

SOP No: SOP-PHYS-006	SOP Description: Rice Flour Pasting Properties
Effective Date: 09/06/11	Version: 2
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Approval:	Approved Date:

SOP-PHYS-006: Determination of Rice Flour Pasting Properties

Scope:

This procedure describes the equipment and standard method used to evaluate the pasting properties of rice flour, including pasting temperature, peak viscosity, final viscosity, and other associated attributes characteristic of a viscosity profile, or pasting curve. These measures are indicators of rice cooking and processing properties.

Principle:

The Rapid Visco Analyser (RVA) is a microprocessor-controlled instrument designed to apply variable temperatures and shear rates to a hydrated starch or flour sample while measuring the sample's change in viscosity. A predefined series of temperatures and shear rates applied over a specified duration is known as a test profile. The profile defined below is approved as a standard method of the AACC (no. 61-02) for rice flour.

Equipment:

Rapid Visco Analyser-Super 4, Newport Scientific Pty. Ltd., Warriewood, NSW, Australia
Analytical Scale

Materials:

Aluminum canisters
Paddles
Deionized (DI) water

Procedure A – Running a test sample:

1. Grind a representative sample of head rice, using a 0.5 mm screen, according to SOP-MILL-007.
2. Perform moisture content analysis on the ground rice sample, according to SOP-PHYS-002 (Proc. B).
3. Switch on the RVA and allow 30 min. for warm-up. Switch on the associated computer and open the RVA control software, *Thermocline for Windows*.
4. Insert a paddle into the RVA tower. Rotate the paddle until it clicks into place and is secure.
5. Select "Run" → "Zero". Click "Start" to initiate the paddle. Allow the value in the box to stabilize and approach 0. Click "zero" and "stop", then close the window.
6. Perform a quality control test using a test starch packet, as described in Procedure B, below.
7. Select "Select Configuration to Run" under the "Run" menu.
8. Load the "Rice Rapid" test profile through the *Thermocline* software.
9. Enter a file name and file path under which to save the data. Click "Run", then "Yes" when prompted to save changes.
10. A sample weight calculator should appear. Make sure the "3.0 g" is selected as the sample size, "25.0 g" as the water weight, and "12%" as the moisture basis.
11. Enter the moisture content of the flour sample to calculate the exact weights of water and flour needed. This calculation is used to adjust all samples to a 12% moisture basis.

12. Place an aluminum canister on the balance and tare the scale.
13. Weigh the specified amount of DI water into the canister.
14. Place a weigh boat or weigh paper on the balance and tare the scale. (Discard weigh paper after the second use.)
15. Weigh the specified amount of flour into the vessel.
16. Add the flour to the water and vigorously jog the blade of the paddle through the sample up and down 10 times. Repeat as necessary until the flour is suspended and no lumps remain.
17. Insert the canister and paddle into the instrument. Rotate the paddle until it clicks into place and is secure.
18. When prompted by the program, depress the tower to initiate the pasting cycle.
19. Upon completion of the cycle, remove the canister. You may need an insulated glove, as the canister will be hot to the touch.
20. Wash the paddle and the canister with warm water and a brush. Dry thoroughly. The paddle may be used repeatedly; the aluminum canister may be used three times before discarding.
21. On the "View" menu, select "View Analysis Results". Copy the values (Peak, Trough, Breakdown, Final Visc, Setback, Peak Time, Pasting Temp) and paste into an Excel spreadsheet.
22. To begin another sample, go to the "Run" menu and select "Run last test".
23. NOTE: The Setback value reported through the *Thermocline* software represents the difference between final viscosity and holding strength. However, the rice industry generally considers Setback to represent the difference between Final Viscosity and Peak Viscosity. Both of these values are provided in the pasting profile, and can be used to calculate Setback for rice.

Procedure B - Running a control sample using a standardized test starch packet:

1. Switch on the RVA and allow 30 min. for warm-up. Switch on the associated computer and open the RVA control software, *Thermocline for Windows*.
2. Zero the instrument, as described in steps 4-5 of Procedure A.
3. Select "Select Configuration to Run" under the "Run" menu.
4. Load the "Standard 1" test profile through the *Thermocline* software.
5. Place an aluminum canister on the balance and tare the scale.
6. Weigh 25.00 ± 0.01 g of DI water into the canister.
7. Place a weigh boat or weigh paper on the balance and tare the scale.
8. Weigh 3.5 ± 0.01 g of starch into the vessel.
9. Add the starch to the water and vigorously jog the blade of the paddle through the sample up and down 10 times. Repeat as necessary until the starch is suspended and no lumps remain.
10. Insert the canister and paddle into the instrument. Rotate the paddle until it clicks into place and is secure.
11. Upon completion of the cycle, the Peak Viscosity and Breakdown values should fall within the ranges specified on the starch packet.
 - a. If the values are not within range, repeat the procedure using another starch packet.
 - b. If the 2nd set of values is not within range, notify a supervisor.
12. Clean canister and paddle as described in step 20 of Procedure A.
13. To proceed with test samples, begin at step 7 of Procedure A.

Reference:

AACC International. Approved Methods of Analysis, 11th Ed. Method 61-02.01. Determination of the Pasting Properties of Rice with the Rapid Visco Analyzer.