

# Feasibility of UV-VIS-SWNIR spectroscopy for monitoring Chitosan edible coatings

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## Abstract

Edible coatings have long been known to protect perishable food products from deterioration and loss of quality. Chitosan coatings have an oilfree appearance, a low caloric content and can be used to increase the shelf-life of foods. The objective of this work was to study the ability of UV-VIS-SWNIR spectroscopy in monitoring the composition of chitosan edible coatings in different formulations of plasticizers: i) glycerol (87%, Panreac, Spain): 0 to 2 (w/v); ii) glycerol/sorbitol (50:50) (97%, Acros Organics, Belgium): 0 to 2 (w/v); and iii) corn oil: 0 to 0.6 (w/v) (Sovena, Portugal).

Spectra were collected by a reflectance probe normal to the sample surface for UV-VIS and UV-NIR wavelengths. The samples temperature was recorded ( $18.0 \pm 2.0^{\circ}C$ ) and the probe-sample distance was kept constant for all the samples. The integration time was set to 3 ms and 2 ms for UV/Vis and VIS/NIR spectra, respectively; and ten replicates of each spectra were recorded. The data analysis was performed for each spectral range independently. The spectra were normalized by its maximum intensity and the corrected for using a robust multiplicative scatter correction algorithm. A principal component analysis was performed to the pre-process spectra and the multivariate statistical process control limits (95% and 99%, respectively) were determined for each product/spectral range.

Chitosan and oil concentrations lead to the higher spectral variance, being possible to identify in the control chart the samples with different levels of these components. Glycerol and sorbitol contribution for spectra variability lower, but nevertheless it is possible to identify samples with different compositions of these two components. Results show that the use of UV-VIS-SWNIR spectroscopy is a feasible technique to monitoring chitosan edible coatings. Calibrations for the studied constituents will be attempted in the near future for establishing quality control techniques.