BIOACTIVE COATINGS OF CHITOSAN AND NEEM OIL FOR PRESERVATION OF CACTUS FRUIT PITAYA IN POSTHARVEST

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ABSTRACT

- *Stenocereus pruinosus* (pitaya) is sweet and tasty, contains phenols and betalains with high antioxidant activities. The consumption is limited for its highly perishability[1-3].
- Therefore, coatings based on chitosan (Q), hydroxypropylmethylcellulose (H), mesquite gum (MG) and neem oil (N) are applied in this study for extending postharvest life of pitaya.
- Q was crosslinked to H (Q-*g*-H) and the blend of Q with MG were used as polymer matrices for the microencapsulation of N (NQ-*g*-H and NQMG).
- NQ-*g*-H produced unstable emulsion with Z-potential close to zero, on the contrary of NQMG.
- Fruits coated with NQ-*g*-H and NQMG presented lower physiological weight loss (WL) than untreated fruits during 15d of storage.
- The fungal contamination and firmness of flesh were significantly different for treated fruits with NQ-*g*-H (4.5CFU/g and 0.61N) than control (5.41CFU/g and 0.36N).
- The color of epicarps were retained with NQ-*g*-H and NQMG coatings, whereas the control became dark.
- The azadirachtin as bioactive compound of N was released from NQ-*g*-H coating at storage conditions of 10±2°C and relative humidity of 75±5%.

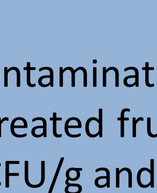
METHODS

Q obtained by fermentation,[4] and heterogeneous deacetylation.

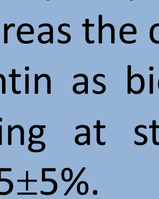
Characterization of Q. Molecular weight (Mv) and degree of acetylation (DA).

COATINGS

NQ-g-H



NQMG

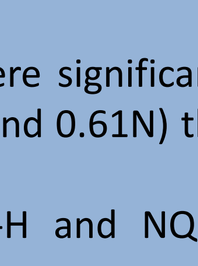


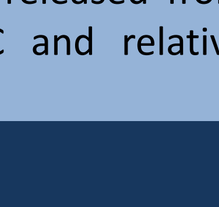
*Q concentration was 5 g/L

Continuous phase: Q* grafted to hydroxydropylmethyl-cellulose (Q-*g*-H).

Disperse phase: Neem oil + mineral oil (ϕ=0.3)

Continuous phase: Q* mixed mesquite gum (QMG).

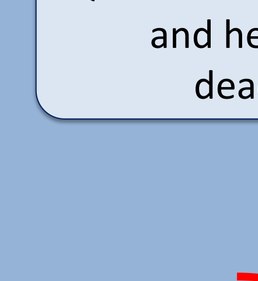




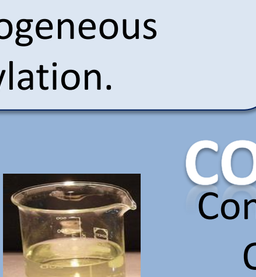
for 10 min
Ampl. 80%
Frec. 1Hz for 10 min

Response variables: Z-potential, drop size and polydispersity (span).

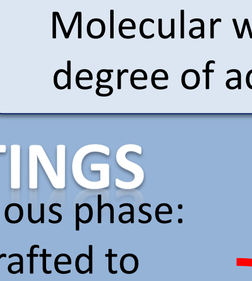
APPLICATION



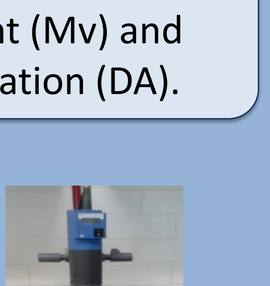
Boned



Selection



Coating



Packed and stored 10±5°C, 75±5% RH.

Response variables: Percentage weight loss (WL), fungal contamination (CFU), pulp firmness, change in color of the epicarp, the release of azadirachtin of N and scanning electron microscopy (SEM).

Acknowledgements.

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RESULTS

Table 1. Characterization of coatings

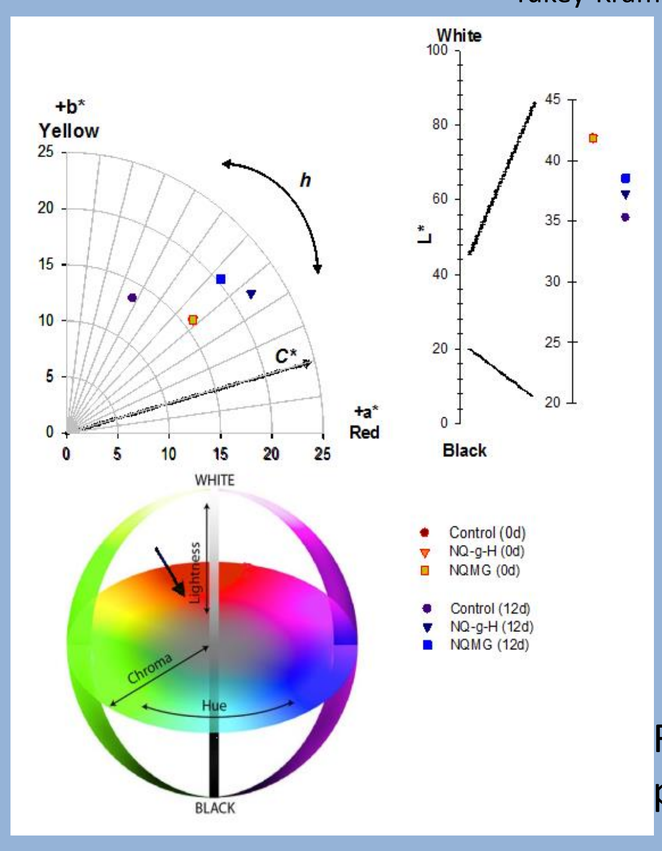
Coating	Z-Potential (mV)	D (3,0) µm	Span
NQ*-g-H	1.08± 0.67 b	2.770± 0.390 b	1.28± 0.01 a
NQ*MG	-21.83±0.97 a	0.393±0.006 a	1.86±0.05 b

*Q presented medium molecular weight (285kDa) with DA of 9.91%. Different letters indicate significant difference ($p<0.05$) determined by multiple mean comparison test of Tukey-Kramer.

Table 2. Determination of WL, fungal growth (CFU) and firmness of pitaya treated with coatings and untreated (control).

	Control	NQ-g-H	NQMG
%WL	6.76±0.35 b	4.63±0.38 a	5.16±0.40 a
Log10(CFU/g)	5.41±0.003 b	4.51±0.06 a	5.25±0.11 b
Pulp firmness (N)	0.36±0.16 a	0.61±0.06 b	0.44±0.05 a

Different letters indicate significant difference ($p<0.05$) by multiple mean comparison test of Tukey-Kramer.



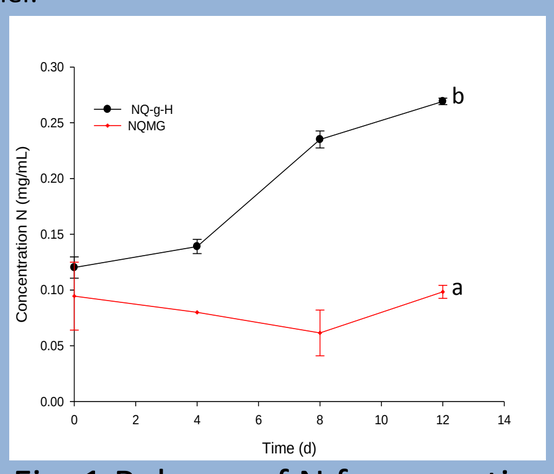


Fig. 1.Release of N from coatings during storage of treated pitayas.
(Different letters indicate significant difference ($p<0.05$) by multiple mean comparison test of Tukey-Kramer).

Fig. 2. Color change in epicarp of pitaya

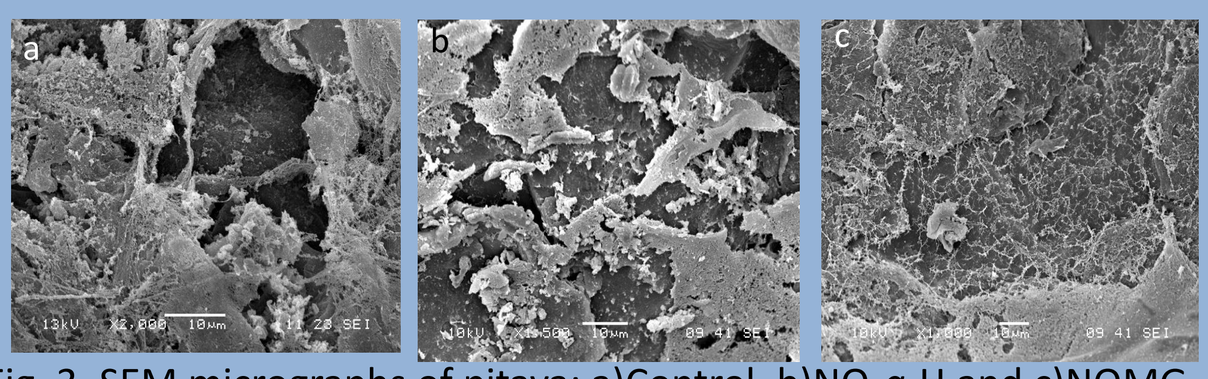


Fig. 3. SEM micrographs of pitaya: a)Control, b)NQ-*g*-H and c)NQMG

CONCLUSION

The coatings NQ-*g*-H and NQMG decreased WL of pitayas, pulp remained with firm texture, as well as maintaned color.

NQ-*g*-H decreases fungal contamination and displays higher release of N rate than NQMG.

Studies on N determination of cytotoxicity is undergoing for food application.

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