

Starch staining procedure

How might we tell if starch is fully developed from cooking?

Background

Looking at starch under a microscope can indicate the quality of starch to see if it is fully developed from cooking. The amylose and amylopectin in starch complexes will react with iodine to provide color and show the starch shape. In this activity, barbecue sauce will be diluted and examined to determine the quality of the starch.

Materials

Light microscope
Microscope slides
Microscope cover slips
Disposable pipettes
Weigh boats
Scale
Distilled water
Iodine solution (Grams iodine or Lugol's iodine)

Procedure







Dilution: Standard dilution is 5% product : 95% water equivalent to 1 part sample : 19 parts water

1. Take a 1-gram sample of product containing cooked starch. Place into weigh boat.
2. Add 19 grams of water into the weigh boat.
3. Mix sample and water together in the weigh boat.
4. The diluted sample is now prepared for the microscope.

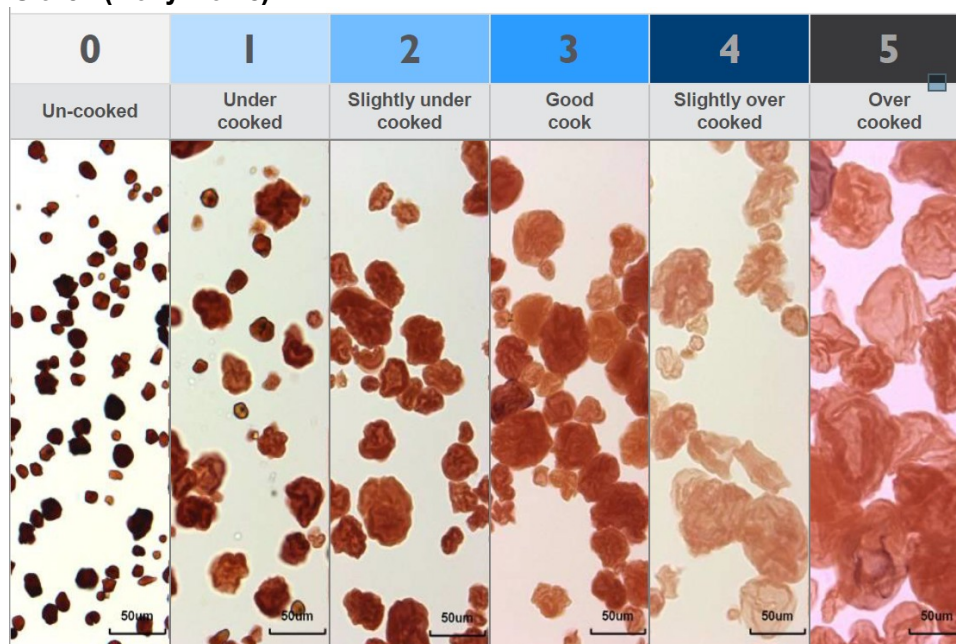
Preparing the viewing slide

1. With a pipette, draw up the mixed sample.
2. Place 1 drop onto the microscope viewing slide
3. With a separate pipette, draw up iodine
4. Add 1 drop of iodine into the sample on the slide.
5. Place a cover slide to flatten the sample.
6. Starch can now be viewed under the microscope.

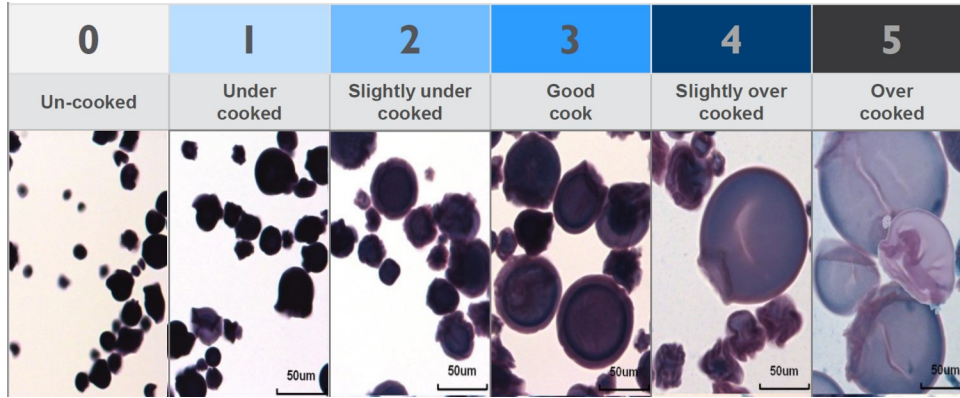
Below are the descriptions of starch quality from Ingredion with example photos for different types of starch:

0	1	2	3	4	5
Un-cooked	Under cooked	Slightly under cooked	Good cook	Slightly over cooked	Over cooked
					
<ul style="list-style-type: none"> • All birefringent granules • Raw • Small dark granules when stained with iodine 	<ul style="list-style-type: none"> • Small swollen granules • Stains darker with Iodine • Raisin shape • May contain birefringent granules 	<ul style="list-style-type: none"> • A mixture of small and fully swollen granules • Slightly wrinkled • No birefringent granules 	<ul style="list-style-type: none"> • Fully swollen granules • Slightly wrinkled • No birefringent granules 	<ul style="list-style-type: none"> • A mixture of fully swollen and extremely large swollen granules • Very few ruptured granules and fragments 	<ul style="list-style-type: none"> • Extremely large fully swollen granules • Ruptured granules • High frequency of fragments

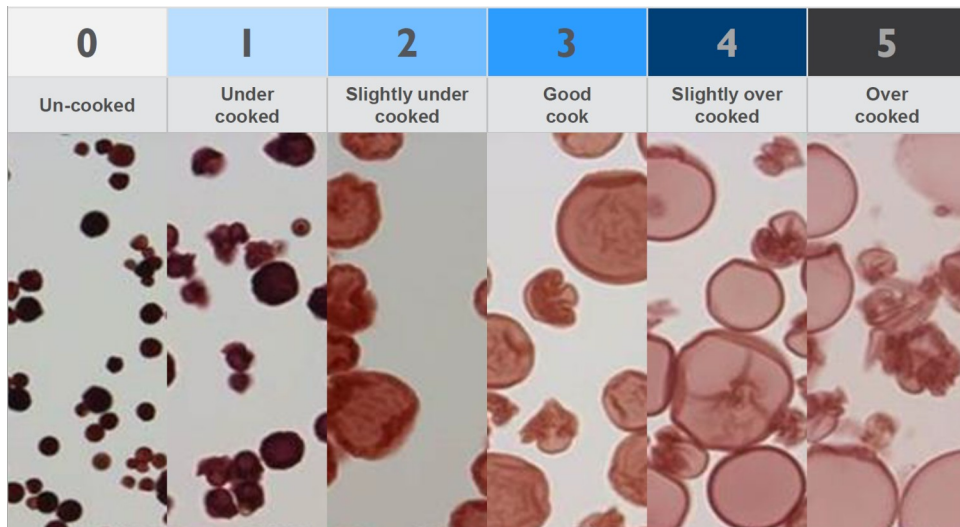
Modified Corn Starch (Waxy Maize):



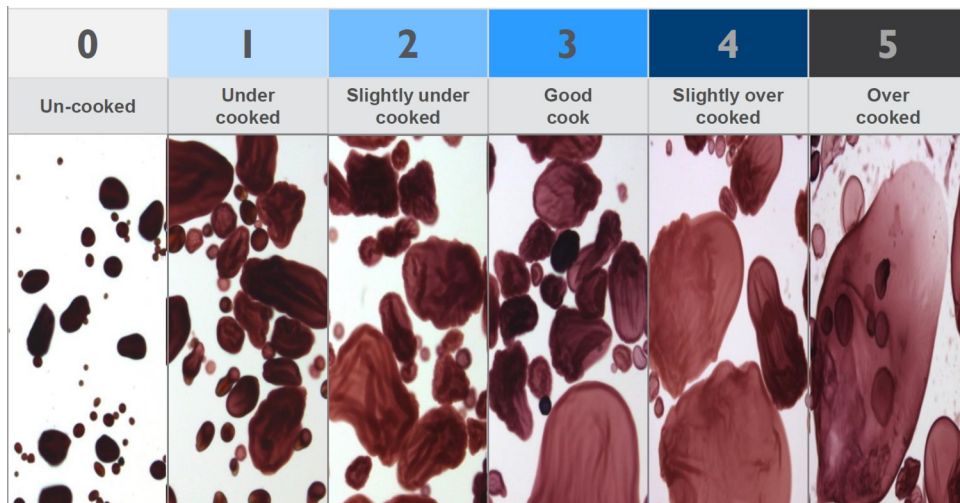
Regular Tapioca:



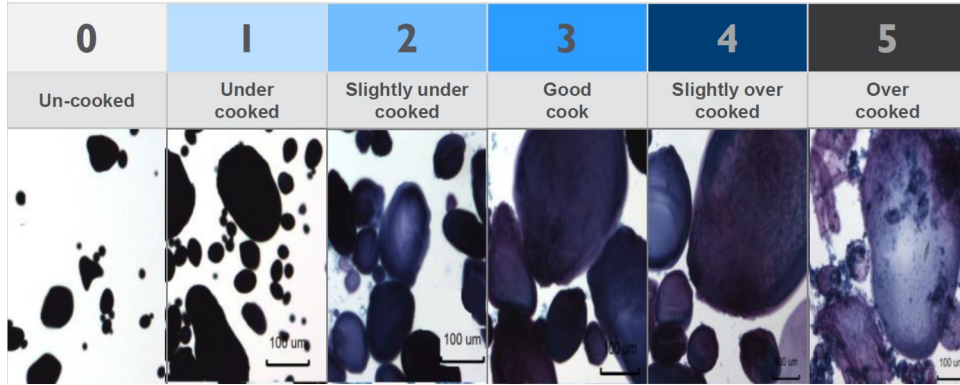
Waxy Tapioca:



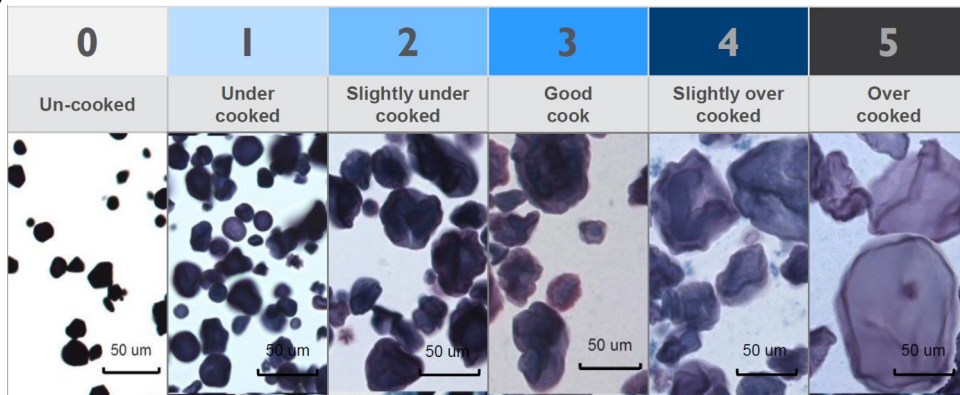
Waxy Potato:



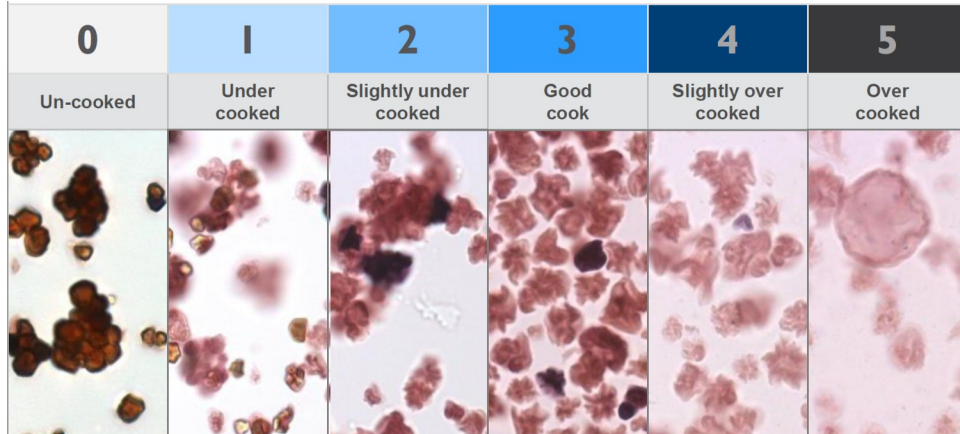
Regular Potato:



Regular (Dent) Corn:



Waxy Rice:



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