

Synchrotron Radiation in Food Packaging Plastics

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Abstract

The objective of this presentation is to demonstrate the potential of synchrotron X-ray analysis to detect morphological alterations that can take place in high barrier packaging polymers and structures. These changes can affect the packaging gas barrier characteristics when conventional and emerging food preservation treatments are applied to packaged foods. The paper presents the results of a number of experiments where time-resolved combined wide-angle X-ray scattering and small-angle X-ray scattering analysis as a function of temperature and/or water activity were applied to ethylene-vinyl alcohol co-polymers (EVOH), polypropylene (PP)/EVOH/PP structures, aliphatic polyketone terpolymers (PK), amorphous polyamide (aPA), thermoplastic biopolymers and amylopectine. A comparison between conventional retorting (high temperature pressurized water sterilization) and emerging high hydrostatic pressure and irradiation processing treatments in terms of morphological alterations are also presented for the cited polymers and biopolymers. These structural observations have also been correlated with oxygen permeability measurements that are of importance when guaranteeing the intended levels of safety and quality of packaged foods.

References:

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