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Assessing the Impact of Storage Time and Shape of the Block on the Slicability of Commercial Cheddar Cheese

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Abstract ID # 1072

Take Home Points

1. Optimum thickness to obtain high quality slices was 2 mm.

2. The extent of proteolysis reduced the overall sliceability of the Cheddar cheese samples.

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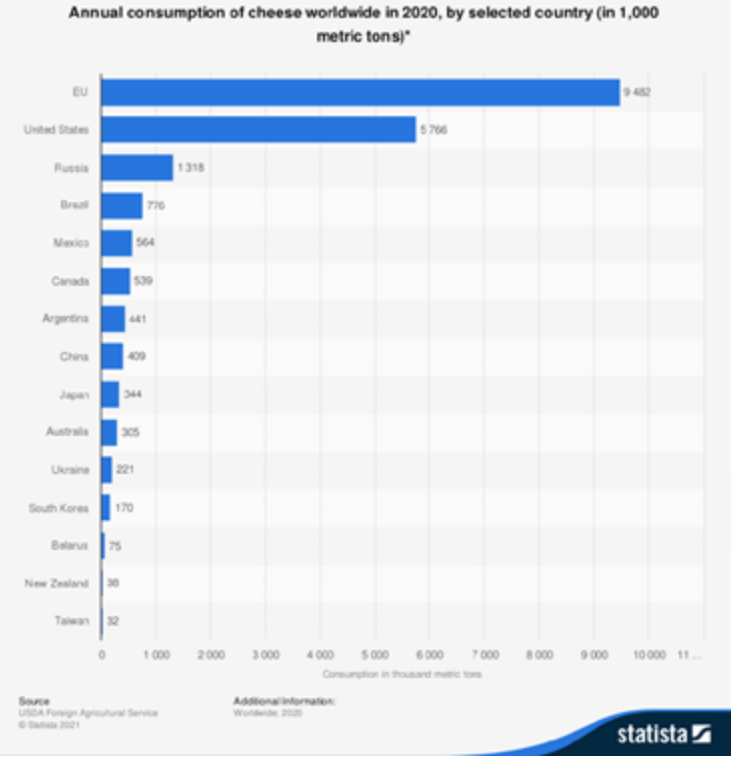
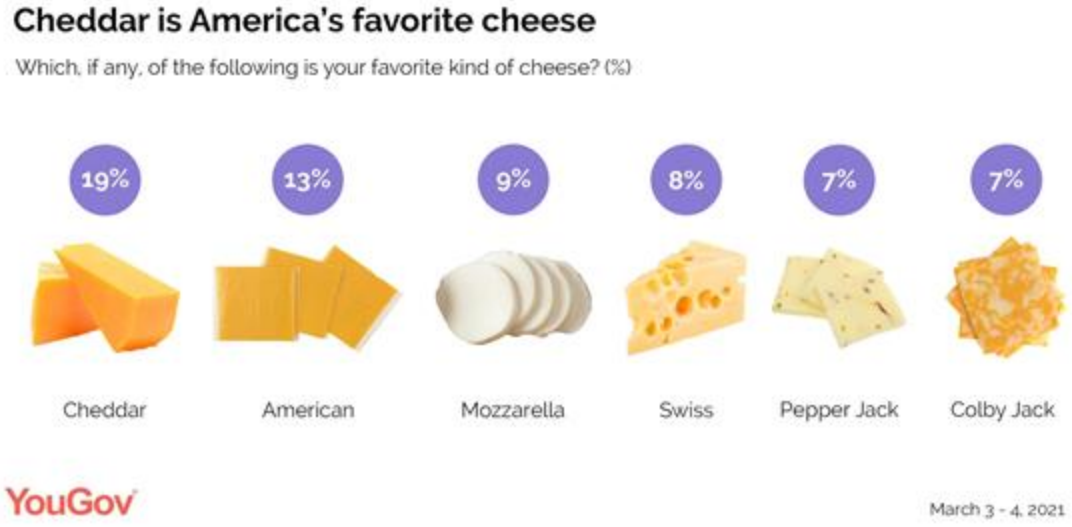
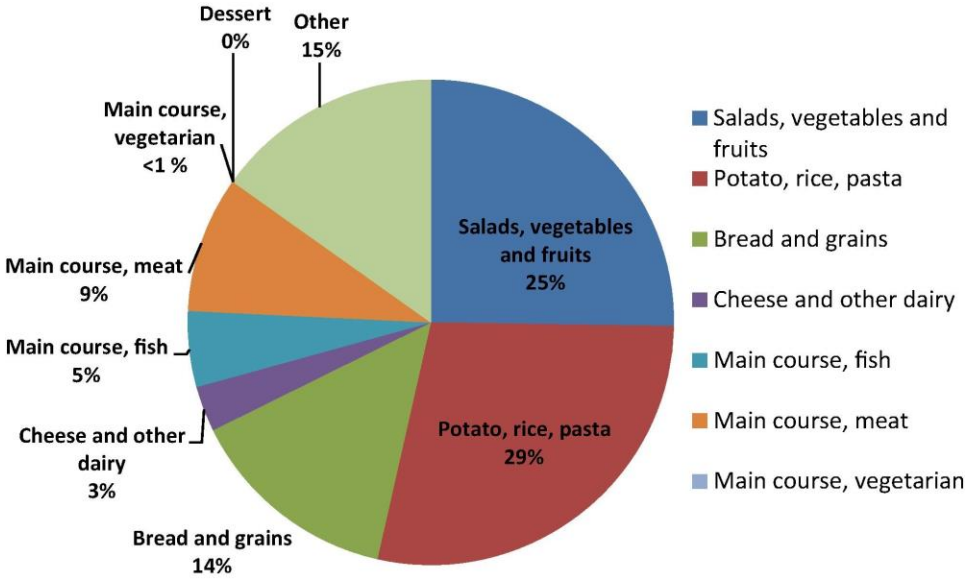
Why This Matters



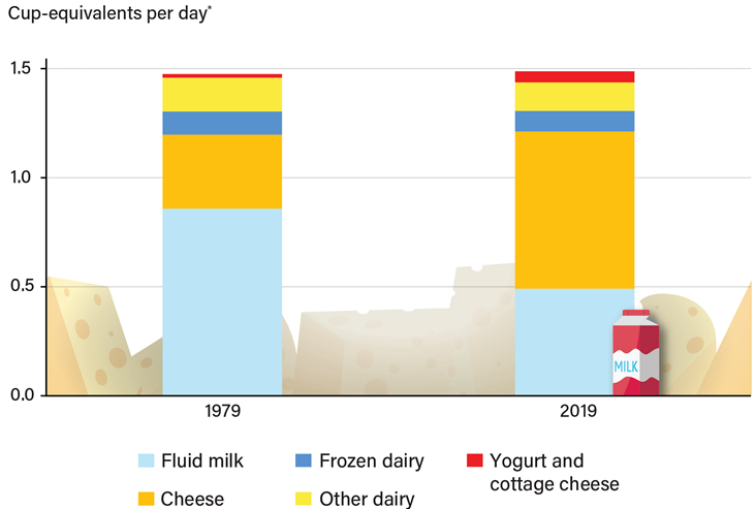


Source: https://today.yougov.com/topics/food/articles-reports/2021/03/05/americas-favorite-cheese

Sustainability



Source: Contribution of the customer plate leftovers in restaurants and diners (Silvennoinen et. al. 2015).



Source: https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=103984

Objectives

To assess the impact of the type of Cheddar cheese on sliceability

To understand the effects of storage time on sliceability.

To examine the effect of slice thickness on sliceability

To analyze the effects of shape on sliceability

Sample preparation, storage and characterization

Slicing

Square:

7 cm x 7 cm

Triangular:

7 cm x 7 cm x 9.9 cm

Vacuum Sealing

Storage at 5 ℃ for 5 weeks.

Samples were extracted for slicing at the end of 0, 7, 14, 21, 28 and 35 days.

Characterization

1. Visual assessment
2. Wear testing using a tribological attachment at 5 ℃ (T-PID/44) in an MCR 302 rheometer

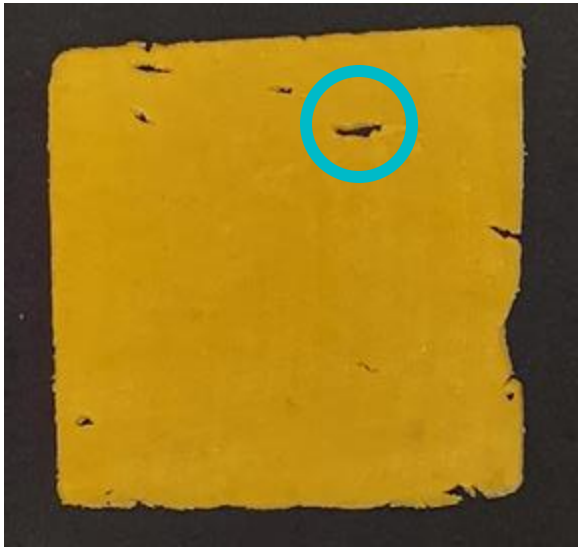
The grading process for assessing the sliceability

- **Grading Scale: 1 - 5**
- **Quality factors**
  - Broken Corners
  - Cracks
  - Pinholes

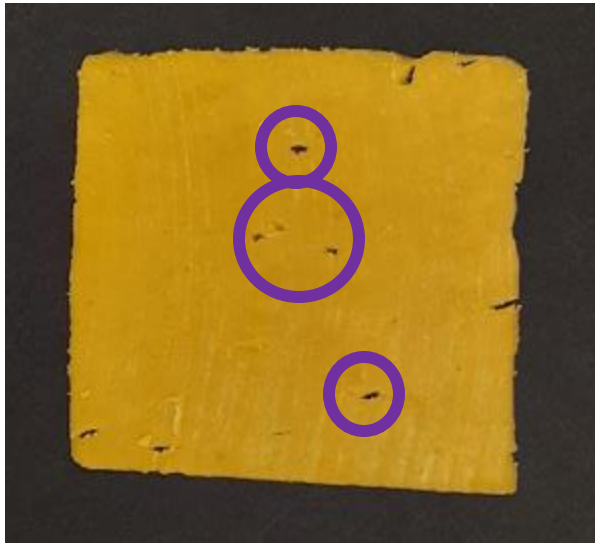
Grades	Description (adopted from *Perrie, J. (2012)*.)
1	Slice does not have any cracks or breaks within interior of slice. Slice contains all corners on the edges of slice, none are broken off. 0-5 pinholes
2	Slice contains one crack within interior and has all corners on edge. Slice contains no cracks within the interior and has one corner broken off. 5-7 pinholes
3	Slice contains three cracks within interior and has all the corners on edge. Slice contains one crack within the interior and has one corner broken off. 7-10 pinholes
4	Slice contains three cracks within the interior and has two corners broken off. 10-20 pinholes
5	Slice contains more than three cracks within interior and has two corners broken off. >20 pinholes

Examples of Considered Defects in Sliced Square Cheddar Cheese Samples

Broken corners

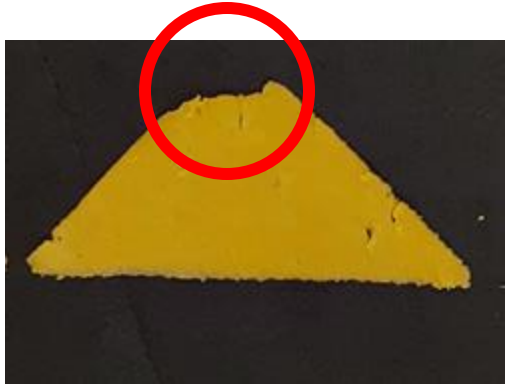


Cracks

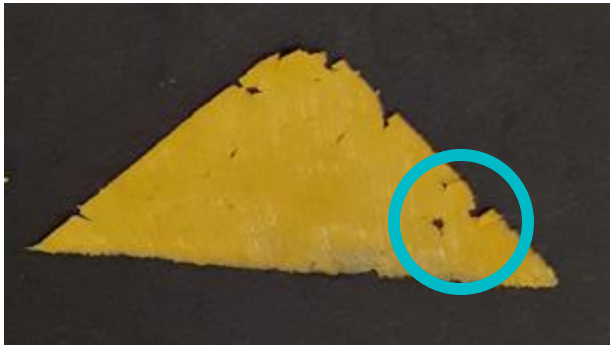


Pinholes

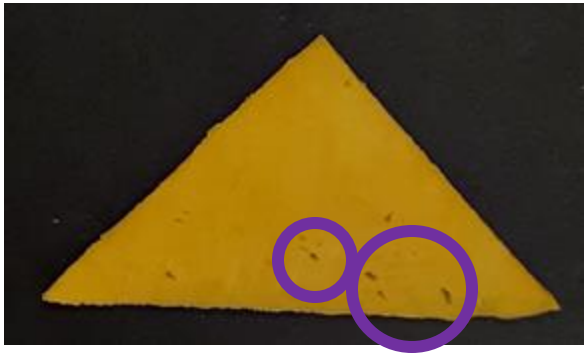
Examples of Considered Defects in Sliced Triangular Cheese Samples



Broken corners

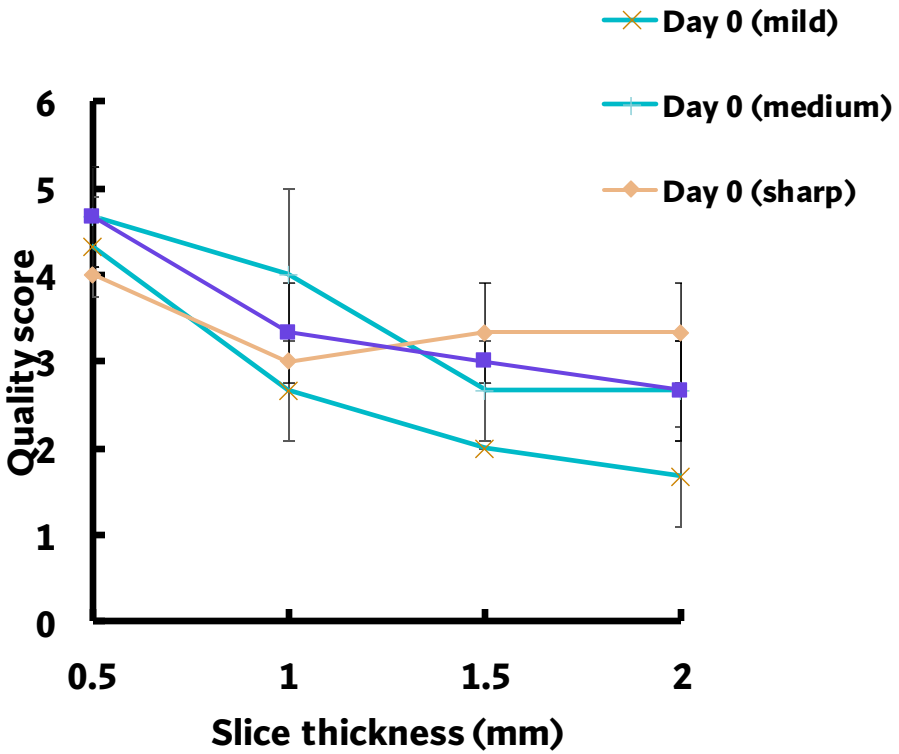


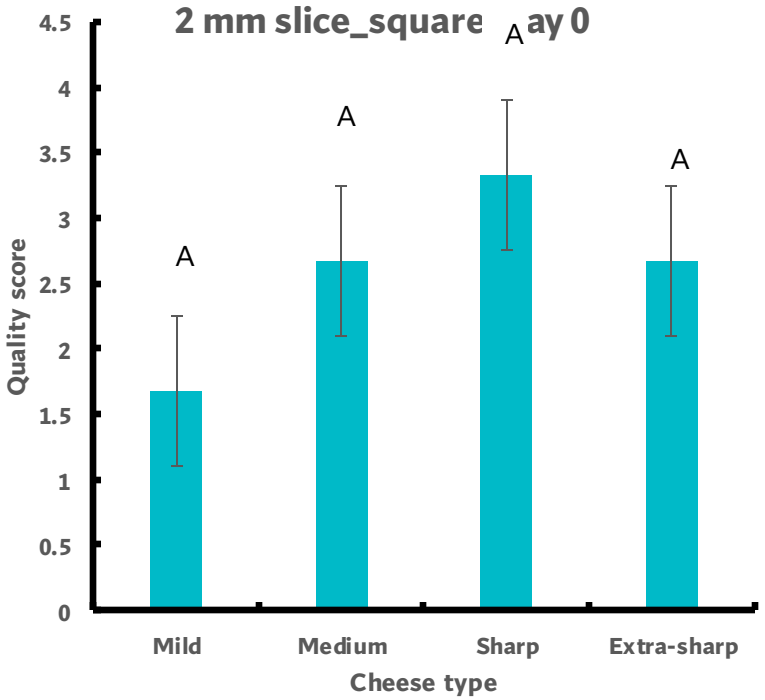
Cracks



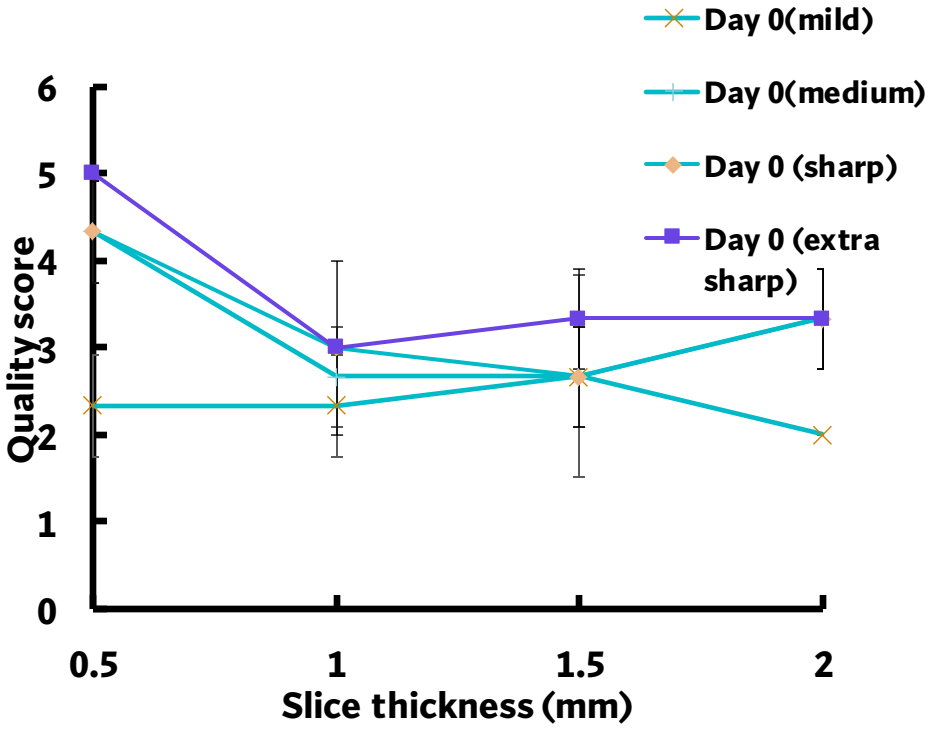
Pinholes

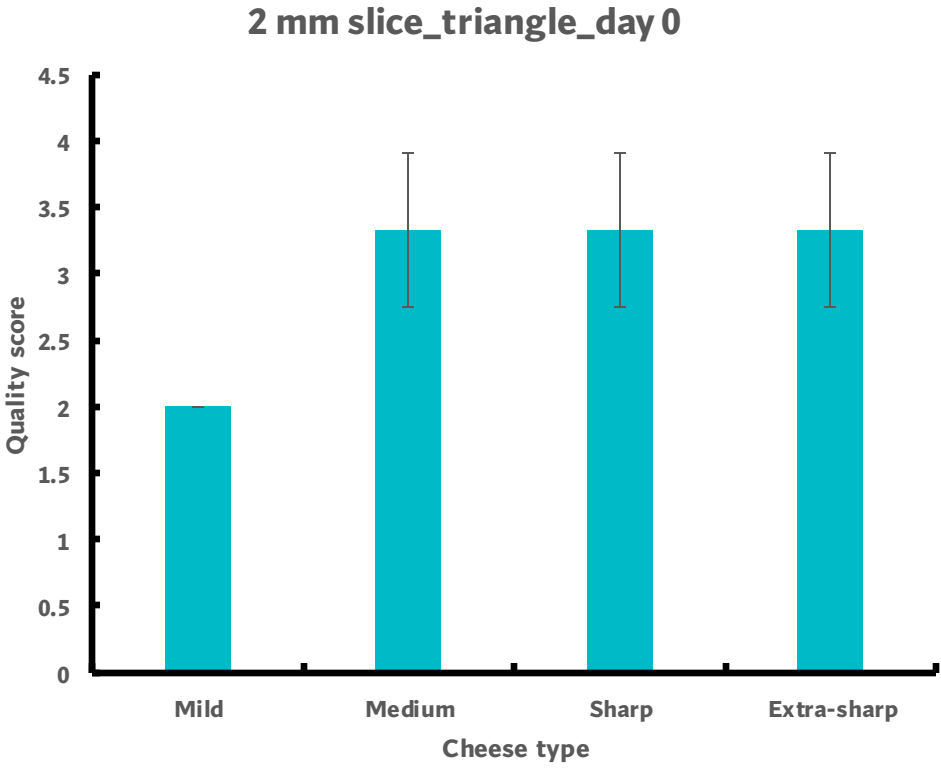
Effect of Slice Thickness and Cheese Type of Square Samples



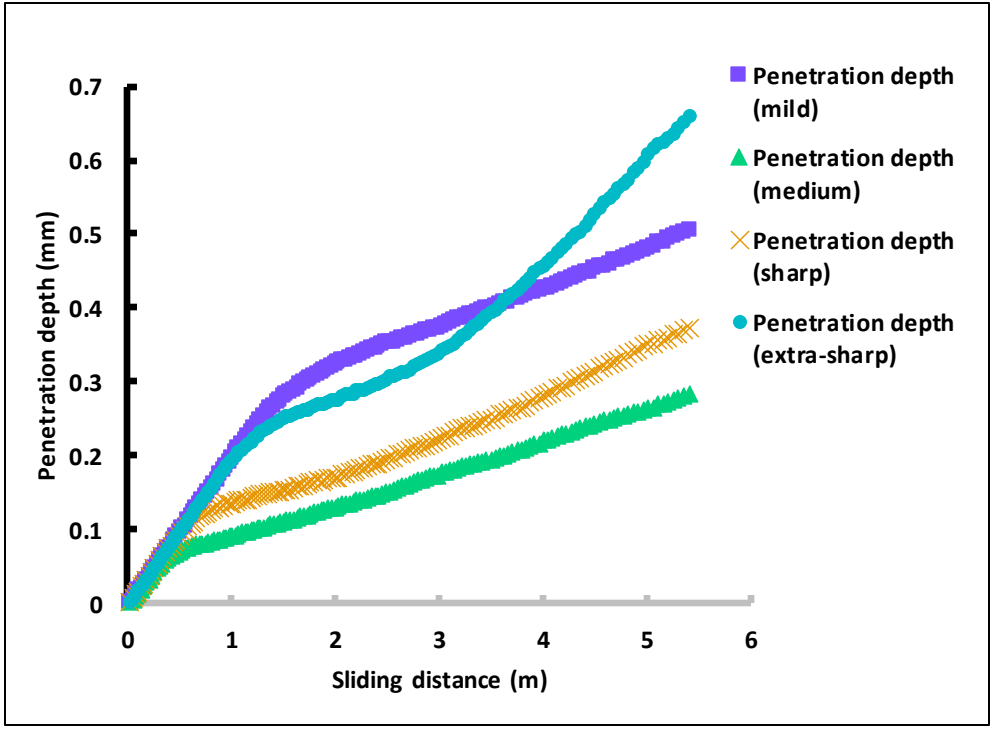


Effect of Slice Thickness and Cheese Type in Triangular Samples

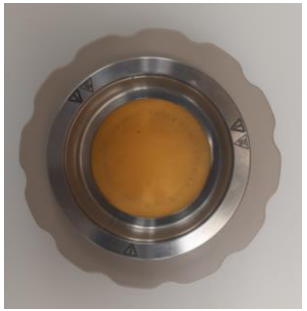




Wear Behavior of Cheddar cheese

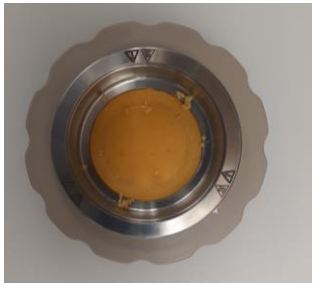


Mild

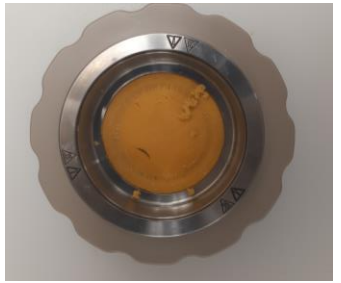


Medium

Sharp



Extra-sharp



Conclusions

1. Sliceability in the cheeses improved with thickness. 2 mm slices were consistent during the storage and has fewer defects.

2. Square slices had lower number of cracks and pinholes than triangular slices.

3.The extent of proteolysis lowered the overall sliceability in the cheese samples.

Industrial significance

1. Minimizing the food waste by characterizing the different cheeses based upon an assigned quality score.

2. Highlights the impact of storage conditions and measures the cheese shape and thickness affectability, thus assisting the food industry to produce more consistent samples targeted for household and restaurant use.

3. Making the slicing process more sustainable

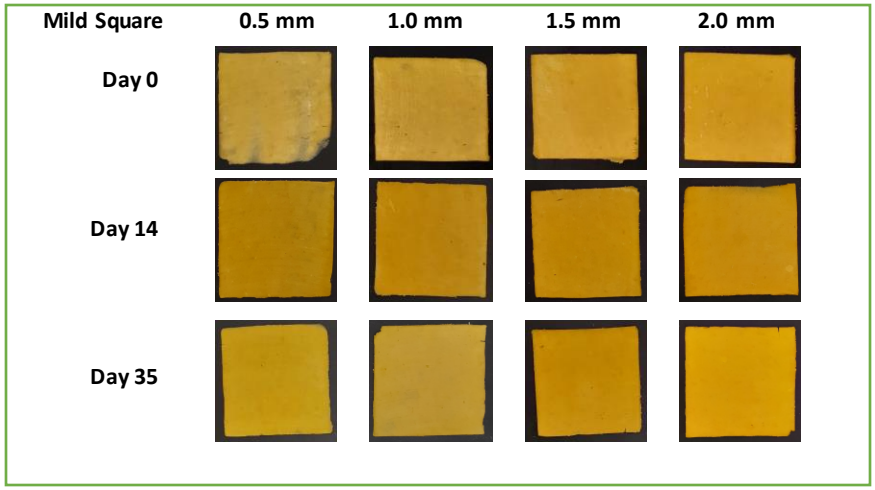
Future work

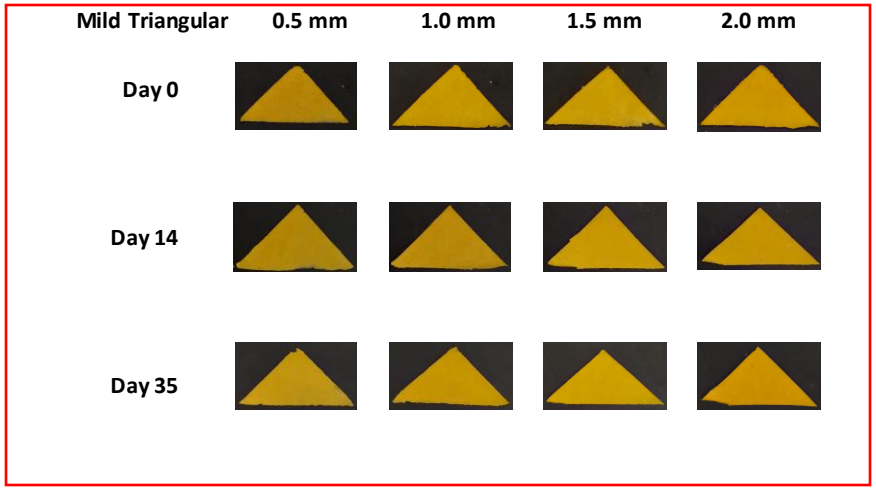
1. Understanding the impact of cheese type on the mass loss and its overall correlation with the sliceability scores.

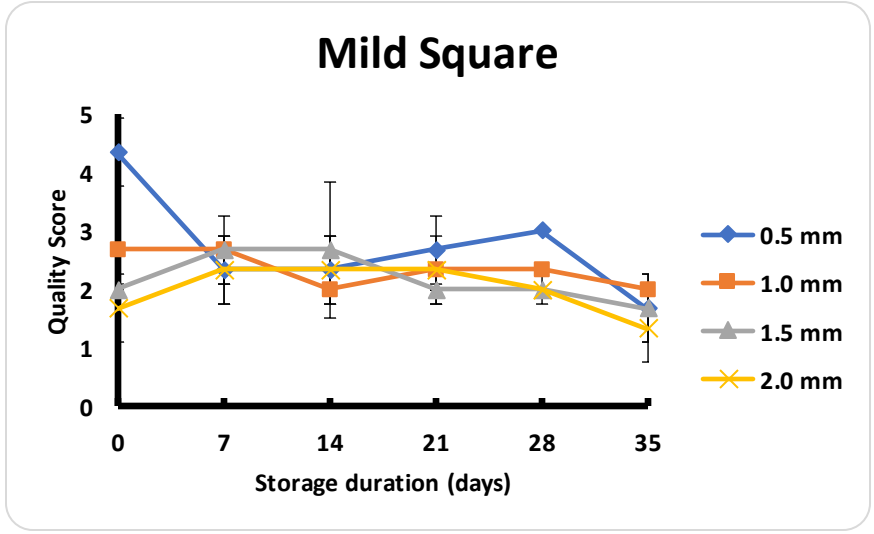
2. Assessing the extent of proteolysis in the cheese samples and evaluate its effect on sliceability of Cheddar cheeses of different ages.

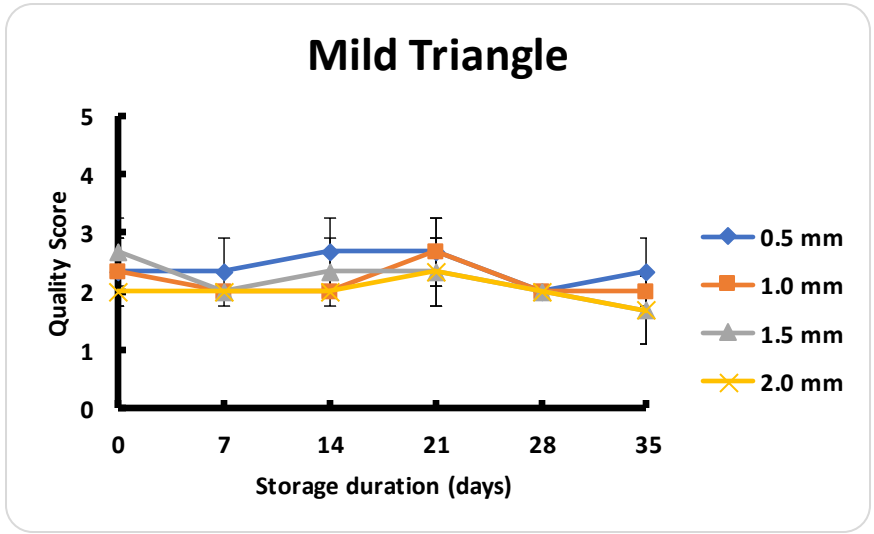
3. Performing TPA and analyzing the impact of cheese properties on sliceability

Acknowledgements & Thank Yous


Mild Square
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Mild Triangular
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Mild Square
Quality Score
0
1
2
3
4
5
0
7
14
21
28
35
Storage duration (days)
0.5 mm
1.0 mm
1.5 mm
2.0 mm


Mild Triangle
Quality Score
0
1
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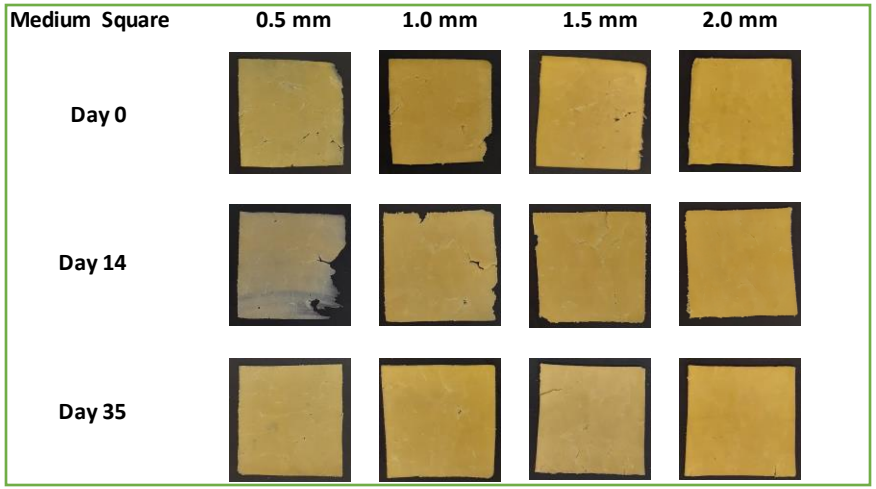
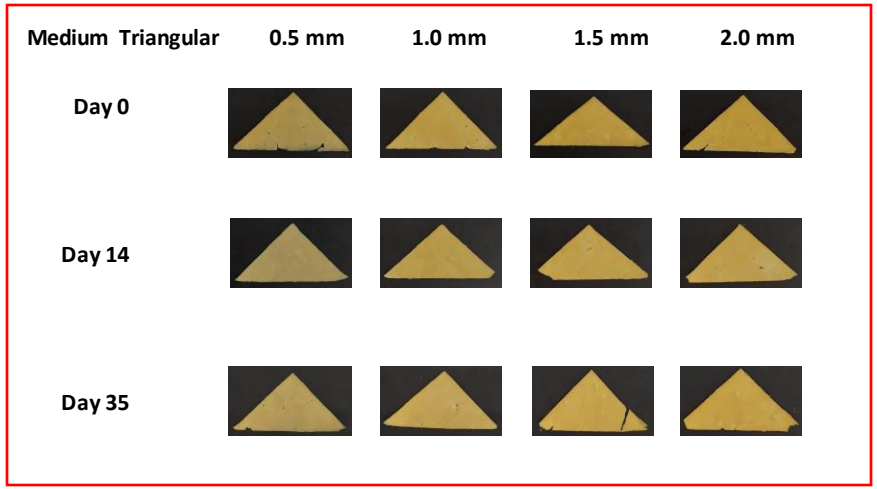
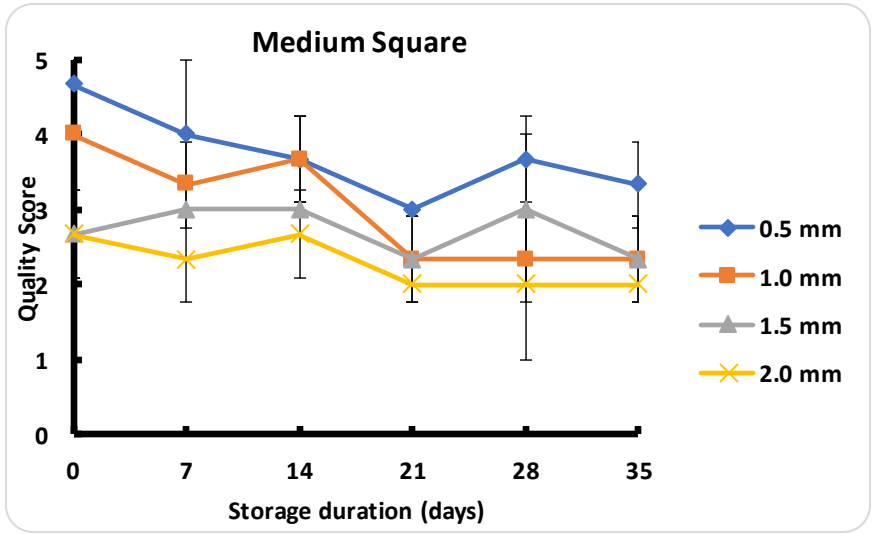
Storage duration (days)
0.5 mm
1.0 mm
1.5 mm
2.0 mm


Medium Square
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Medium Triangular
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Medium Square
Quality Score
Storage duration (days)
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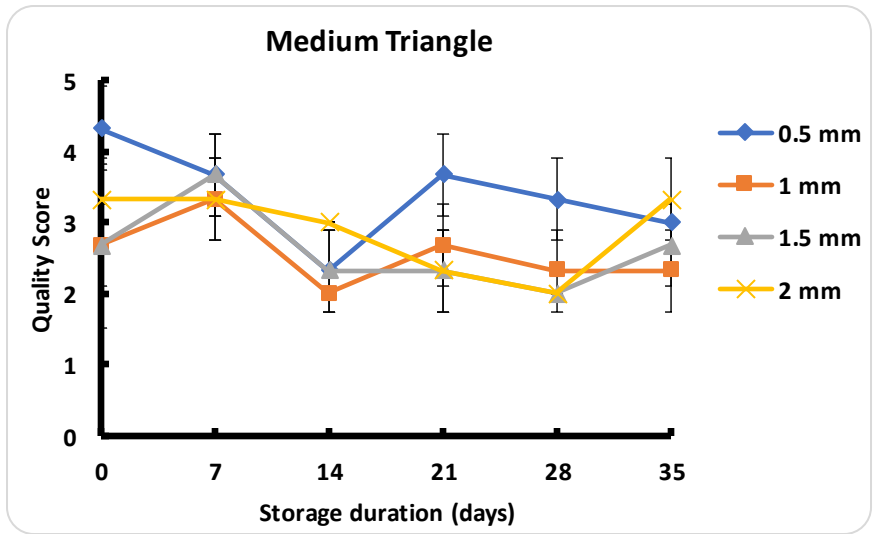
Medium Triangle
Quality Score
Storage duration (days)
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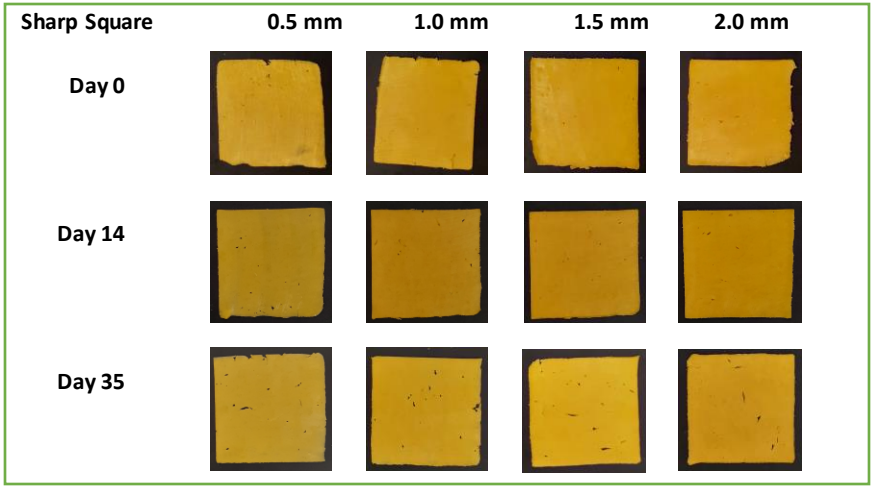
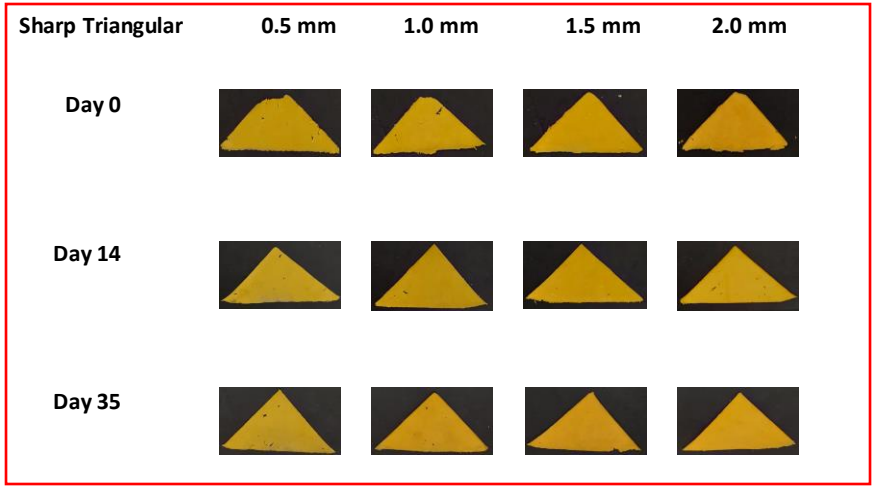
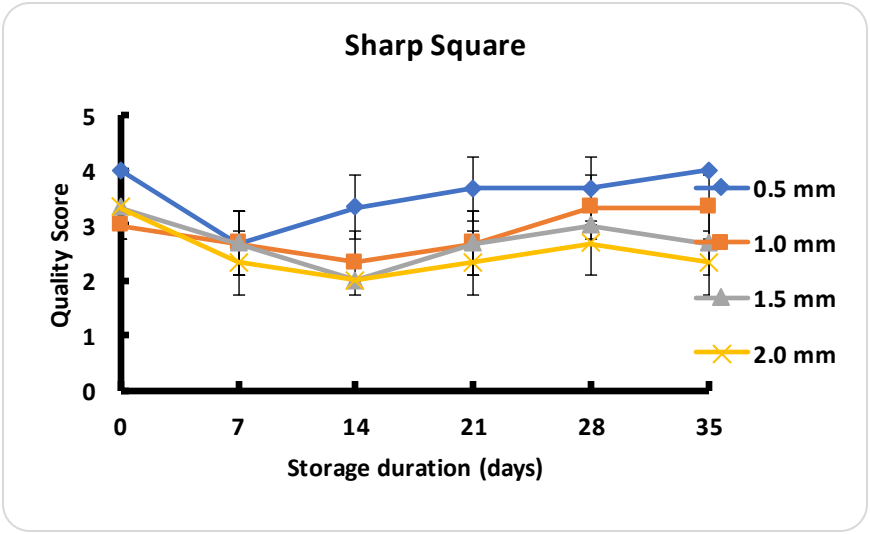

Sharp Square
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Sharp Triangular
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Sharp Square
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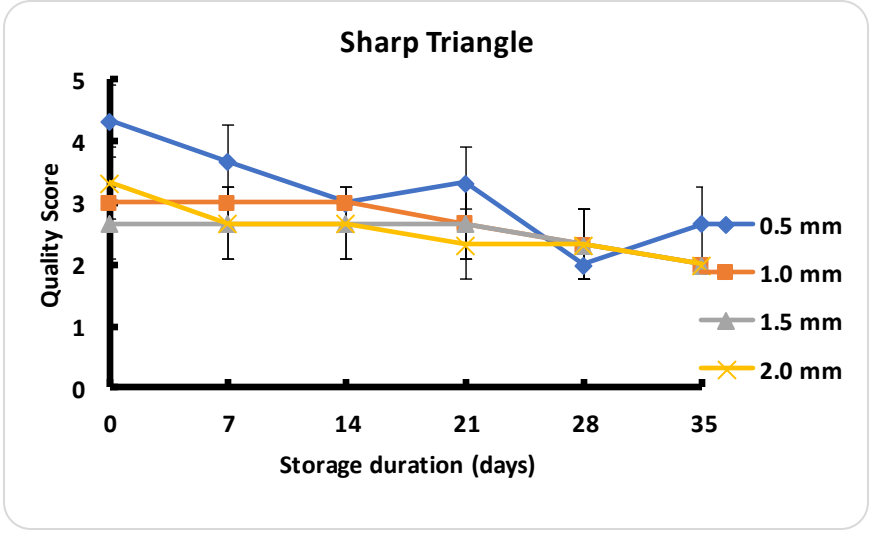
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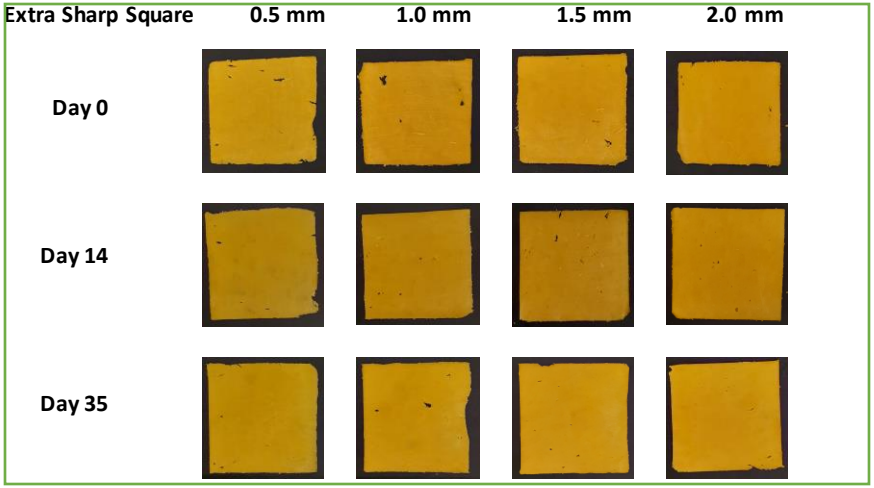
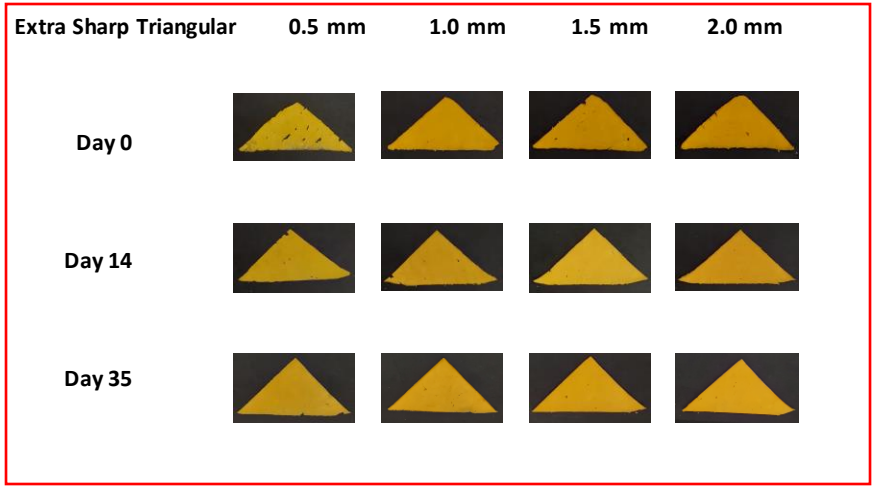
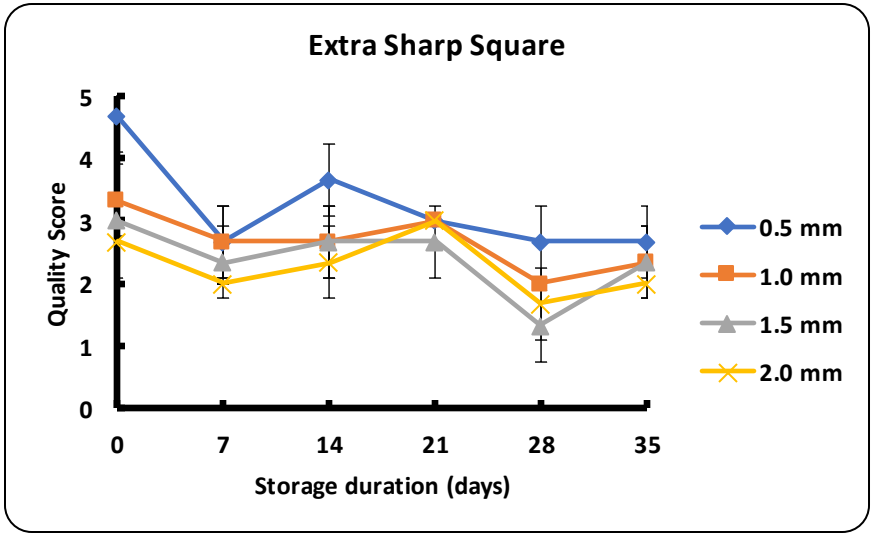

Extra Sharp Square
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35


Extra Sharp Triangular
0.5 mm
1.0 mm
1.5 mm
2.0 mm
Day 0
Day 14
Day 35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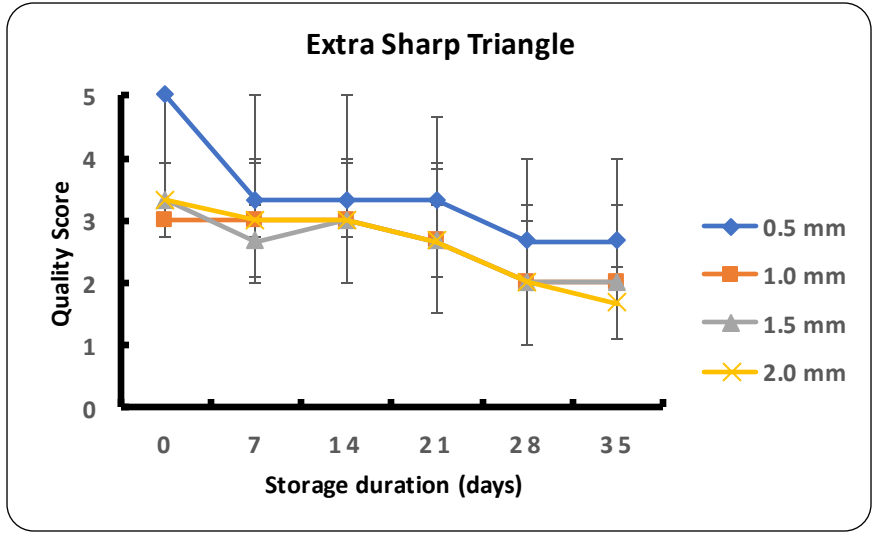
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