

## Highlights

The effect of chitosan, tea polyphenols, and citric acid on avocado storage duration was investigated using a central composite design and response surface methodology by using Design-Expert software. A quadratic polynomial regression mathematical model was constructed with time as the response value to obtain the best concentration combination of chitosan, tea polyphenol, and citric acid for developing the basis of a low-cost, high-efficiency storage preservative for avocados.

The optimisation results show that the preservative effect on avocados was the best when chitosan, tea polyphenols, and citric acid were combined at a concentration of 1%, 2% and 2%, respectively, and when the storage duration was 19.2 days.

Validation tests confirmed that this composite agent effectively delayed the decrease in hardness, the weight loss rate, the soluble solids, soluble protein and vitamin C (VC) content of avocados and decreased their browning index, similar to the predicted results.

These results carry practical significance for guiding avocado storage and preservation technology development.