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Encapsulated butylated hydroxyanisole (BHA) interaction with phospholipid liposomes as monitored by confocal Raman spectroscopy

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Liposome carriers may be used for delayed release of butylated hydroxyanisole (BHA), a lipophilic-hydrophobic antioxidant. The purpose of this research was to investigate molecular interactions between the BHA and the liposomal structure by using Raman spectroscopy. Using a modified dehydration-rehydration method, BHA was dissolved in methanol and incorporated into the liposomes. Confocal Raman analysis of interactions was characterized on the different regions of the liposome phospholipid. The spectra of the BHA alone compared to the BHA in methanol were similar. Raman spectra of liposomes with and without BHA were recorded where the C-N stretching region in the head group shows a major band at 714 cm^{-1} and a vibration at 695 cm 1, a characteristic of BHA ring. Raman spectroscopy enabled us to generate spectra of the different components of the lipid bilayer and the antioxidant BHA. The findings showed that there was a difference between Raman spectra of lipid capsules and lipid capsules containing BHA. These results demonstrated that there was an interaction between the antioxidant BHA and liposomal vesicles.

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Neuro-fuzzy modeling to predict quality and microbiological parameters of partial-dried cherry tomato during storage: Effects of water activity, temperature and storage time

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In the study, osmotically dehydrated cherry tomatoes were partial-dried in an air-drying oven to water activities between 0.746-0.868. The resulting partial-dried cherry tomatoes were vacuum-packed and stored at 4-30°C for up to 60 days. Adaptive neuro-fuzzy inference system (ANFIS) was utilized to predict the quality and microbiological parameters of these partial-dried cherry tomatoes during storage. Satisfactory accuracies were obtained when ANFIS was used to detect the lycopene and total phenolic contents, color and microbial pollutions according to the statistical analysis. Through ANFIS modeling, the effects of water activity, temperature and storage time on the properties of partial-dried tomatoes were visualized. Generally, contents of lycopene and total phenolics decreased with the increase of water activities, temperature and storage time, while aerobic plate count and number of yeasts and molds increased at high water activities and temperatures. Overall, ANFIS approach can be used as an effective tool to study the quality decrease and microbial pollution of partial-dried cherry tomatoes during storage, as well as identify the suitable preservation conditions, which is of importance to the food industry.

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