Innovative Food Labeling Technology

Produce Quality, Safety, and Consumer Analysis

Ag Innovation Forum

Panel: Transparency and Information Systems

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Research Background

Price Look-Up Stickers

CO2 laser-engraved QR code

Research Objective

To evaluate the effect of laser labeling technology on the postharvest quality, microbial safety, and consumer analysis of three horticultural produce:

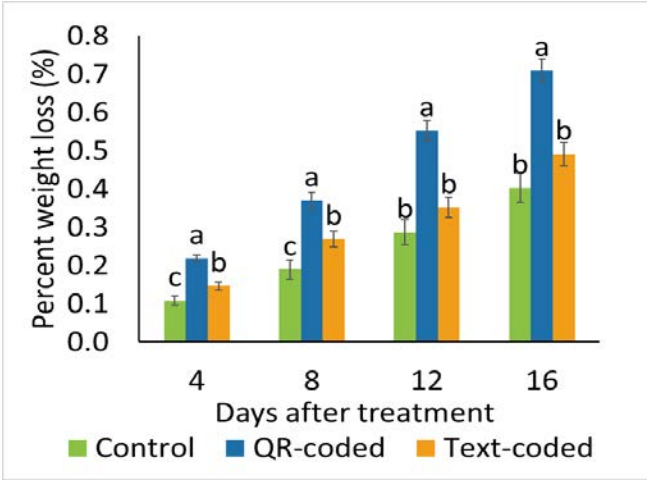
Apple **Cucumber** **Green bell pepper**

Materials & Methods

QR Code

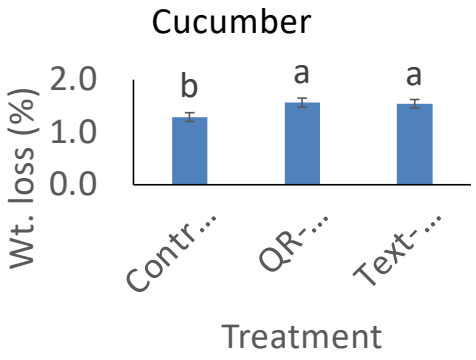
Text Code

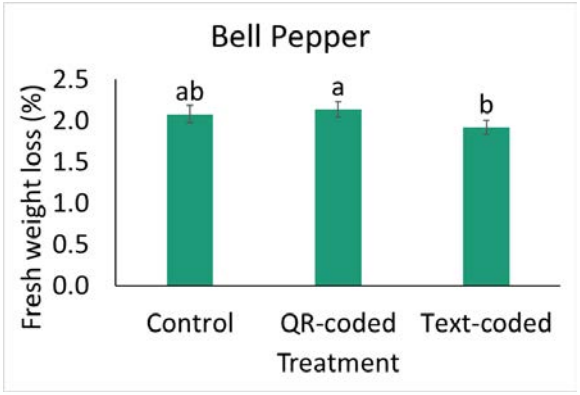
Results – Postharvest Quality



Treatment	Visual Ratings		
	Apple	Cucumber	Bell Pepper
Control	4.92^{ab}	4.69^{a}	4.56^{b}
QR-coded	4.88^{b}	4.66^{a}	4.63^{b}
Text-coded	5.00^{a}	4.70^{a}	4.78^{a}

Apple (QR code Readability)		
Day	N	%
0	27/27	100
4	27/27	100
8	26/27	96.3
12	26/27	96.3
16	25/27	92.6





Cucumber			Bell Pepper	
Day	N	%	N	%
0	27/27	100	27/27	100
2	25/27	92.6	25/27	92.6
4	23/27	85.2	23/27	85.2
6	20/27	74.1	16/27	59.3
8	14/18	77.8	12/18	66.7

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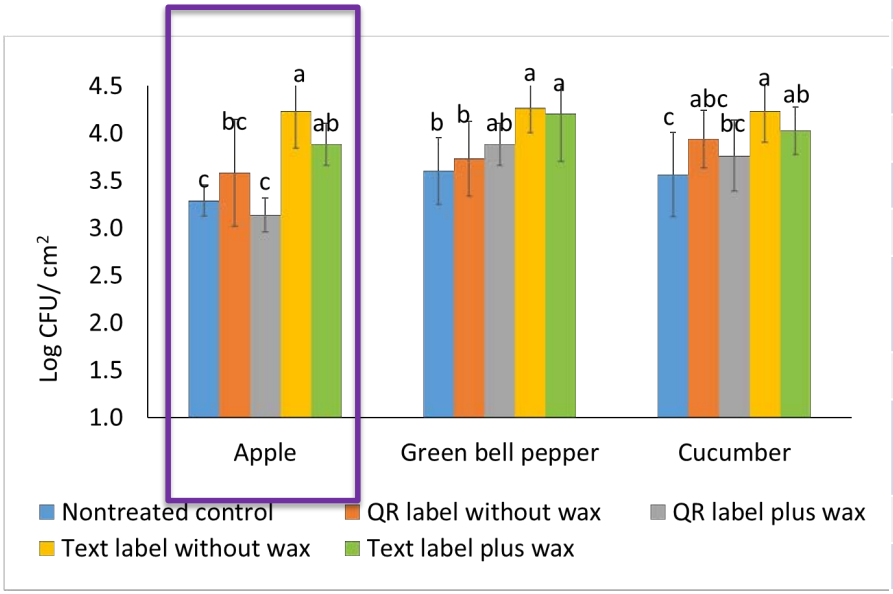
Error bars represent the standard error of the mean. Different letters on bars indicate statistical significance according to the Tukey test at $P < 0.05$

Results - Microbial Safety and Consumer Analysis



Parameter	Treatment		
	No label	**Sticker label**	**QR-code label**
Overall liking	6.8a[†]	7.1a	5.6b
Label liking	6.1a	6.4a	4.3b
Purchase Intent	3.8a	4.1a	3.3b
Label concern		3.5b	5.1a
Concept liking		6.1a	6.4a
Concept Purchase Intent		4.1a	3.6b
Preference		48%	52 %
Recommendation		3.8a	2.9b
Before Ranking	1.6a	1.9b	2.4c
After Ranking	2.1a	1.9a	1.8a

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Conclusions

- Laser labeling technology minimally reduced the postharvest quality compared to the nontreated control in three studied produce.
- The wax application did not change the susceptibility of microbial attachment in all three studied produce.
- QR-code readability was the greatest in apples and the least in green bell pepper. Future research is needed to improve the QR-code readability.
- Future research on the effect of wax coating on code readability is needed.
- Although consumers liked the concept of laser labeling, people were less likely to recommend or purchase laser-labeled produce. Information on innovative laser labeling technology improved the consumers' perception and overall liking and thus warrants education and outreach programs.
- Laser labeling technology could potentially be used in a commercial application to improve food traceability among several fresh produce commodities.

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