

Active Packaging to Improve Pecan Quality

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Research Projects

- **Chitosan-Essential Oil Coatings to Extend The Storage Life and Improve Safety of Pecans**
- **Amylose Inclusion Complex to Delay Color Change and Reduce Oxidation**
- **Methylcellulose Coatings to Reduce Oxidation in Pecans**
- **Modified Atmosphere Packaging to Reduce Rancidity**
- **Effect of Press Temperature on Pecan Oil Quality**

Objective: preserving pecan quality and increasing value

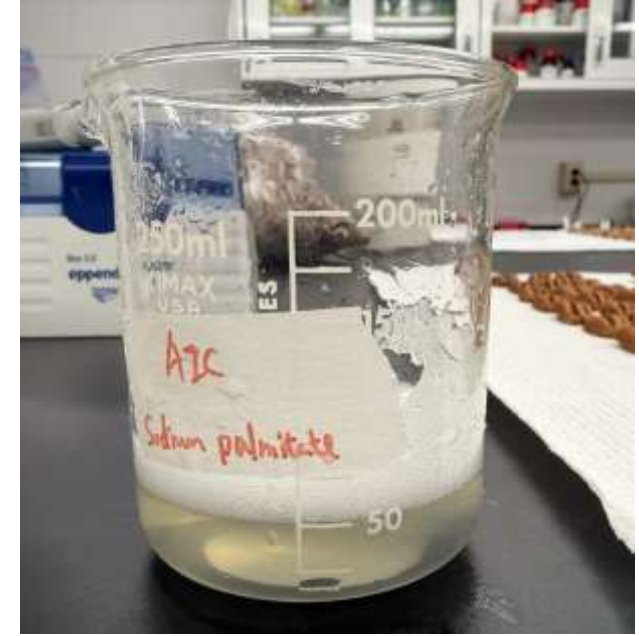
Edible Coatings



Chitosan/Essential Oil



Methylcellulose

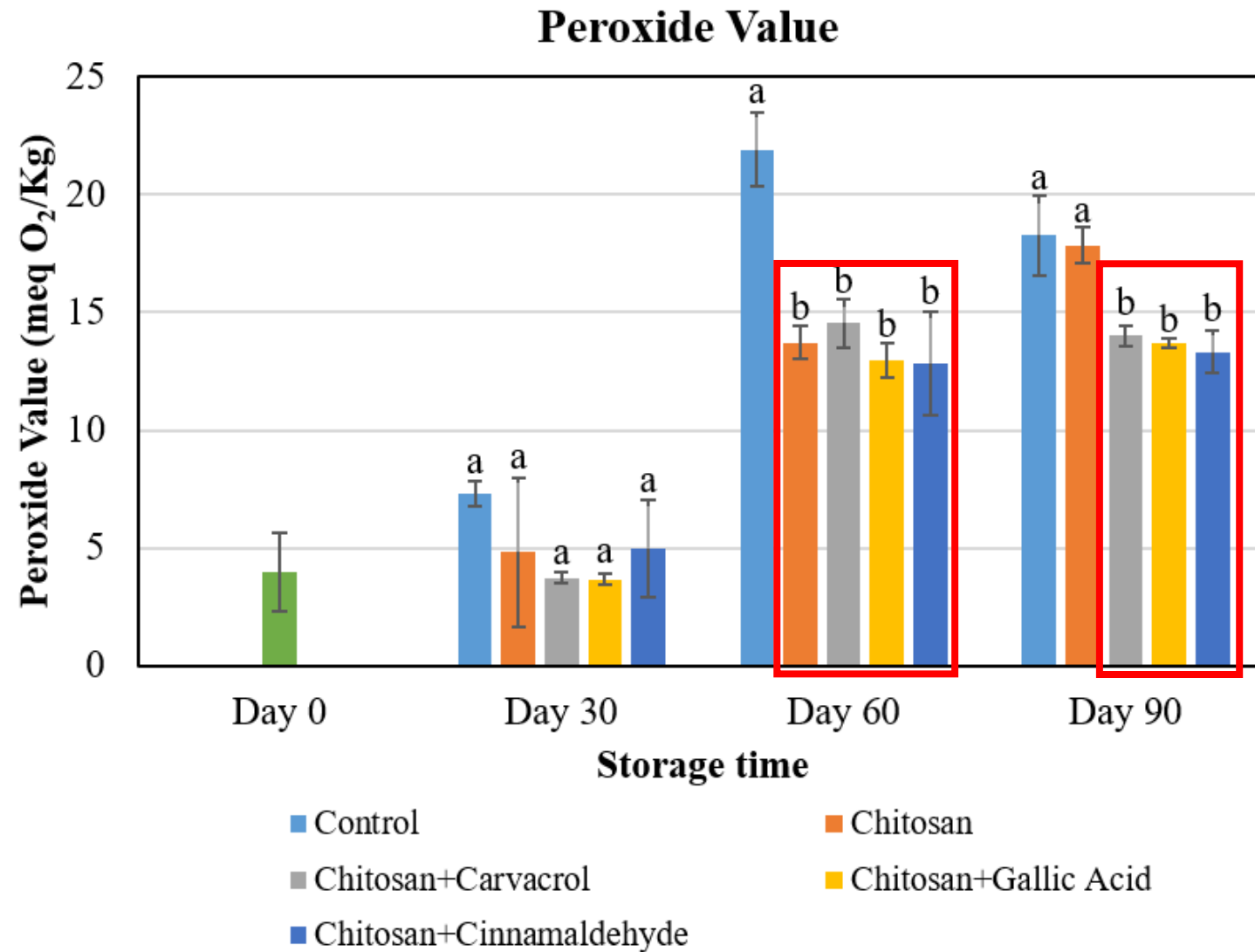


Amylose Inclusion Complex



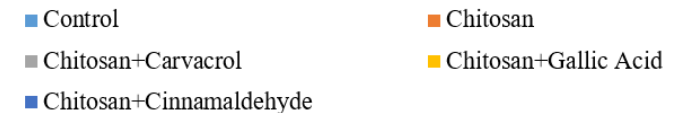
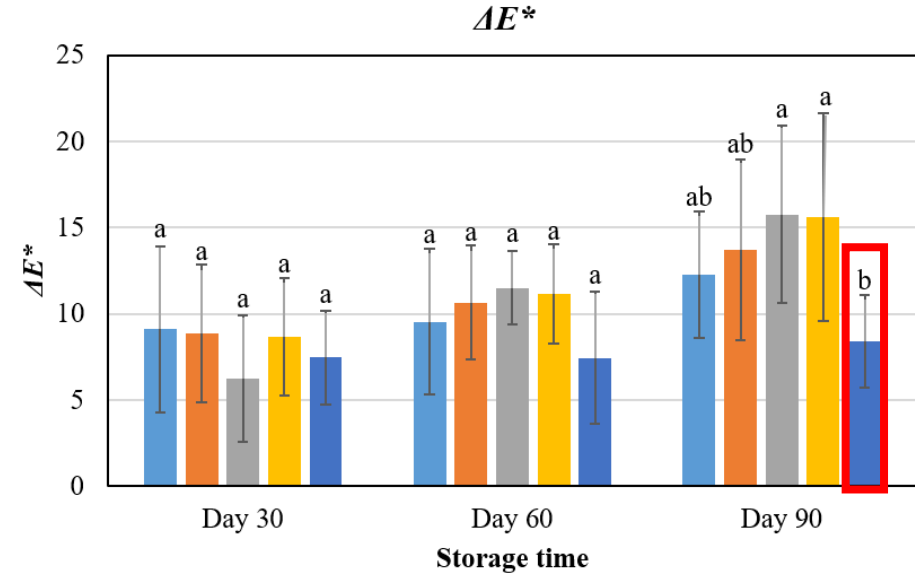
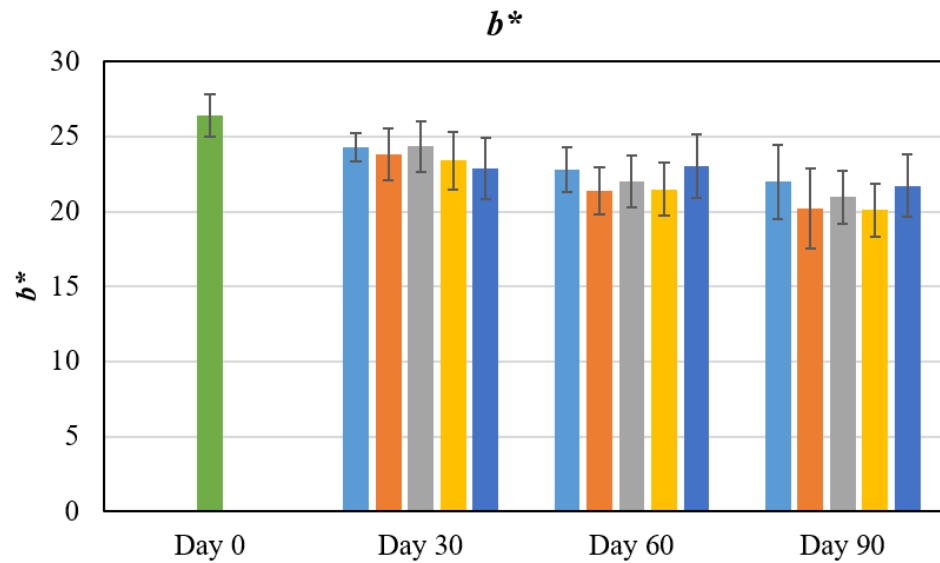
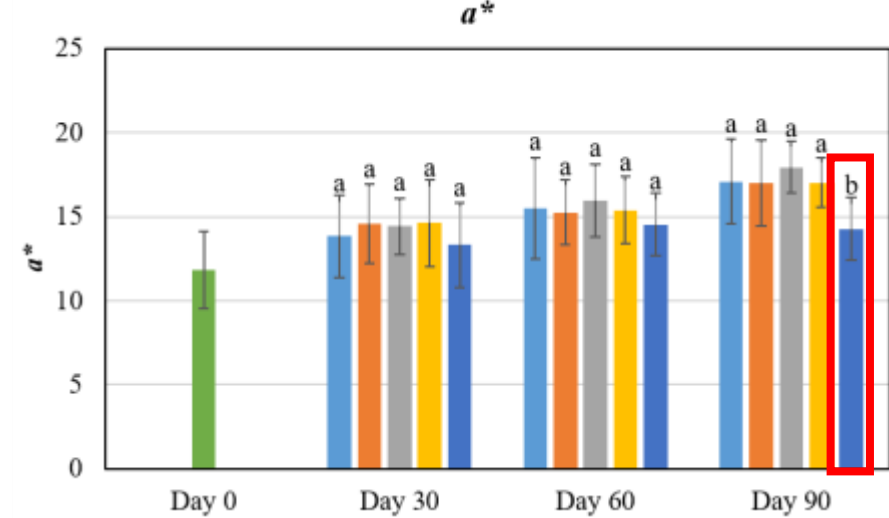
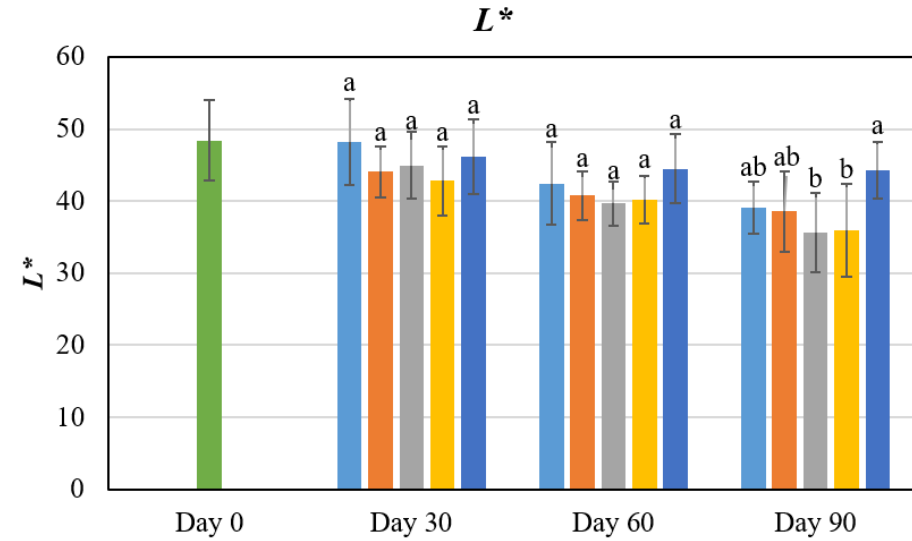
Wax Coatings

Effect of Chitosan Essential Oil Coatings on Peroxide Value



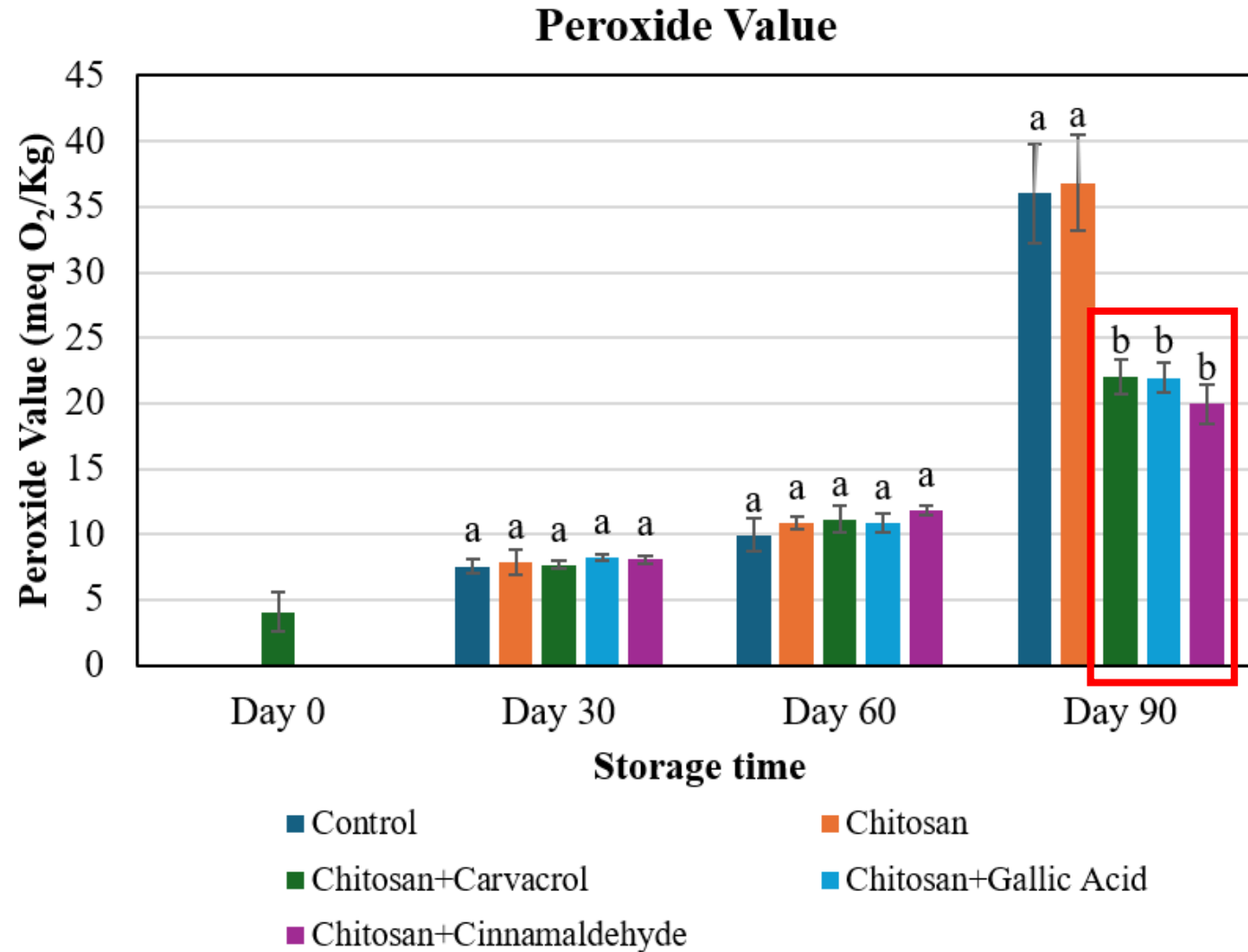
Combining chitosan with antioxidant compounds provides additional protection

Effect of Chitosan Essential Oil Coatings on Color



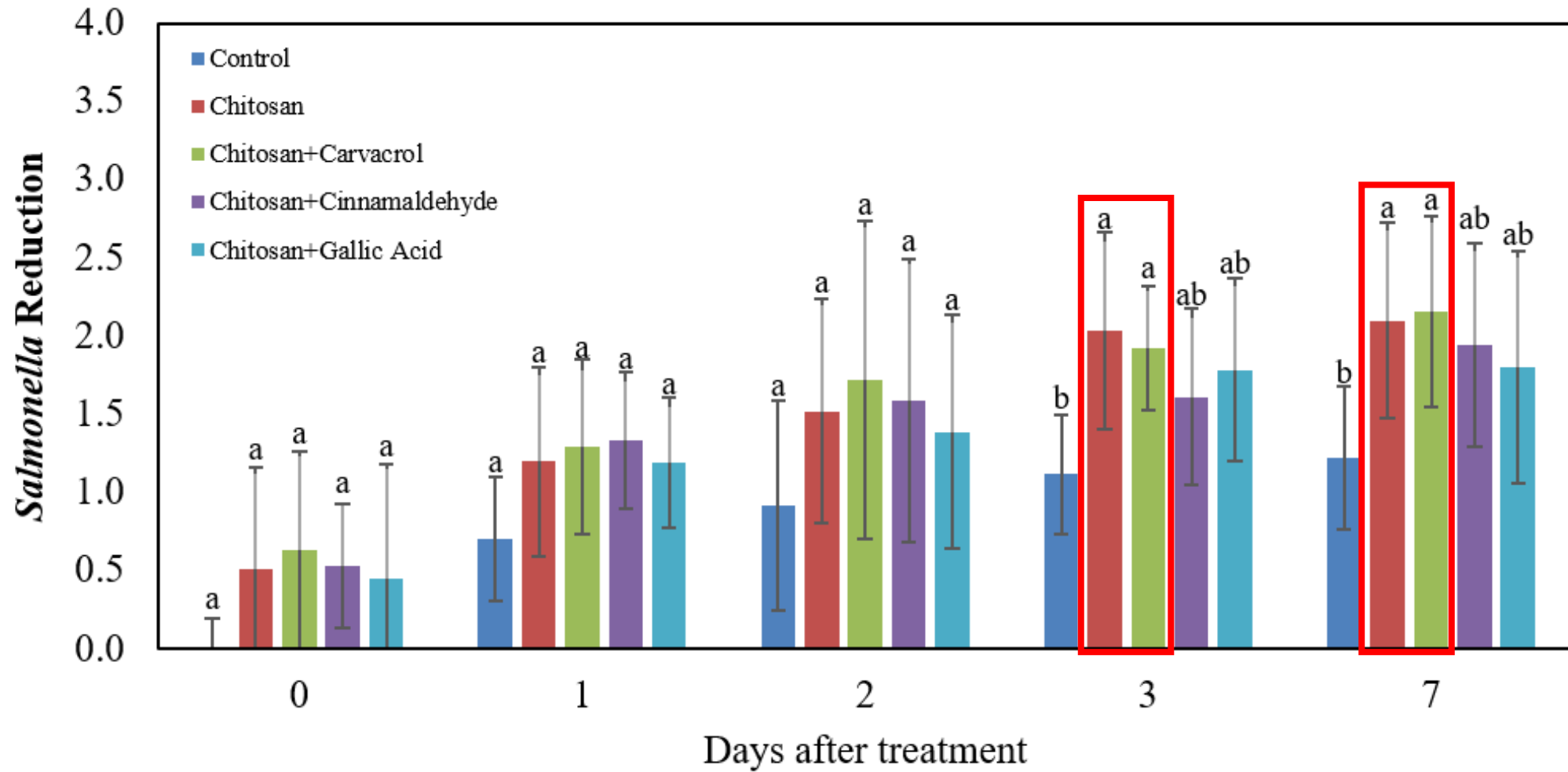
Chitosan with cinnamaldehyde delays the color change

Effect of Chitosan Essential Oil Coatings on Peroxide Value



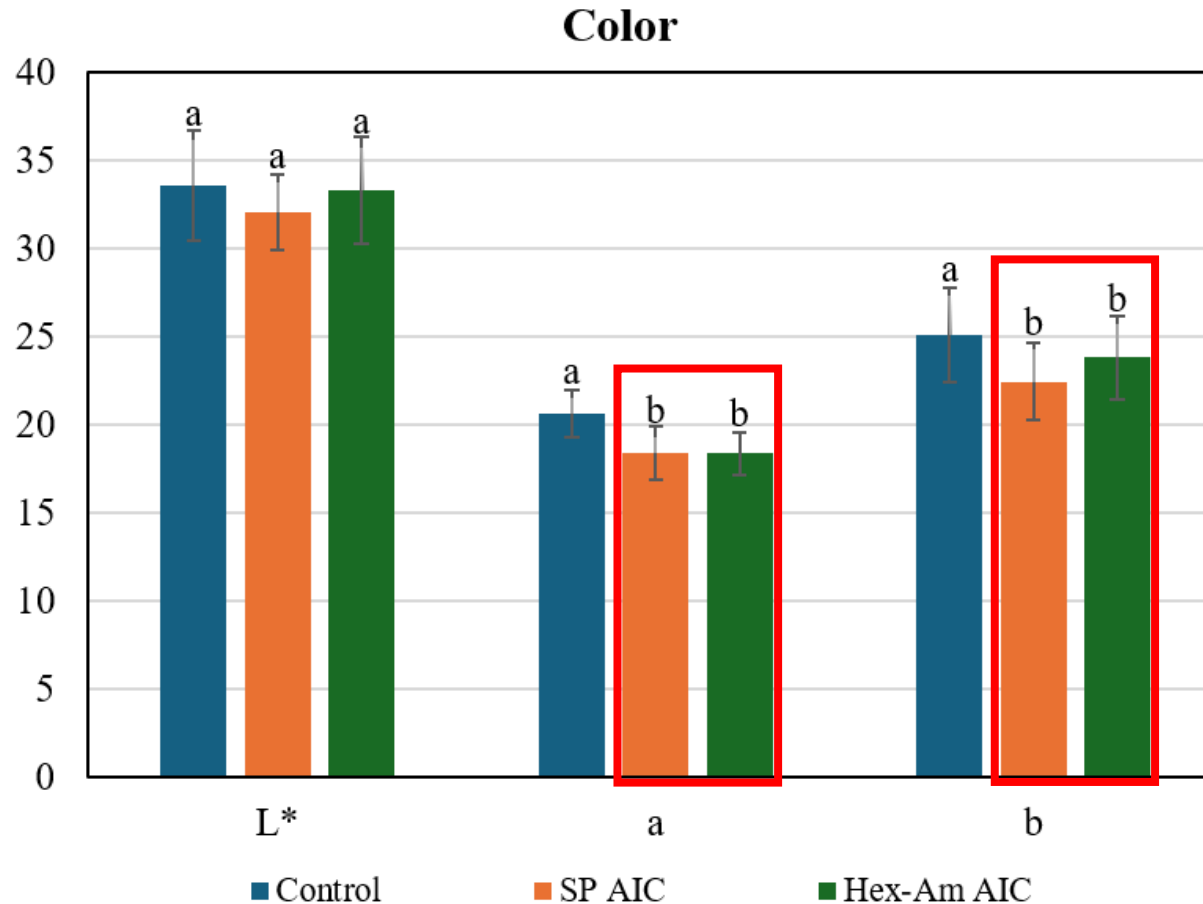
The chitosan-based coatings may be effective across multiple pecan varieties

Effect of Chitosan Essential Oil Coatings on *Salmonella*



Chitosan coatings show stronger antimicrobial activity against *Salmonella*

Effect of Amylose Inclusion Complex (AIC) Coatings on Color



SP AIC:

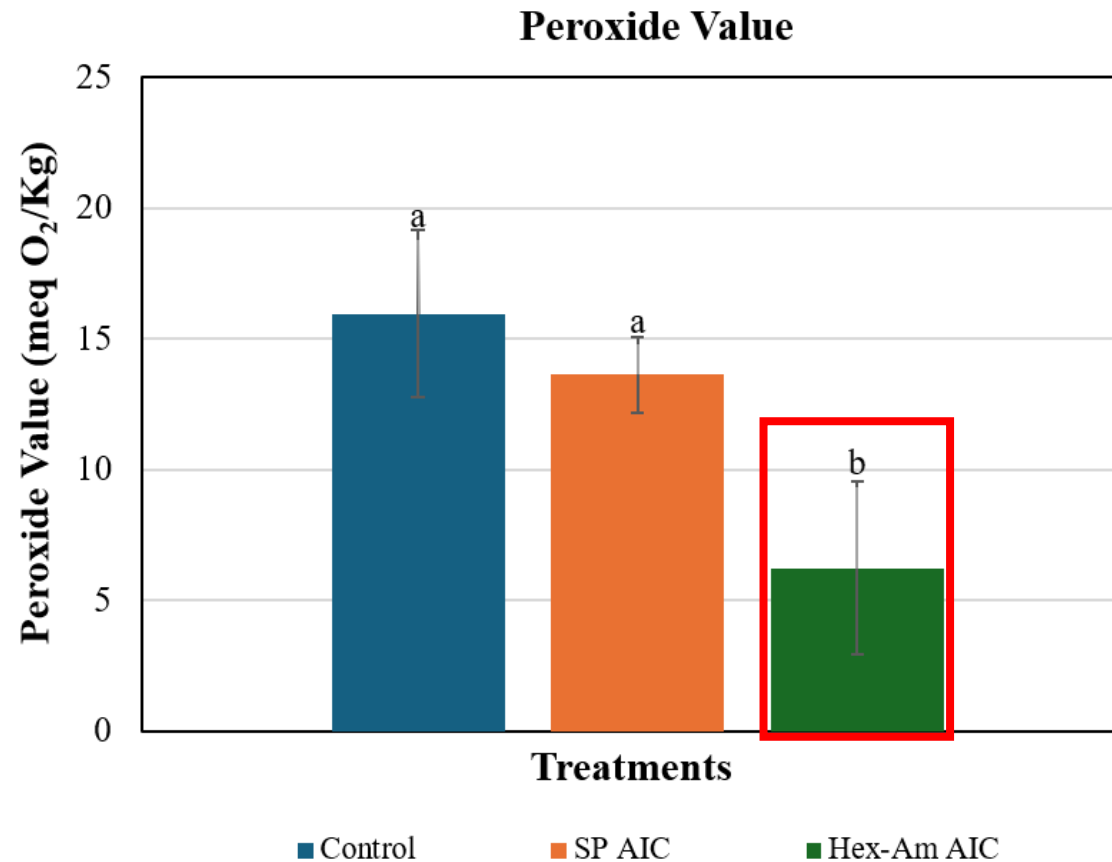
Sodium Palmitate Amylose
Inclusion Complex

Hex-Am AIC:

Hexadecyl Ammonium
Chloride Amylose Inclusion
Complex

AIC coatings delays the color change

Effect of Amylose Inclusion Complex (AIC) Coatings on Peroxide Value



SP AIC:

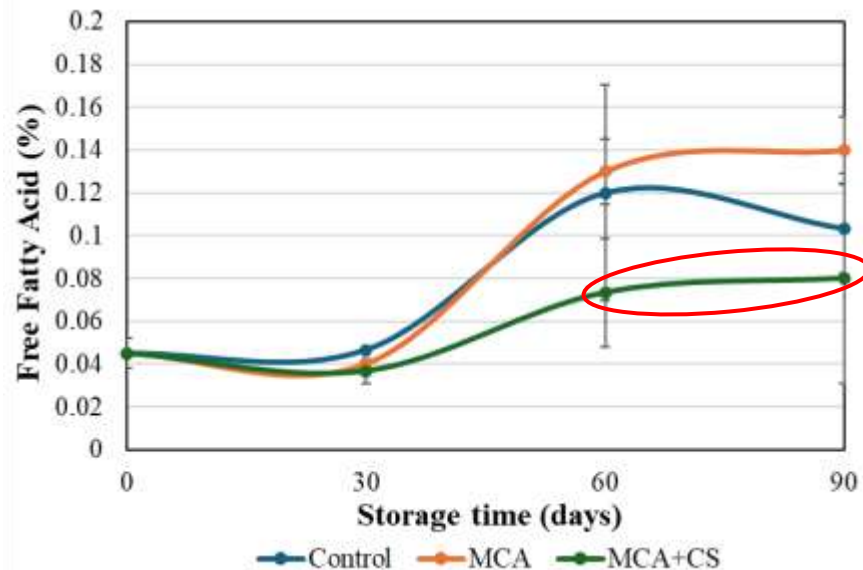
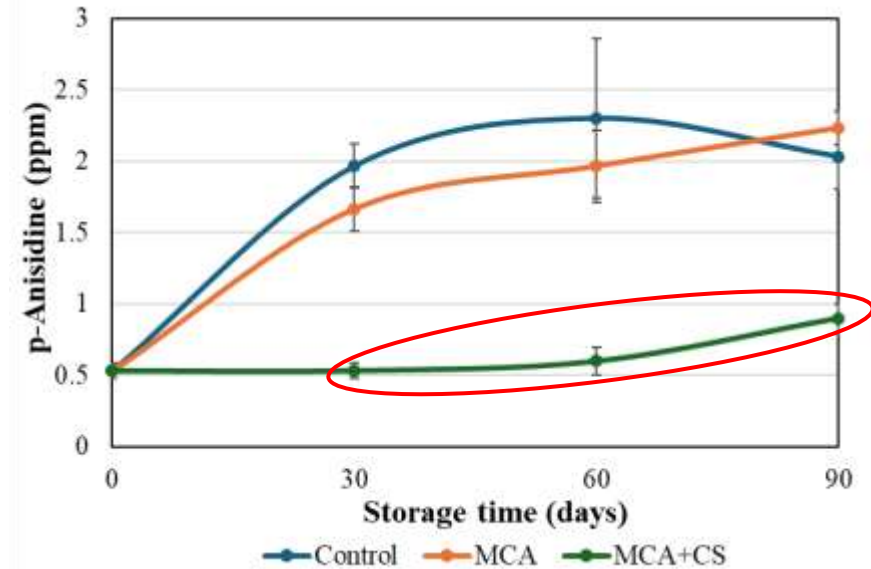
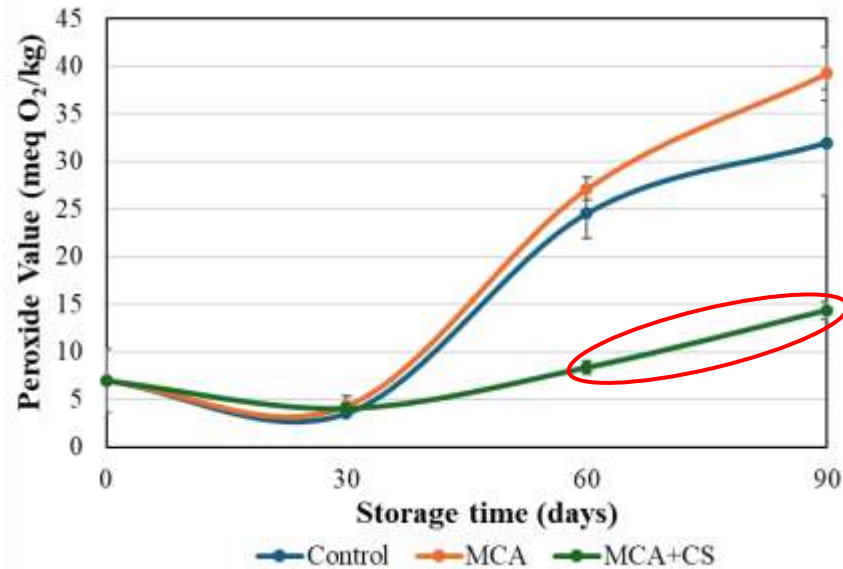
Sodium Palmitate Amylose
Inclusion Complex

Hex-Am AIC:

Hexadecyl Ammonium
Chloride Amylose Inclusion
Complex

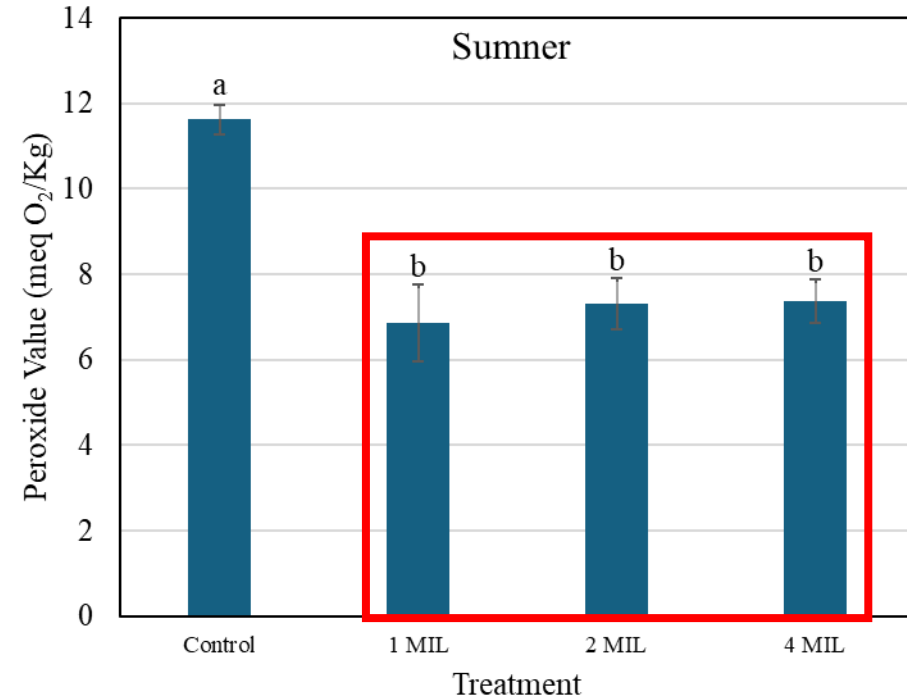
Hex-Am AIC coating delays the oxidation

Methylcellulose (MCA) Coatings



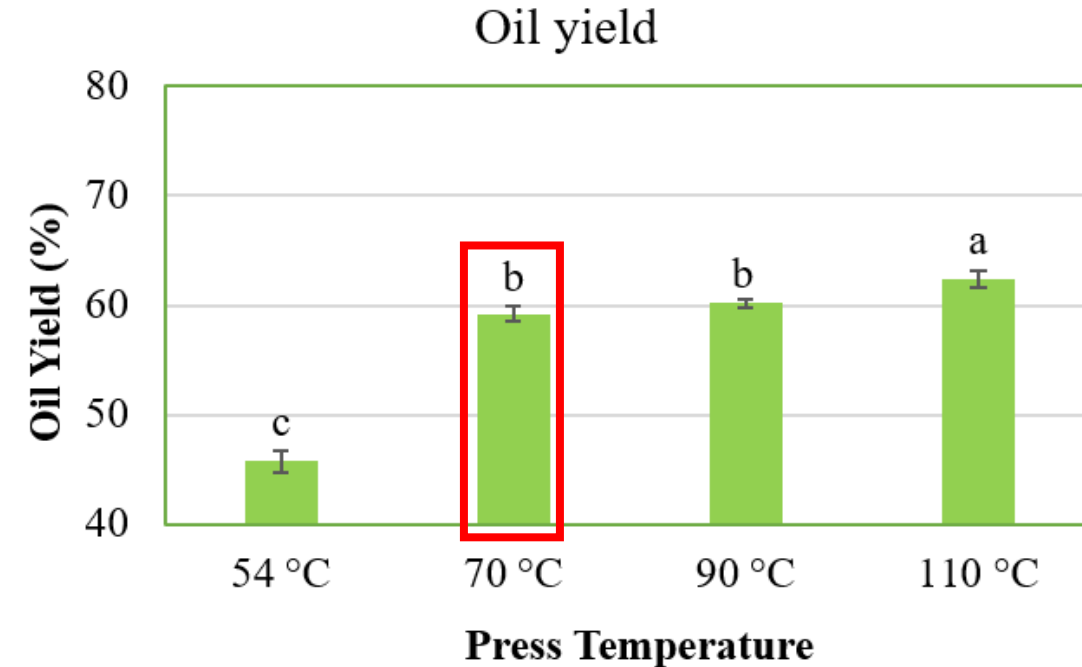
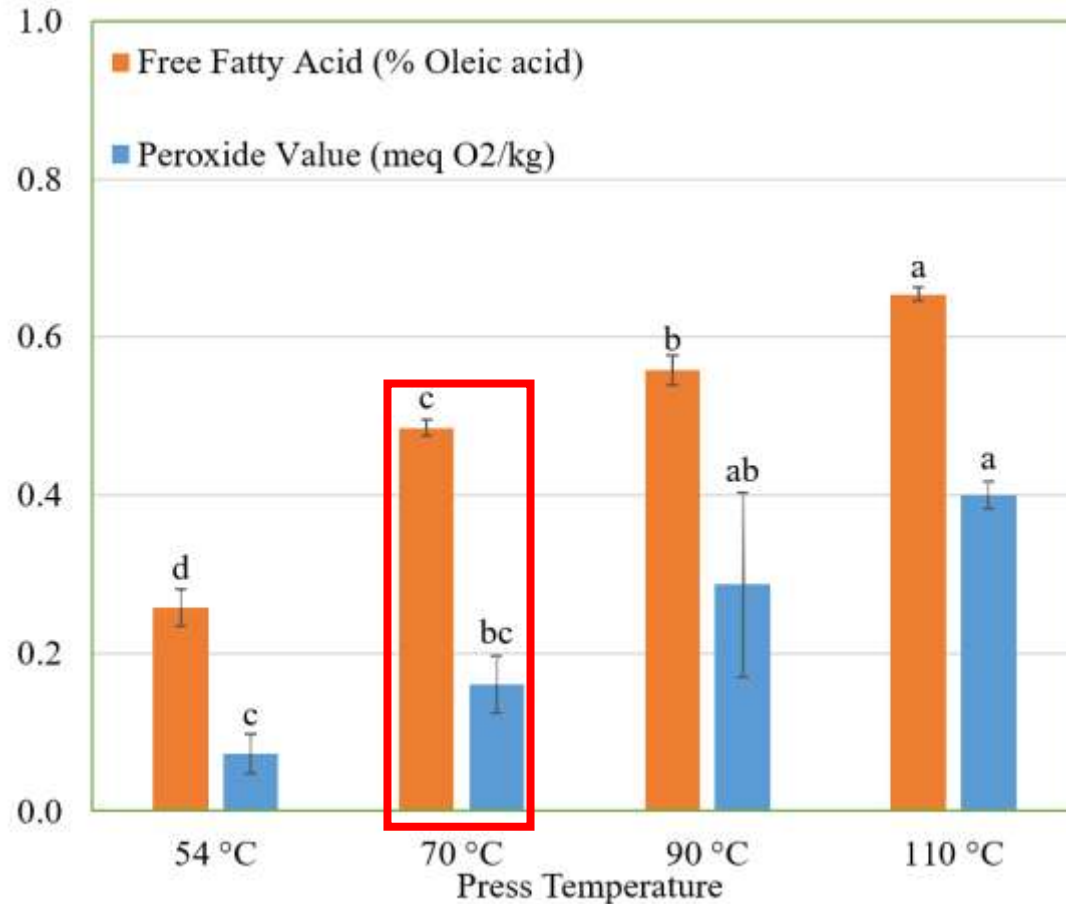
The methyl nanocellulose-chitosan (MCA+CS) coating reduced the PV, PA and FFA values at D60 & D90, demonstrating potential for shelf-life extension

Packaging Methods



Packaging improvements can provide protection against rancidity

Pecan Oil Quality



Pressing at 70 °C balances yield efficiency with minimal quality deterioration

Other on-going Projects

- **Additional coatings methods**
- **Modified atmosphere packaging**
- **Pecan new products (Pecan flour/milk)**
- **Pecan byproducts**



Summary

- Coatings can slow oxidation and color deterioration
- Chitosan-based systems can provide antimicrobial protection
- Packaging can further protect pecans during storage
- 70 °C provides a good balance between oil yield and quality
- Combining preservation + processing strategies may increase pecan value

Thank you!