13.1</td>
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<tr>
<td>IRG4</td>
<td>2009</td>
<td>14.2</td>
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<tr>
<td>Margot</td>
<td>2009</td>
<td>15.3</td>
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<tr>
<td>Bangal</td>
<td>2009</td>
<td>15.7</td>
</tr>
</tbody>
</table>

Medium-grain

Long-grain

Optimum staining duration for developing the Iodine-amylose complex.
Cultivar: Wells

Effect of milling duration on color development.
Staining duration: 5 mins
Cultivar: Wells

Effect of iodine solution pH on color development.
Staining duration: 5 mins
Cultivar: Wells

Procedure
Weigh 9 g of milled head rice, rinse once with DI water, drain.

In a beaker, add 27 mL of DI water + 3 mL of iodine solution + 9 g of milled rice sample.

Stir, let stand for staining duration of 10 mins.

Immediately drain iodine solution into another beaker using a strainer. (within 5–7 s)

Transfer rice into another beaker, remove any remaining drops of liquid in the sample using a dropper.

Take a color reading using the Hunter Lab colorimeter.

Results

Color intensity of iodine-stained head rice samples having the indicated amylose content percentages

AC: 0.1%  AC: 12.6%  AC: 18.2%  AC: 23.3%

Results

Conclusion

- No difference in color values for different staining and milling durations.

- AC of an individual sample can be predicted from L* and b* values of stained head rice kernels

- Potential method for rapid measurement of amylose.
Future work
- More short-grain, low AC-level cultivars need to be tested.
- Improve stain adherence by adjusting pH

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Thank you!