

2013-2014 DSC Trial using NS McIntosh

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Sept. 25 = SmartFresh treatment in NS

Sept. 30 = arrival in Ontario

Table 1: Maturity of ‘McIntosh’ apples from Nova Scotia treated with or without SmartFresh. (Evaluations on Sept. 30th in Simcoe)

		Firmness (lb)	Internal ethylene (ppm)	Soluble solids (%)	Malic acid (mg/100 ml)	Starch index (1-8)
CAP No SmFr	Average	14.7	85	12.2	824	6.3
	Minimum	13.2	23			6
	Maximum	16.6	220			7
PWR No SmFr	Average	15.2	61	11.9	730	6.4
	Minimum	13.6	35			6
	Maximum	17.3	96			8
PIL No SmFr	Average	14.6	169	13.3	761	6.3
	Minimum	12.0	18			6
	Maximum	16.2	740			7
CAP +SmFr	Average	14.7	27	12.1	724	6.2
	Minimum	13.1	6			6
	Maximum	16.0	214			7
PWR +SmFr	Average	14.6	12	11.6	761	6.3
	Minimum	13.3	4			6
	Maximum	17.0	20			7
PIL +SmFr	Average	13.7	180	11.3	714	6.4
	Minimum	8.0	6			5
	Maximum	16.9	1536			8

Sept. 30 = all CA established at 2.5% O₂ + 0.5% CO₂
(matching van Meekeran commercial room)

Oct. 9

SCA (standard CA) = 2.5% O₂ + **2.5% CO₂**

LO (low oxygen) = 2.5% O₂ + 0.5% CO₂

DCS (dynamic) = 2.5% O₂ + 0.5% CO₂

Oct. 10

SCA = 2.5% O₂ + 2.5% CO₂

LO = **2.2% O₂** + 0.5% CO₂

DCS = **2.2% O₂** + 0.5% CO₂

Oct. 25

SCA = 2.5% O₂ + 2.5% CO₂

LO = **1.7% O₂** + 0.5% CO₂

DCS = **1.7% O₂** + 0.5% CO₂

Oct. 28

SCA = 2.5% O₂ + 2.5% CO₂

LO = **1.3% O₂** + 0.5% CO₂

DCS = **1.3% O₂** + 0.5% CO₂

Nov. 12

SCA = 2.5% O₂ + **3.5% CO₂**

LO = **1.2% O₂** + **1.0% CO₂**

DCS = **1.2% O₂** + **1.0% CO₂**

Nov. 28

SCA = 2.5% O₂ + 3.5% CO₂

LO = 1.2% O₂ + 1.0% CO₂

DCS = **0.9% O₂** + **1.0% CO₂**

Dec. 18

SCA = 2.5% O₂ + **4.5% CO₂**

LO = 1.2% O₂ + 1.0% CO₂

DCS = 0.9% O₂ + 1.0% CO₂

April/ May

SCA = 2.5% O₂ + 4.5% CO₂

LO = 1.2% O₂ + 1.0% CO₂

DCS = **0.6-0.7% O₂** + **<0.5% CO₂**

May 26 = all apples removed from storage

Table 2: Fruit quality of ‘McIntosh’ apples from Nova Scotia treated with or without SmartFresh and held in standard control atmosphere (SCA – 2.5% O₂), low oxygen (LO – 1.2% O₂), or dynamic control (DCS – 0.6-12% O₂) for 8 months at 3°C, plus 1 and 7 days at room temperature (~25°C).

	Firmness (lb)	Internal ethylene (ppm)	Soluble solids (%)	Malic acid (mg/100 ml)	Senescent breakdown (%)	Core browning (%)	Storage rots (%)
1 day at RT							
<i>No SmartFresh</i>							
DCS	11.9 ^C	84 ^{CD}	11.5 ^A	343 ^{BC}	0 ^F	0 ^C	3 ^{CD}
LO	12.1 ^C	84 ^{CD}	11.1 ^{AB}	366 ^{AB}	7 ^{EF}	0 ^C	0 ^D
SCA	9.7 ^E	221 ^C	11.4 ^A	380 ^A	19 ^{A-C}	1 ^C	1 ^D
<i>+ SmartFresh</i>							
DCS	14.1 ^A	64 ^D	11.5 ^A	359 ^{AB}	0 ^F	0 ^C	0 ^D
LO	13.1 ^B	79 ^{CD}	10.7 ^{BC}	377 ^A	3 ^F	0 ^C	1 ^D
SCA	11.9 ^C	158 ^{CD}	11.5 ^A	381 ^A	16 ^{B-D}	0 ^C	0 ^D
7 days at RT							
<i>No SmartFresh</i>							
DCS	10.7 ^D	1164 ^B	11.2 ^{AB}	339 ^{BC}	12 ^{DE}	0 ^C	9 ^{AB}
LO	10.3 ^D	1232 ^{AB}	11.2 ^{AB}	302 ^D	20 ^{AB}	0 ^C	11 ^{AB}
SCA	8.8 ^F	1221 ^{AB}	11.4 ^A	340 ^{BC}	25 ^A	11 ^A	6 ^{BC}
<i>+ SmartFresh</i>							
DCS	11.7 ^C	1209 ^{AB}	11.6 ^A	365 ^{AB}	13 ^{C-E}	0 ^C	9 ^B
LO	10.7 ^D	1342 ^A	10.4 ^C	323 ^{CD}	11 ^{DE}	0 ^C	16 ^A
SCA	9.2 ^F	1258 ^{AB}	11.1 ^{AB}	335 ^{BC}	16 ^{B-D}	4 ^B	6 ^{BC}
Significance	****	****	***	****	****	****	****

Means within the same column with the same letter are not significantly different at $P < 0.05$.

, * = significant at $P < 0.001$ or $P < 0.0001$, respectively.

Each value represents the average of 30 apples, plus another 75 for disorders on Day 7.

Executive Summary

- DCS fruit were ~ ½ lb firmer than those held in LO, and ~ 2 lb firmer than those in SCA
- LO fruit were ~ 1½ lb firmer than those held in SCA
- SCA fruit without SmartFresh were <10 lb after 1 day at room temperature
- SCA fruit with or without SmartFresh were <10 lb after 7 days at room temperature
- DCS fruit with SmartFresh had significantly greater firmness than all other treatments
- DCS and LO fruit maintained >10 lb firmness after 7 days at room temperature
- CA regime had little or no effect on internal ethylene, soluble solids or malic acid content
- DCS and LO reduced incidence of senescent breakdown and core browning
- DSC fruit had less senescent breakdown than those held in LO when no SmartFresh was used
- CA regime had no effect on storage rots



Plate 1: Senescent breakdown and core browning in 'McIntosh' from SCA, after 7 days at room temperature.