



Sample Protocol for Calculating Drip Loss in IQF Blueberries

Purpose: Provide a method that outlines quality measurements that can be used in the production of IQF frozen produce (specifically blueberries).

What is drip loss? Drip loss is measurement of the loss of fluid in in the thawing of food, in this case produce, as a result of the disruption of cellular tissue during freezing. A large drip loss is an indicator of poor quality as the water loss can result in change in texture, loss in nutrients and/or flavor.

Method: The method outlined below was adapted from Alfaro et al. and Cao et al. with slight modifications. This analysis was chosen as it could be adopted by the facility processing the blueberries without the need of purchasing extra materials.

Supplies:

- Frozen produce
- Absorbent papers
- Analytical scale
- Weight boats
- Permanent marker

Procedure:

1. Label the weigh boats accordingly depending on what the trial was testing.
2. Place a piece of paper towel in each weight boat.
3. Record the weight using an analytical scale.
4. Place ten frozen blueberries into each boat to be thawed for 1 hour and 30 minutes.
5. After the 1 hour and 30 minutes passed, roll the berries in the boat and paper towel through shaking the weight boat for 5 seconds. This is done to remove excess liquid off of the berry.

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6. Weigh again the blueberries and boat with the paper, then remove the blueberries and record the weight of boat and paper towel weight.
7. Calculate the percent drip loss using the formula.

Mathematical calculation: Drip loss is calculated by subtracting the total amount of water that drips from produce during the thawing process. The calculation is:

Calculation for % drip-loss:

$$\text{Drip loss (\%)} = 100 \times \frac{(\text{initial weight of blueberry} - \text{weight of thawed berry})}{\text{initial weight of blueberry}}$$



Figure 1. A sample of a drip loss assay of blueberries in a weight boat. The moisture has been transferred to the paper towel.

Example: Below is an example of the calculated drip loss reported after three sampling pulls at the XYZ Production facility. Sampling accounts for the average using the three reported values. The calculation is reported below the data set.

| | Frozen | | Thawed | | Drip Loss |
|-----------|---------------------------|--------------------------------------|---------------------------|--------------------------------------|-----------|
| | Boat and Paper Weight (g) | Blueberry, Boat and Paper Weight (g) | Boat and Paper Weight (g) | Blueberry, Boat and Paper Weight (g) | |
| m1 | 3.27 | 17.47 | 17.26 | 3.28 | 1.55% |
| m2 | 3.25 | 17.33 | 17.08 | 3.34 | 2.41% |
| m3 | 3.30 | 14.61 | 14.35 | 3.28 | 2.12% |

Sample of drip loss calculation:

$$\text{Drip Loss (\%)} = \frac{(\text{initial weight of blueberry}) - (\text{weight of thawed blueberry})}{(\text{initial weight of blueberry})} \times 100 = \frac{(17.47 - 3.27) - (17.26 - 3.28)}{(17.47 - 3.27)} \times 100 = 1.55\%$$

Sample log of drip loss:

| | Name | | | | |
|-----------|------------------------------|--------------------------------------|---------------------------|--------------------------------------|-------------|
| | Production date | | | | |
| | Production Location | | | | |
| | Production Parameters | | | | |
| | Date of analysis | | | | |
| | Frozen | | Thawed | | Drip Loss % |
| | Boat and Paper Weight (g) | Blueberry, Boat and Paper Weight (g) | Boat and Paper Weight (g) | Blueberry, Boat and Paper Weight (g) | |
| m1 | | | | | |
| m2 | | | | | |
| m3 | | | | | |

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References

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