

Effect of curing temperatures on the quality of 'Clearwater Russet' potatoes

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Research content

General recommendations are to cure potatoes between 50 to 55 °F and 95% RH for 14 days. However, the industry has recently questioned the impact of curing potatoes at a lower temperature of 50 °F, rather than 55 °F, would have on processing quality. In 2023, curing 'Clearwater Russet' potatoes at 50 °F did not affect respiration or weight loss over the 14-day curing period. However, sugars and fry color were affected, resulting in higher sugar content (0.051% glucose) and darker fry color (44.35% reflectance) than curing potatoes at 55 °F (0.027% glucose – 49.32%). Decisions on curing temperatures can impact processing color.

Material and methods

- 'Clearwater Russet' potatoes were harvested and immediately treated with i. control (without any treatment), ii. nitric oxide treatment (22 ppm) for 5 hours, and iii. spray application of 2% calcium chloride (CaCl₂).
- After the treatment application, the tubers were cured at two temperatures 50 °F and 55 °F with 95% relative humidity (RH) for 14 days. Following, the temperature was ramped down to 45 °F and 95% RH.
- The experiment was set according to a complete randomized design (CRD) in a factorial design 3 (treatments) x 2 (temperatures) x 8 (withdraws, 0, 2, 4, 6, 8, 10, 12, and 14 days) x 3 repetitions of 10 potatoes.

Results and discussion

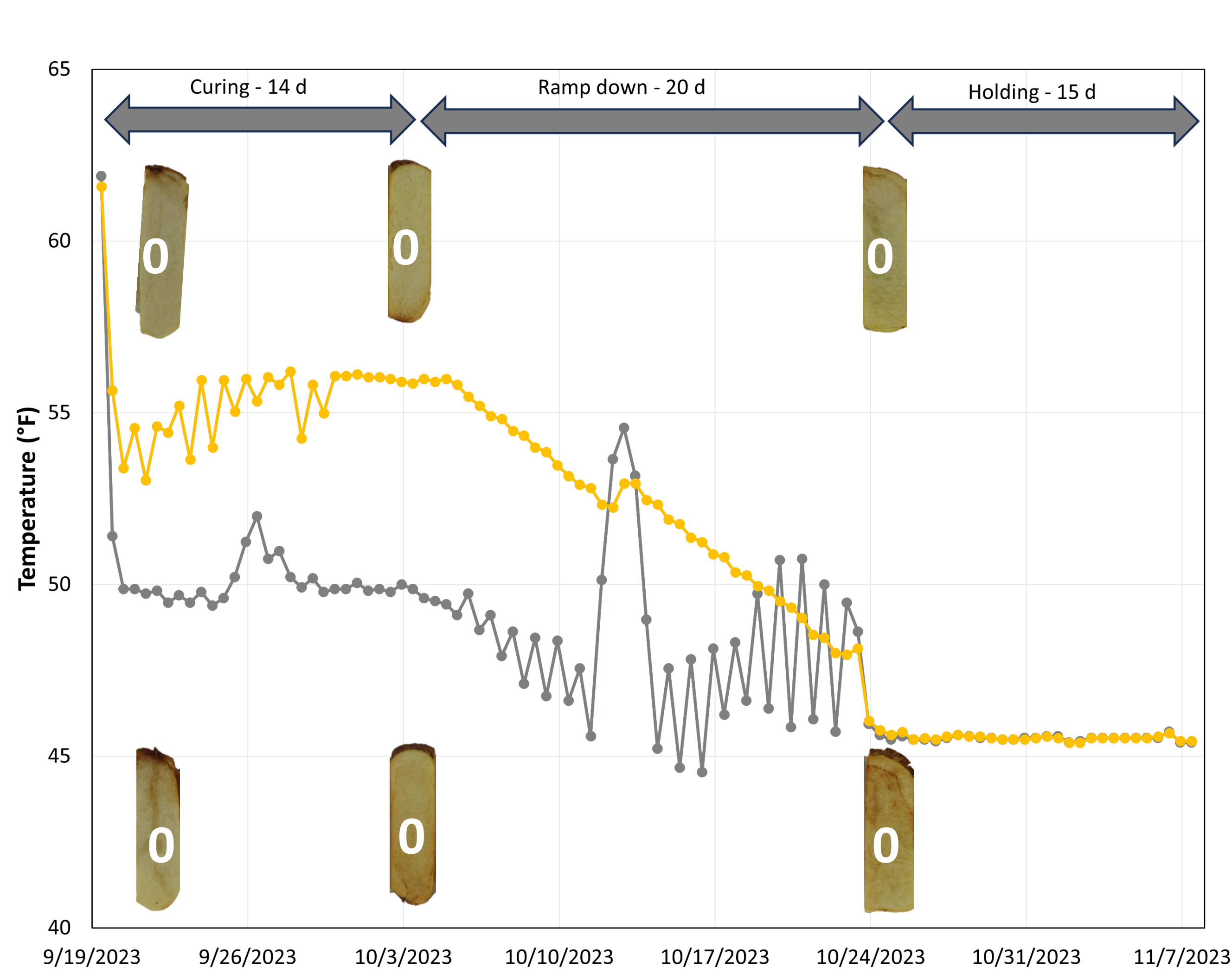


Fig. 1. Temperatures (°F) and fry color (% reflectance) of 'Clearwater Russet' potatoes cured at two temperatures (50 °F and 55 °F, 95% RH) for 14 days.

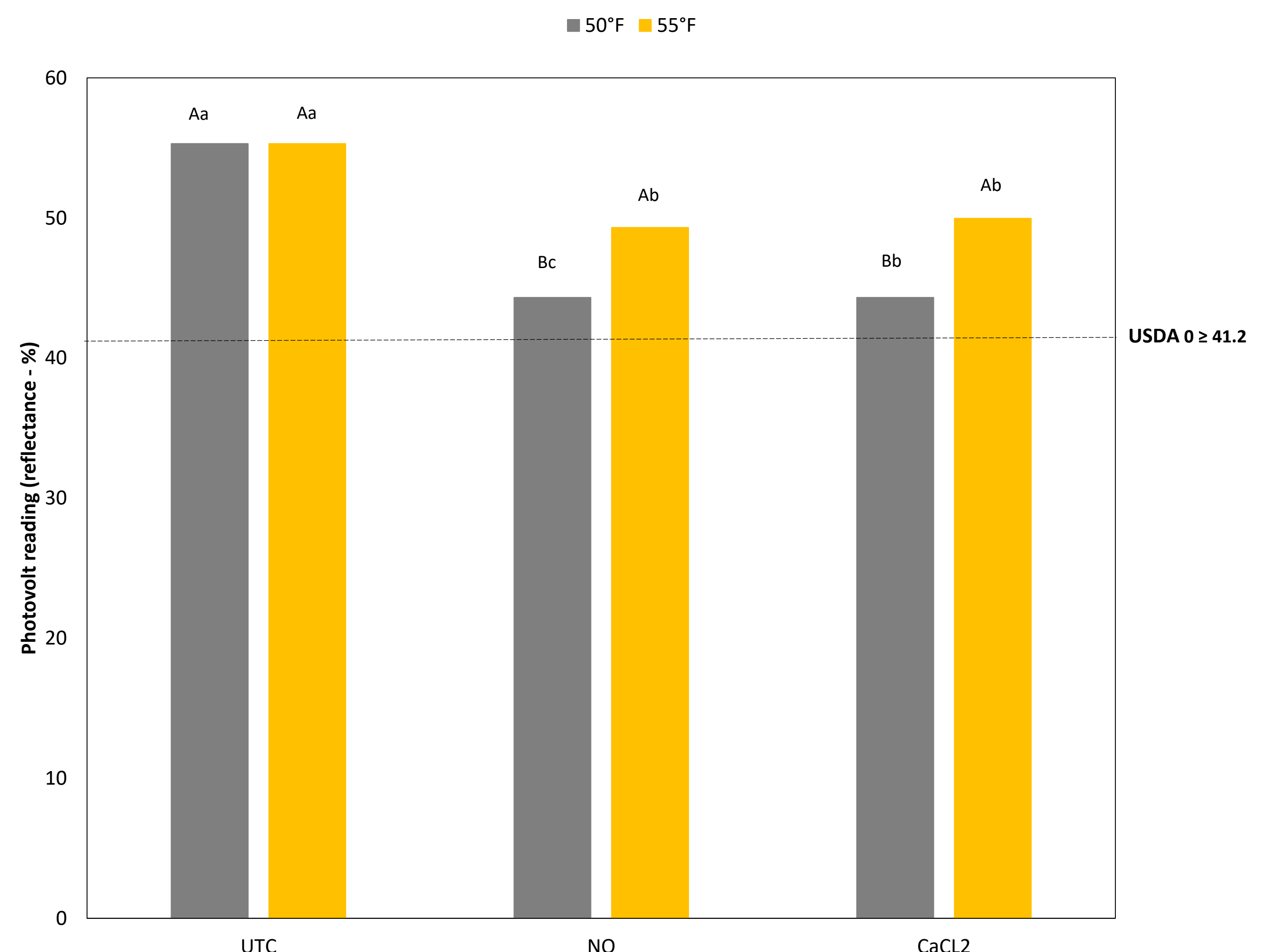


Fig. 2. Significant interaction between curing temperatures (50 °F and 55 °F, 95% RH) and treatments (control - UTC, 2% CaCl₂, and 22 ppm nitric oxide - NO).

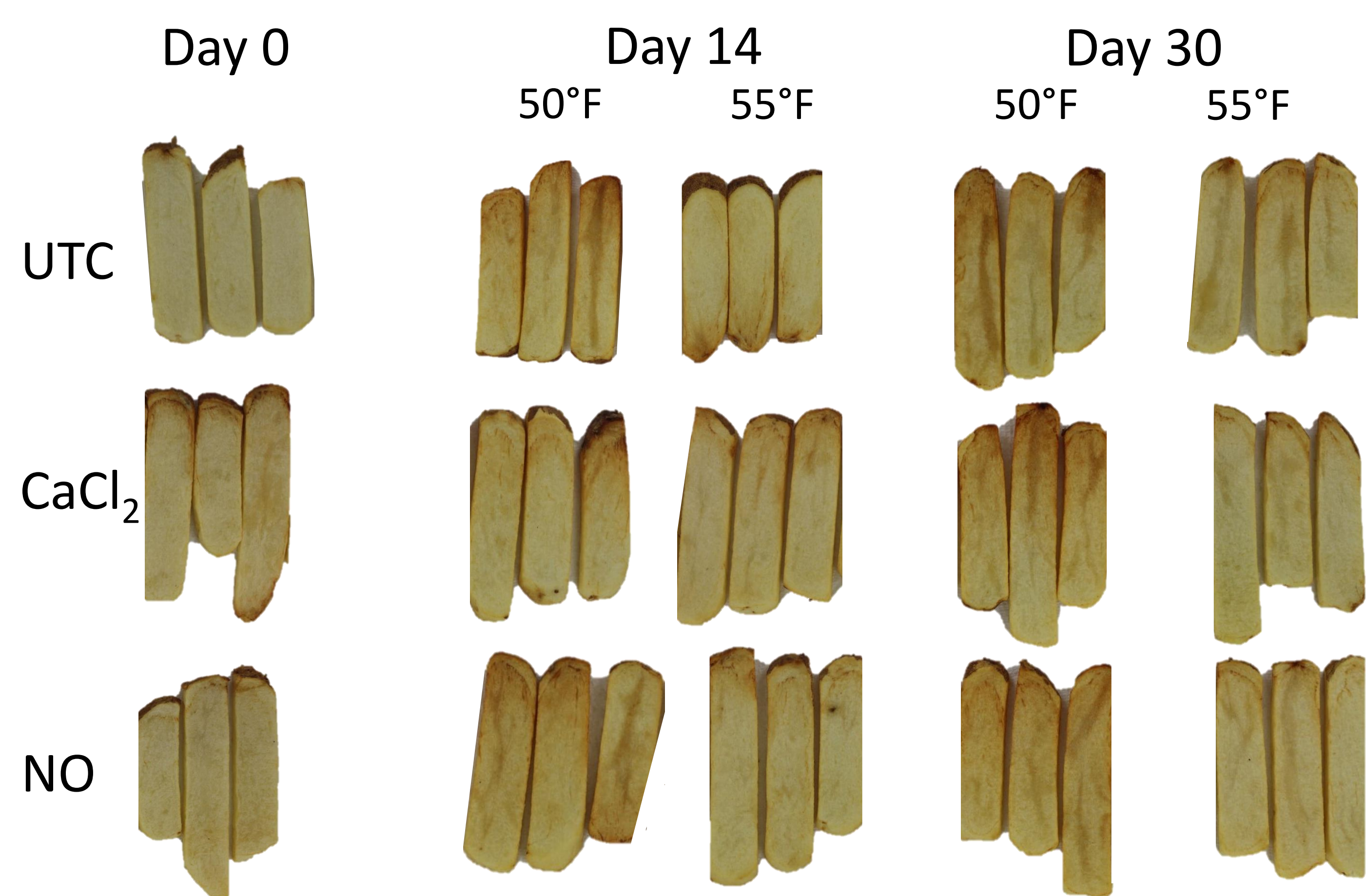


Fig. 3. Visual appearance of 'Clearwater Russet' potatoes cured at two temperatures (50 °F and 55 °F, 95% RH) for 14 days and treated with 2% CaCl₂ and 22 ppm nitric oxide.

Table 1. Weight loss (%), respiration rate (mg CO₂ kg⁻¹ h⁻¹), fry color (% reflectance), fructose (% m/v), glucose (% m/v) of 'Clearwater Russet' potatoes cured at two temperatures (50 °F and 55 °F, 95% RH) for 14 days and treated with 2% CaCl₂ and 22 ppm nitric oxide.

Main factors	Weight loss (%)	Respiration (mg CO ₂ kg ⁻¹ h ⁻¹)	Fry color (%)	Fructose (% - m/v)	Glucose (% - m/v)
Temperature (A)					
50 °F	0.60b	3.74	48.80a	0.079a	0.035a
55 °F	0.76a	3.31	51.53b	0.072b	0.018b
Treatments (B)					
UTC	0.63	3.38ab	55.31a	0.093a	0.002b
Nitric oxide	0.63	3.16b	46.83c	0.079b	0.039a
CaCl ₂	0.79	4.04a	48.37b	0.055c	0.039a
Time (C)					
0	0.00c	4.23a	50.26a	0.077a	0.026a
14	0.90b	3.37b	49.89a	0.075a	0.027a
38	1.84a	1.81c	50.36a	0.074a	0.027a
Interactions					
A x B	**	NS	**	**	**
A x C	**	NS	NS	NS	NS
B x C	**	NS	NS	NS	NS
A x B x C	*	NS	NS	NS	NS
SD	14.03	14.09	3.37	8.17	13.45

Conclusions

Curing temperatures did not affect respiration. However, sugars and fry color were affected by curing temperatures and treatments. When potatoes were cured at 50 °F the fructose and glucose were higher than at 55 °F. It affected the fry color reflectance, which was lower at 50 °F than at 55 °F.

Although the fry color was affected by temperatures, all samples were still in the USDA no 0 classifications (%≥41.2%).

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