



Damage to sugar beet roots caused by harvesters - influence on rots and sugar losses during storage

2006 - 2008

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Introduction

Storage of sugar beets with a minimum of sugar losses requires that only undamaged, clean and healthy beets are put in the clamps. Damage to sugar beet roots caused by harvesters is the cause of major sugar losses during storage.

The aims of this study were to measure sugar losses per day and root rots on beets harvested with traditional 3–6 row bunker harvesters .



Mechanically damaged sugar beet roots after storage for 60 days

Materials and methods

Treatments

1. Hand harvested roots
2. New technology
(Grimme Maxtron)
3. Standard practice
(traditional 3–6 row bunker harvesters)

Measurements

Rots on surface and root tip, 1 (almost no rot)–9 (= completely destroyed).

Sugar loss, % per day.

Design

Beets were harvested in adjacent strips on a total of nine fields 2006–2008.

8 replicates per treatment and temperature (5°C and 15°C). Storage 60–70 days.



Results

Rots (mean 9 fields 06-08) Root tip 1–9 Surface 1–9

Treatment	5°C	15°C	5°C	15°C
1. Hand harvested	1,1	1,2	1,0	1,2
2. New technology	1,3	1,3	1,1	1,3
3. Standard practice	2,0	2,0	1,2	2,0
RSQ	86,4	84,6	70,3	85,1
LSD 5%	0,23	0,43	0,11	0,28
Prob	<0,0001	<0,0001	ns	<0,0001

Botrytis, *Penicillium* and *Sclerotinia* were isolated from damaged and rotted beet tissue.



Results

Rots correlated with sugar loss

% per day (Pearson corr. coeff.)

Rots in	5°C	15°C
Root tip	0,12 ns	0,77 <0,0001
Surface	0,25 ns	0,74 <0,0001



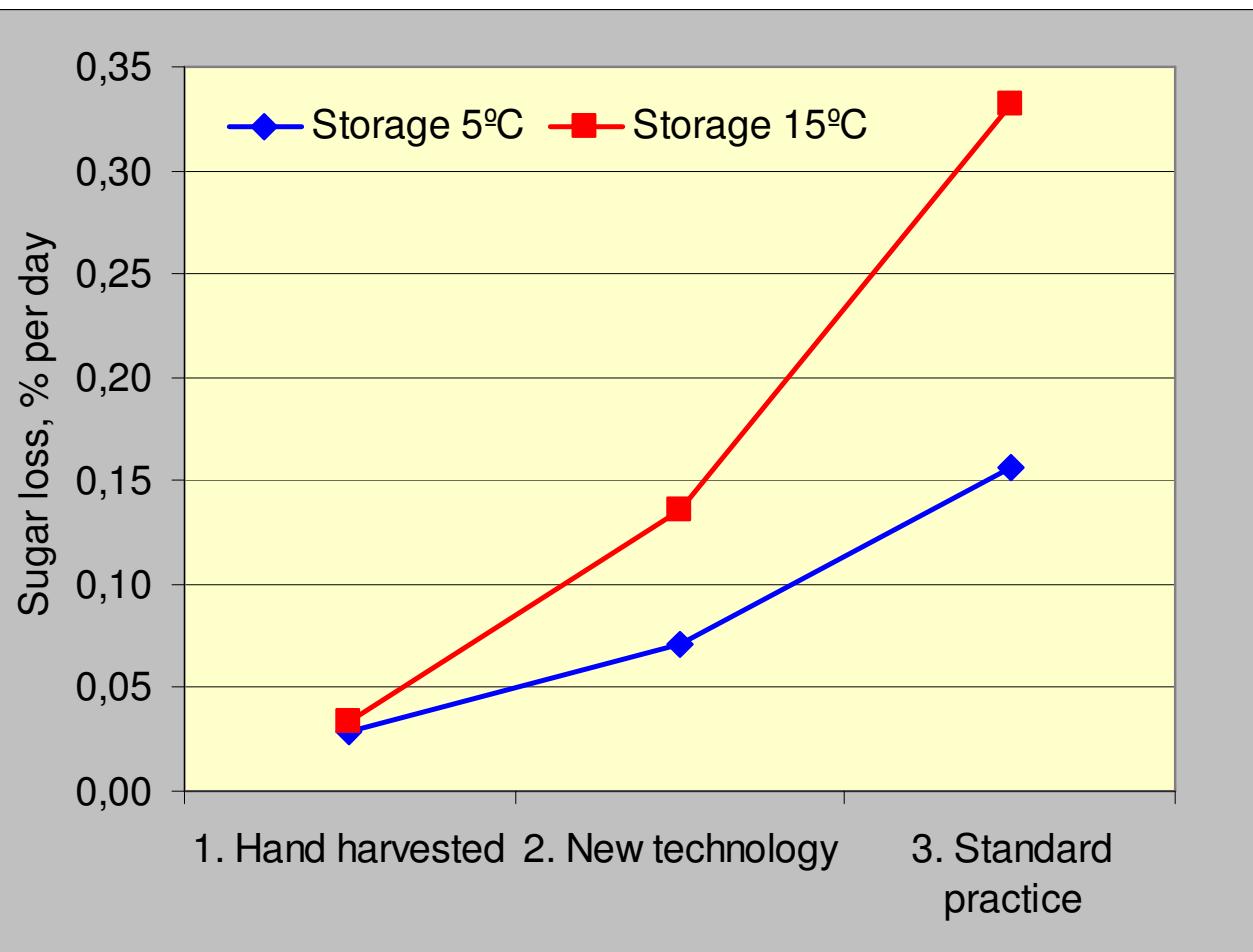
Fungal growth occurred on most wounded tissue and was highly correlated with rots.

Dirt tare %, mean over 3 fields per year

	2006	2007	2008
Grimme Maxtron	8,09	8,83	6, 21
Standard practice	7,14	5,97	4,67

Results

Sugar loss, % per day, 9 fields 2006 - 08



Beets harvested using different harvesters (traditional 3-row harvester above, Grimme Maxtron, below) in Sweden.

5°C:

RSQ = 39,0
LSD = 0,04
Prob < 0,0001

15°C:

RSQ = 73,4
LSD = 0,04
Prob < 0,0001

Conclusions

- Hand harvested roots lost less than 0,05 % sugar/day independent of temperature.
- The sugar loss per day was doubled when temperature increased from 5°C to 15°C for new technology and standard practice.
- Sugar loss per day was correlated to fungal growth and rots on wounded tissue at 15°C.
- *Botrytis, Penicillium* and *Sclerotinia* were common fungi on rotted tissue
- New technology decreased sugar losses with 50 % at 5°C and with 60 % at 15°C compared to standard practice.

Acknowledgements

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