

Potato Sugar Discussion 2021



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Techmark Inc.
Lansing, MI

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Techmark, Inc. History



- Techmark, Inc. founded in 1988 in Lansing, MI.
- Our Mission is to serve high value agricultural producers, striving to make the best producers better.



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Potato Sugars/Specific Gravity:
How and Why does the plant form a potato?



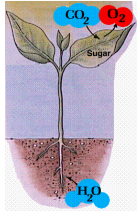
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The Potato Plant is a Factory Photosynthesis

$6 \text{ CO}_2 + 6 \text{ H}_2\text{O} + \text{Sunlight} = \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2$

- Excess Glucose combines to Sucrose
- Sucrose transmitted to the Tuber
 - Growth (yield)
 - Converted to Starch (SG)




The diagram shows a potato plant with arrows indicating the process of photosynthesis. CO₂ (in a blue circle) and H₂O (in a blue circle) enter the plant from the bottom. O₂ (in a red circle) exits from the top. An arrow labeled 'Sugar' points from the leaves down to the tubers.

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Major Influences Affecting Solids Production and Sugar Accumulation

Variety Weather
Soil Cultural Practices




The diagram shows a potato plant with arrows pointing to it from the words 'Variety', 'Weather', 'Soil', and 'Cultural Practices', indicating these factors influence the plant's growth.

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Variety Traits

- Yield
- Specific Gravity
- Sugar Profile in Storage
- Bruise Resistance
- Disease Resistance
- Determinate vs. Indeterminate




A close-up photograph of a person's hands holding several large, light-brown potatoes.


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Cultural Practices

- Variety Selection
- Field Selection
- Irrigation
- Disease Control
- Fertilizer Use



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Major Influences Affecting Sugar Accumulation/Solids Production (SG)


Variety

Weather is **Wildcard**

Soil

Cultural Practices
N- Management




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Crop Maturity

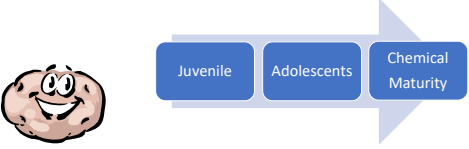
- A key item you need to know and understand for a successful storage season.
- Immature vs. over-mature crops have very different needs in storage.
- Issues compounded when other stress factors added into the equation (Drought or Flooding).

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Tuber Sucrose Rating is The Primary Indicator of Chemical Maturity

- % Tuber **Sucrose Rating** is used to determine where a crop is in its tuber life cycle
- % **SG** is a Baseline Maturity Indicator.

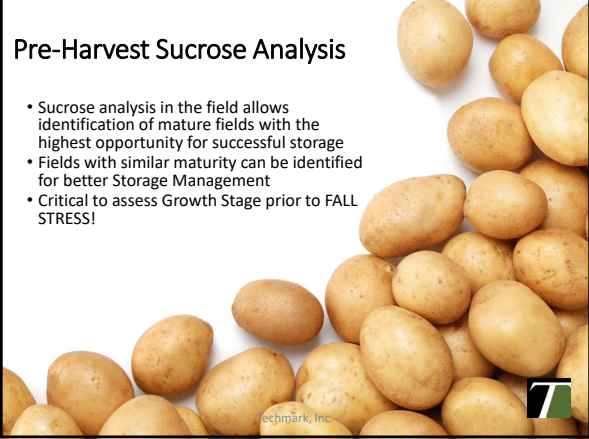


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Pre-Harvest Sucrose Analysis

- Sucrose analysis in the field allows identification of mature fields with the highest opportunity for successful storage
- Fields with similar maturity can be identified for better Storage Management
- Critical to assess Growth Stage prior to FALL STRESS!



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MB 2020 Pre-Harvest Data Russet Burbank

RB - 69 Samples	Glucose	Sucrose	S.G.
Min	0.009	1.484	1.062
Max	0.199	5.547	1.095
	Sample	1.484	1.072
		5.547	1.08

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MB 2020 Pre-Harvest Data Umatilla Russet

Umatilla n=8	Glucose	Sucrose	SG
min	0.019	4.515	1.058
max	0.076	6.192	1.084
	Sample	4.515	1.075
		6.192	1.063

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MB 2020 Pre-Harvest Data Ranger Russet

Ranger n=8	Glucose	Sucrose	SG
Min	0.011	1.860	1.069
Max	0.137	3.720	1.084
	Sample	1.86	1.08
		3.72	1.082

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MB 2020 Pre-Harvest Data Clearwater Russet

Clearwater n=9	Glucose	Sucrose	SG
Min	0.005	0.565	1.075
Max	0.040	1.860	1.090
	Sample	0.565	1.087
		1.86	1.08

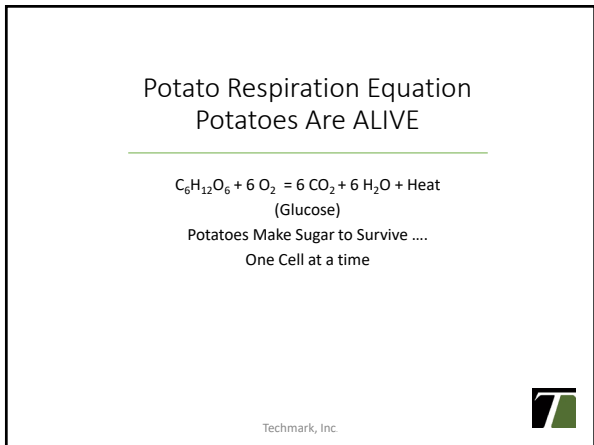
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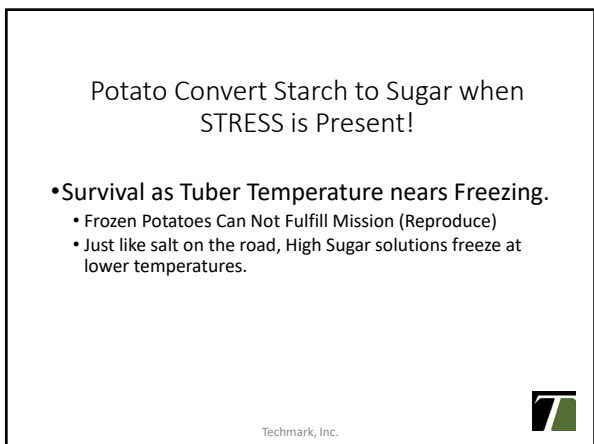
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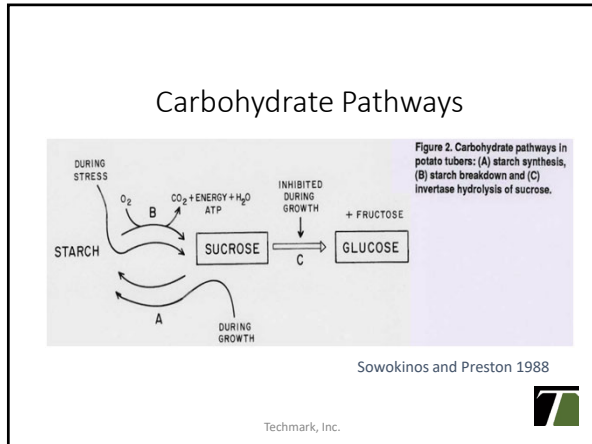
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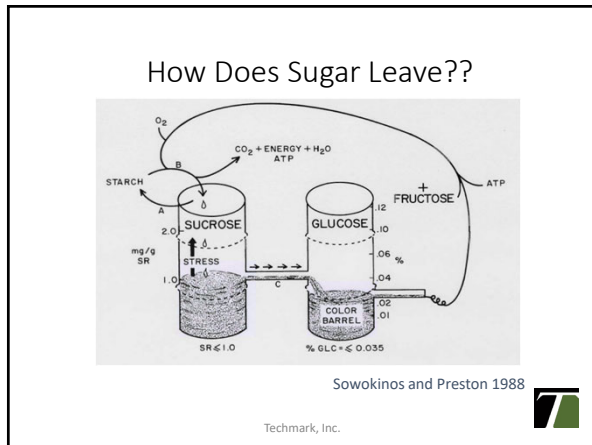
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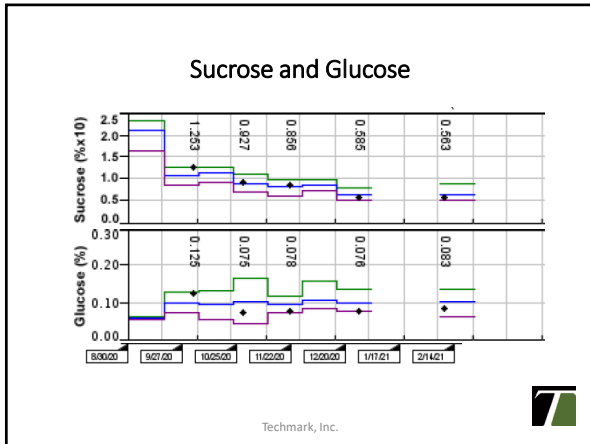
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Techmark Sugar Report

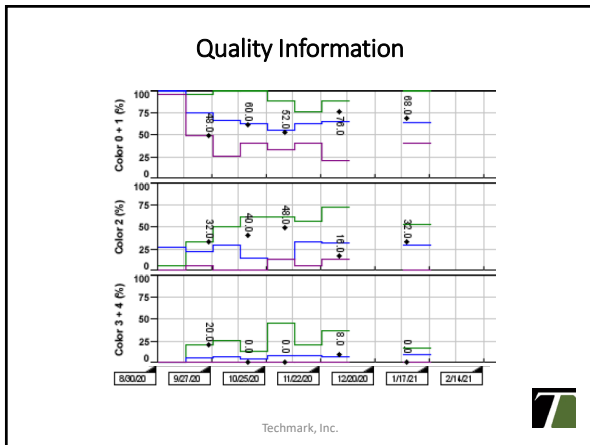
- ← Planting and Preharvest data
- ← Trend lines of sugar data and fry quality defects
- ← Bin trends and regional varietal performance

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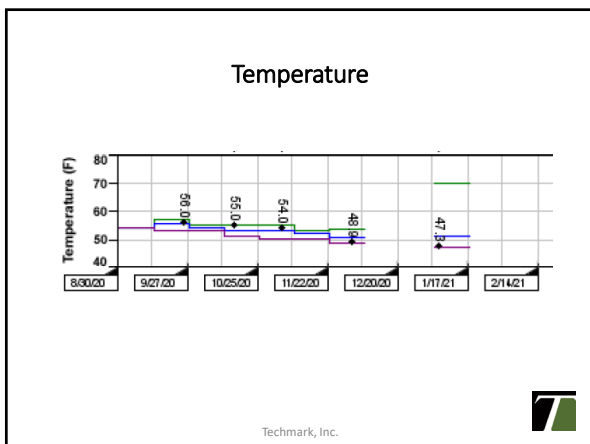
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Bin Sample Comparison

Bin #####			
	Date: 1/4/2021	11/30/2020	% Change
Sucrose (%x10):	0.563	0.585	-3.76
Glucose (%):	0.083	0.076	9.21
Color 0 (%):	20.0	12.0	-
Color 1 (%):	48.0	64.0	-
Color 2 (%):	32.0	16.0	-
Color 3 (%):	0.0	8.0	-
Color 4 (%):	0.0	0.0	-
Sugar Ends (%):	0.0	4.0	-


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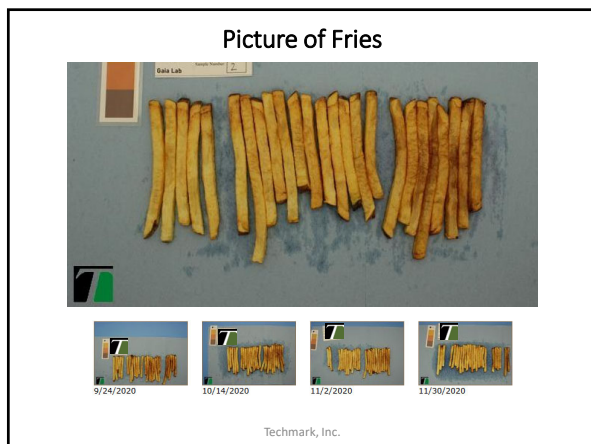
Province Comparison by Variety

Summary of All Bins in Northern Manitoba for Variety Russet Burbank				
	High	Low	Average	% Change
	0.793	0.553	0.623	
	0.138	0.063	0.105	
	68.0	0.0	16.5	-
	60.0	32.0	45.5	-
	52.0	0.0	30.0	-
	16.0	0.0	7.5	-
	4.0	0.0	0.5	-
	0.0	0.0	0.0	-

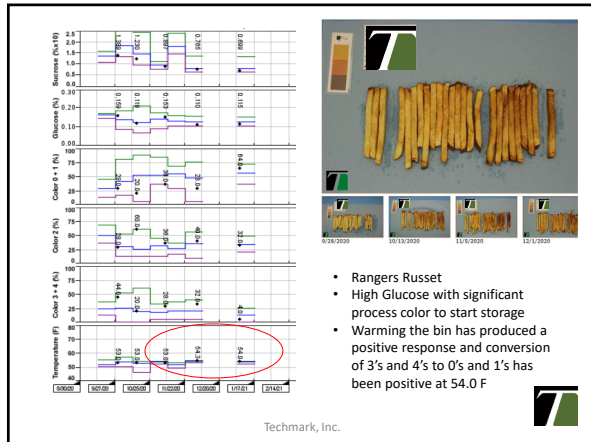
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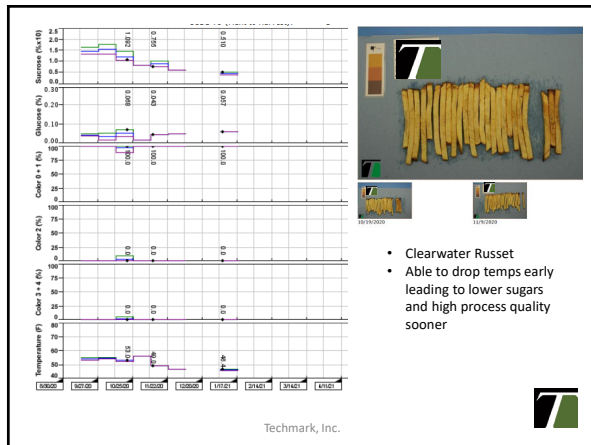


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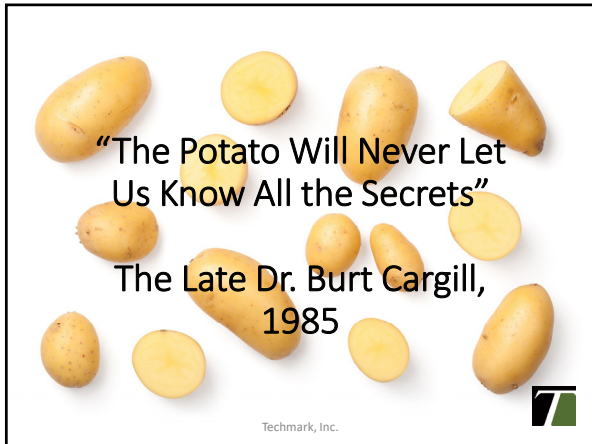
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Rate of Recovery Test

- Does the Fry Color Recover to acceptable level?
- How Do the Potatoes Look in Storage
- Allow to recover at 48 degrees and observe rate of recovery RELATIVE to recovery at 60F+
- Determine How Much to Warm the Storage
- Determine When to Warm the Storage

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