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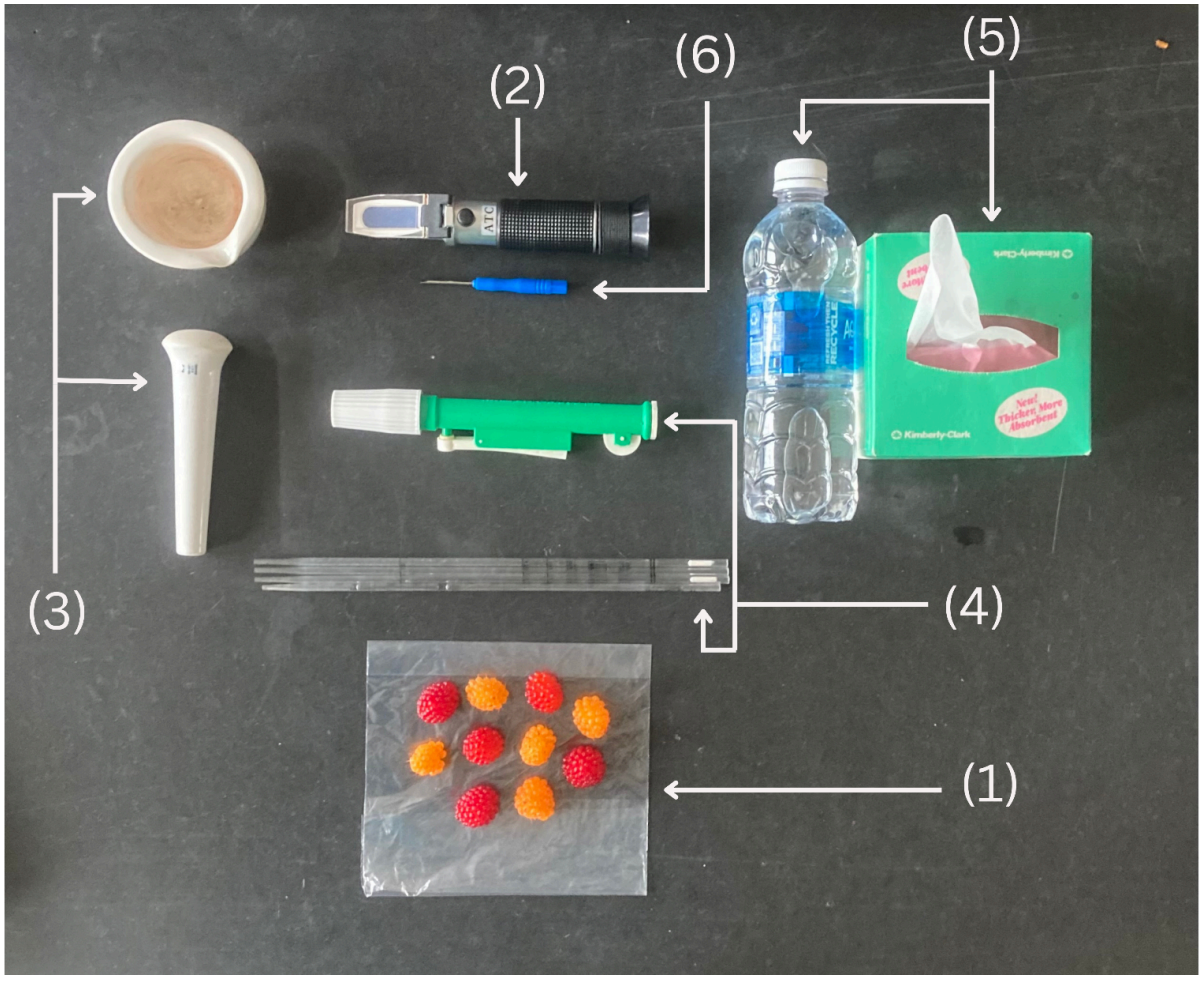
Salmonberry Sugar Content Testing

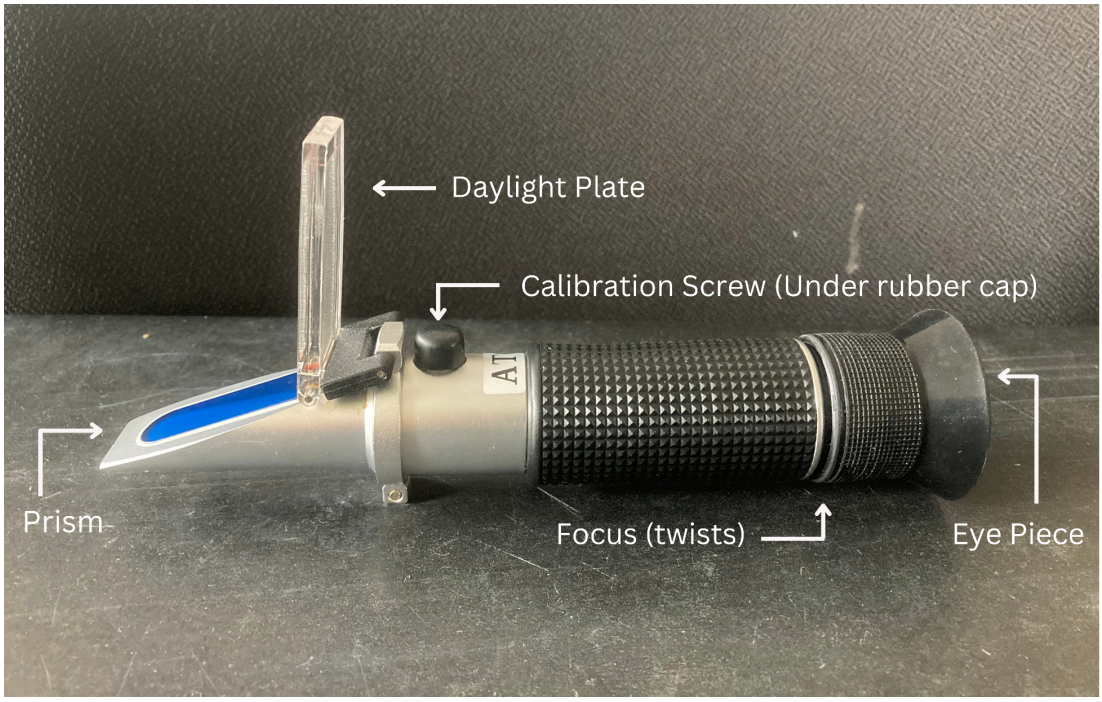
Methods developed by: Gale McCrary, SHI Research Intern 2024

Supplies Needed:

1) Salmonberry Sample
2) Brix Refractometer
3) Mortar and Pestle
4) Pipette Pump and Micropipettes
5) Distilled water and Kimwipes
6) Screwdriver (Use one that matches Refractometer's calibration screw)



Parts of a Refractometer (for reference)

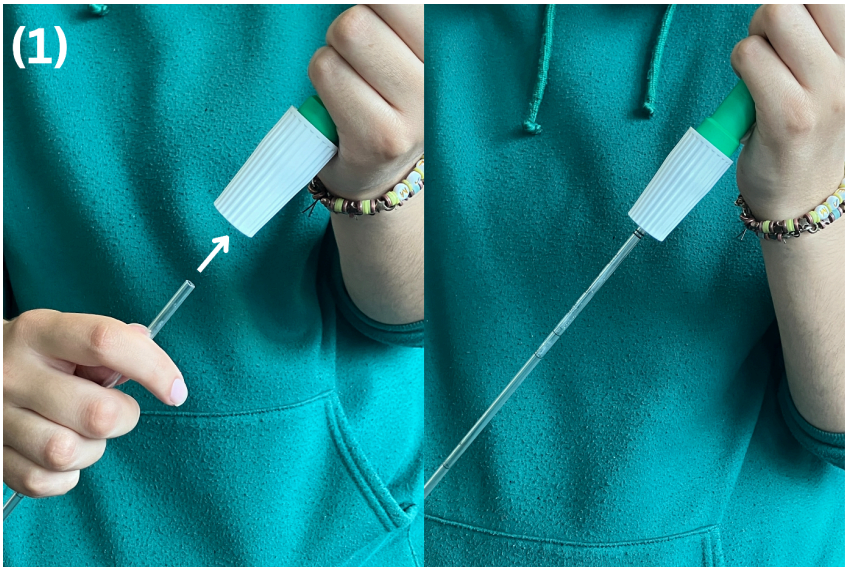


How to use Pipette Pump

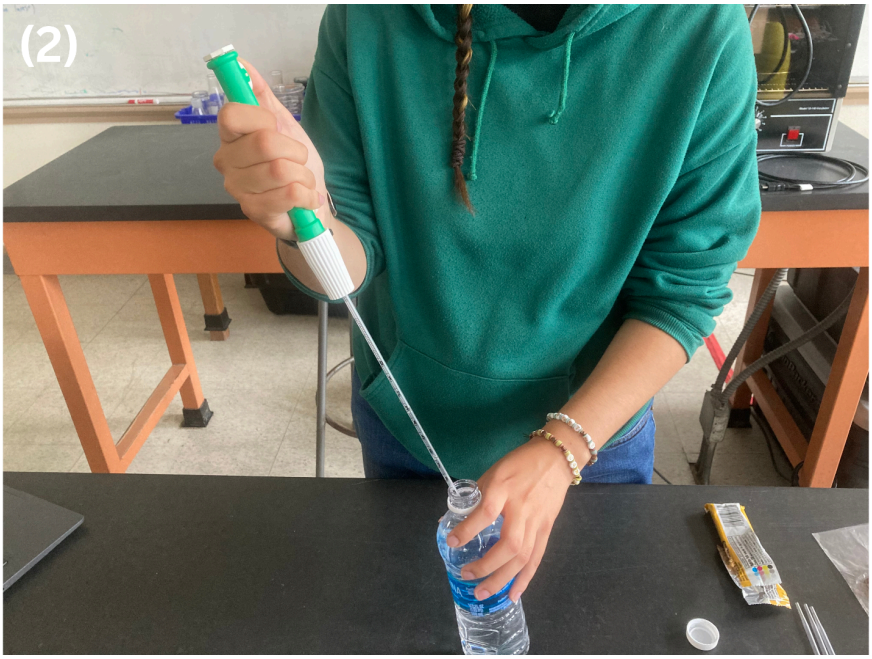
Calibrate Refractometer

Refractometer **must** be calibrated prior to testing of berries. Failure to do so can result in incorrect readings.

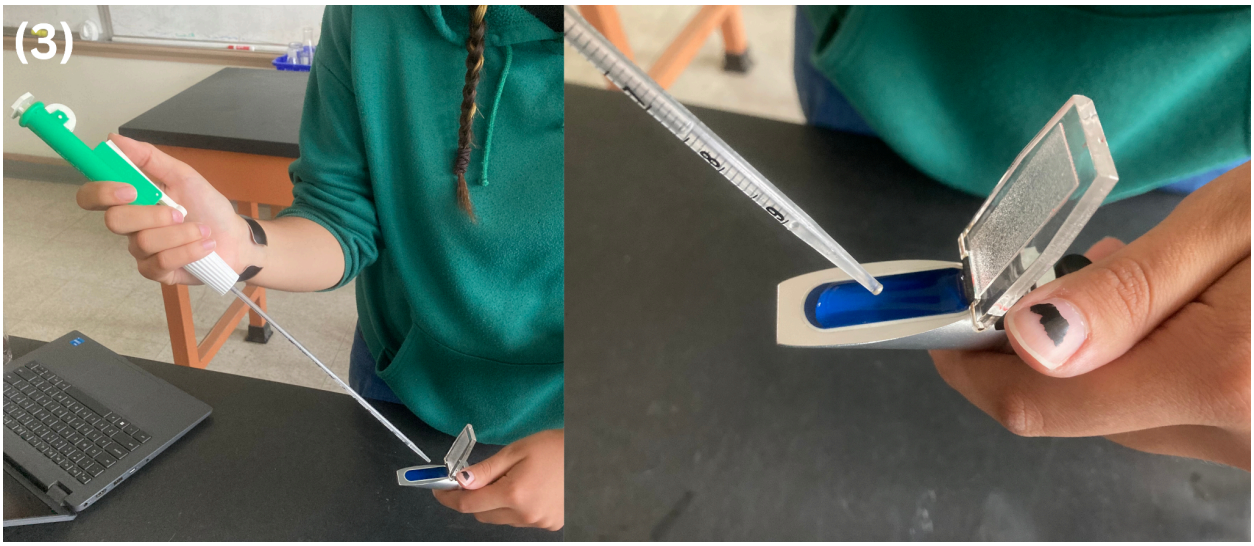
Assemble Pipette pump and Micropipette (1)



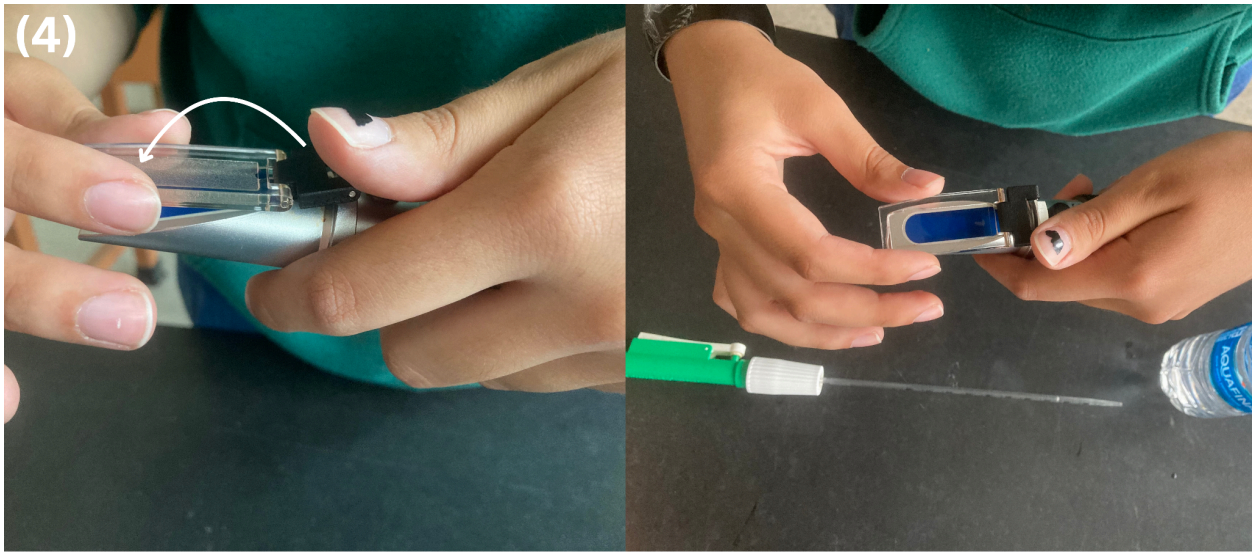
Draw up water in micropipette (2)



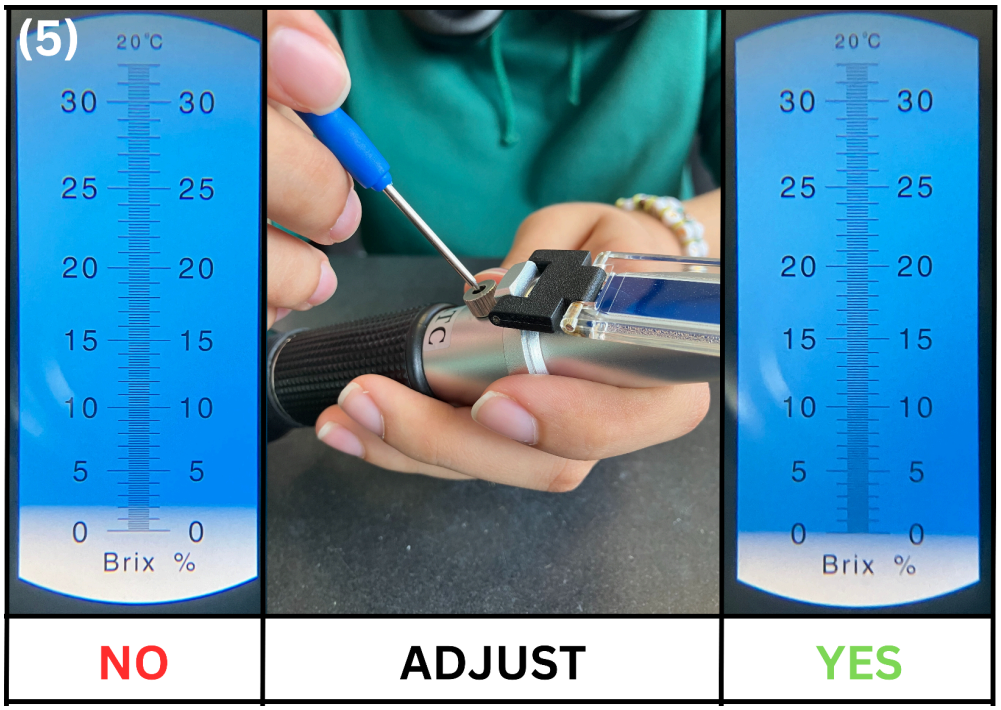
Transfer 3 to 4 drops of distilled water from pipette onto prism of Refractometer. (3)



Lay Daylight Plate onto the Prism, making sure plate is completely flat against prism. (4)

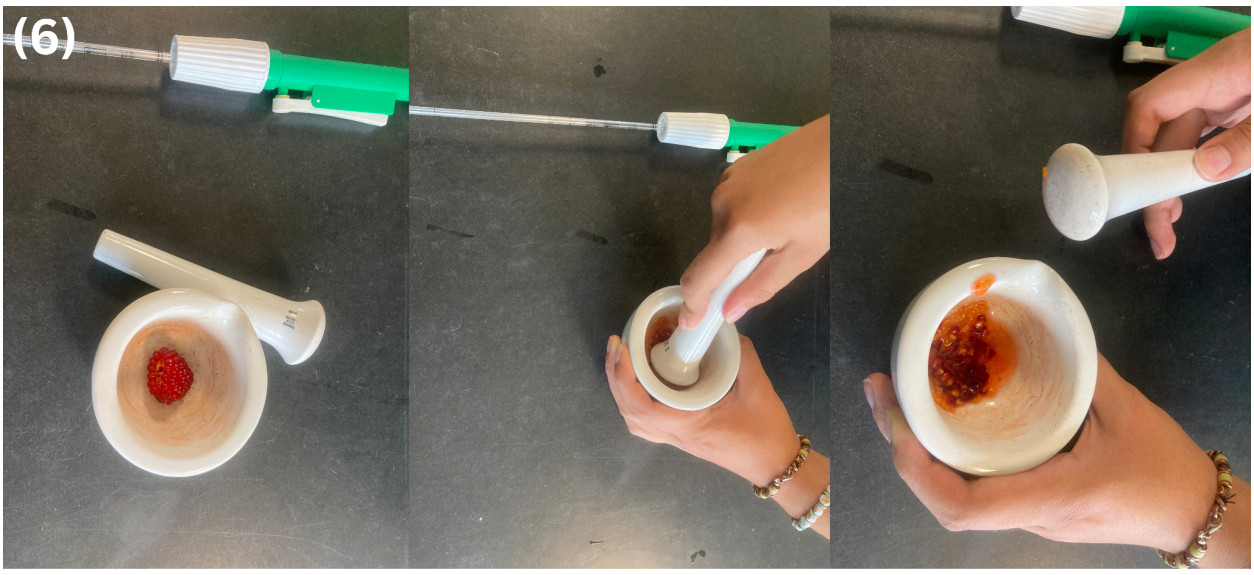


Look into the Refractometer and look for a white bar. Top of the bar should align with the zero within the refractometer. If bar doesn't align then remove cap from screw and adjust screw with screwdriver until it aligns with zero (5)



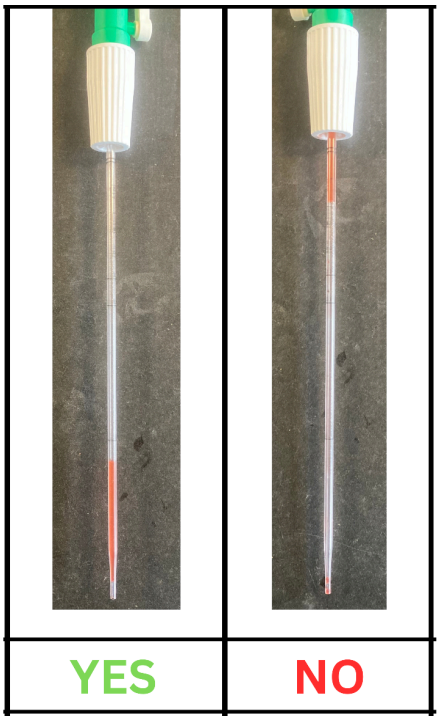
Sample Preparation

Place one berry into a clean and dry mortar. Crush with a clean and dry pestle until juice pools in the bottom of the mortar. (6)



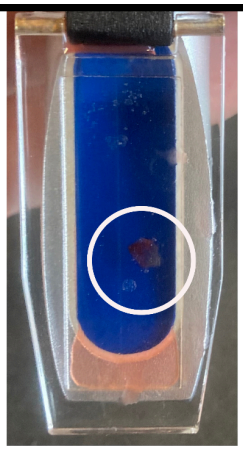
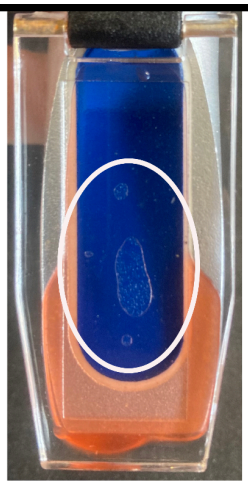
Draw juice up into pipette, take care to avoid sucking up pulp or seeds (7)

Avoid drawing the juice up past the top of the pipette and into the pump. Draw up as much juice as possible without overflowing into the top of the Pipette Pump. Do not add water to berry juice. Doing so dilutes sample and will result in incorrect readings.

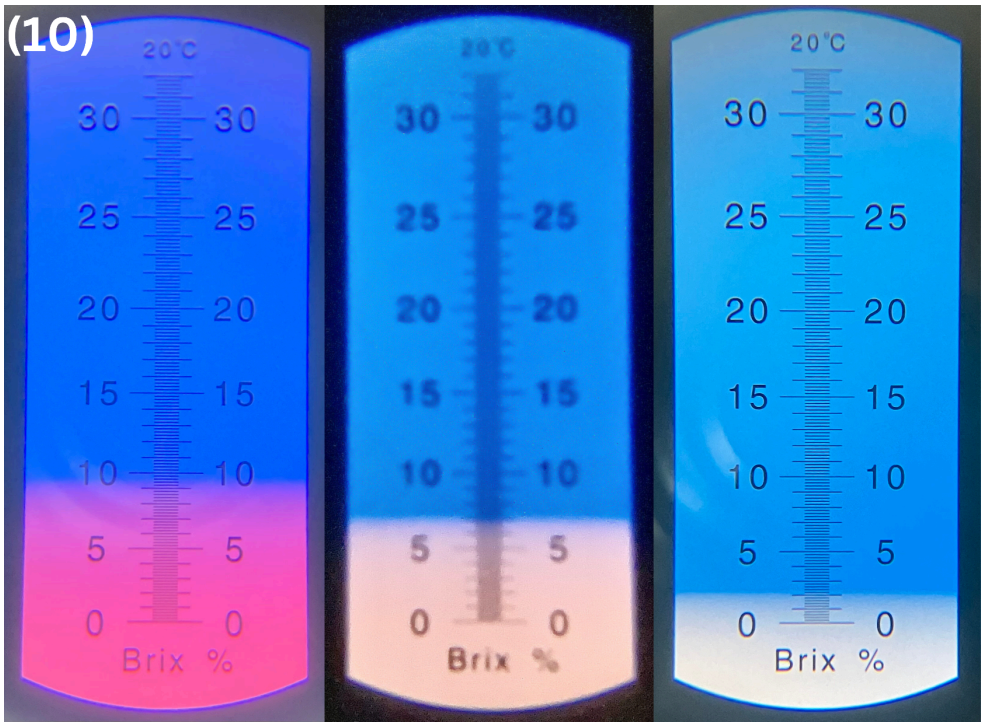


Ensure the Refractometer Prism and Daylight plate is clean and dry. Drop 3 to 4 drops of berry juice onto the prism of the Refractometer. (8)

Lay Daylight Plate onto Refractometer Prism. Take care to avoid bubbles or debris (pulp, seeds, dirt, etc.) under plate which can affect accuracy of reading. (9)

		
NO Bubble and pulp caught under plate. Remove berry pulp or seed and pop bubble. Relower plate	**NO** Air bubbles caught beneath plate. Pop bubble(s) and relower plate	**YES** Good seal, no air bubbles or berry pulp

Bring Refractometer up to the eye and identify where the top of the line matches up with markers within the refractometer. (10) Color of bar can vary, see image below:



1 Brix = 1% Sugar. Record sugar percentage of berry in data sheet (Attached to this paper)

Cleaning Refractometer

Partially wet Kimwipe until it is damp but not dripping water (11). **Do not pour water over Refractometer or submerge it in water**. Gently clean Prism and Dayplate, wiping away berry juice towards the end of the refractometer (12). With a new Kimwipe carefully dry Refractometer until no moisture remains on Prism or on Dayplate (13).

Second Reading

Repeat steps 8 through 10, recording the number of Brix in the data sheet. Then repeat steps 11 through 17.

Cleaning Instruments

Scrape berry pulp and seeds out of Mortar using the Pestle (14).

Pour water into Mortar and swirl it around to remove any berry juice, pulp, or seeds that are stuck to the sides of the mortar (15).

Dump out water and use Kimwipe to wipe away any remaining berry pulp, juice, or seeds. Do this with the Pestle as well (16).

Repeat steps 15 and 16. (17).

Testing Continued

Repeat steps 6 through 17 twice for each Salmonberry tested

Data Sheet (Example)

- Site is location that berries are collected from
- Sample number is each individual berry that is tested
- Replicate I.D A is for first sugar content reading; B is for second reading
- Sugar content is the number of Brix

Date	Site	Sample number	Replicate I.D	Sugar Content	Color	Notes
7/9/2024	Lance Drive	1	A	10	Orange	Berry had black dots
7/9/2024	Lance Drive	1	B	9	Orange	

7/9/2024	Lance Drive	2	A	9	Orange	
7/9/2024	Lance Drive	2	B	9	Orange	
7/9/2024	Lance Drive	3	A	10	Orange	Juice was pale
7/9/2024	Lance Drive	3	B	10	Orange	
7/9/2024	Lance Drive	4	A	11	Orange	
7/9/2024	Lance Drive	4	B	12	Orange	
7/9/2024	Lance Drive	5	A	9	Orange	
7/9/2024	Lance Drive	5	B	9	Orange	
7/9/2024	Lance Drive	6	A	10	Orange	Trouble getting enough juice for sample

7/9/2024	Lance Drive	6	B	9	Orange	
7/9/2024	Lance Drive	7	A	10	Orange	
7/9/2024	Lance Drive	7	B	10	Orange	
7/9/2024	Lance Drive	8	A	10	Orange	
7/9/2024	Lance Drive	8	B	10	Orange	
7/9/2024	Lance Drive	9	A	10	Orange	
7/9/2024	Lance Drive	9	B	9	Orange	
7/9/2024	Lance Drive	10	A	9	Orange	
7/9/2024	Lance Drive	10	B	9	Orange	

Data Sheet

Date	Site	Sample number	Replicate I.D	Sugar Content	Color	Notes

Research Extensions

Freezer Berry Project

1) Decide timespan of study and frequency of testing
2) Pick ½ quart of ripe salmonberries.
    a) Salmonberries are considered ripe when they are the texture of a raspberry and can be removed from the bush with little force
3) Wrap berries in cheesecloth and squeeze juice into container
4) Use salmonberry sugar content methods (see above) to do two readings of juice. Record results
5) Transfer juice from container to ice cube trays and freeze till solid
6) Remove juice ice cube from tray and let thaw for two hours so it reaches room temperature
7) Use salmonberry sugar content methods (see above) Do two readings of juice. Record results

Sugar Content and Elevation Project

1) Select four study sites, each at a different elevation. To qualify as study site, ripe salmonberries must be present
2) Select point and collect ten Salmonberries within a quarter mile radius of that point. Collect berries from several randomly selected bushes
    a) Salmonberries are considered ripe when they are the texture of a raspberry and can be removed from the bush with little force
3) Use Salmonberry Sugar Content Methods (see above) to test each berry. Record results