ISHS Acta Horticulturae 476: International Symposium on Applications of Modelling as InnovativeTechnique in the Agri-Food Chain. MODEL-IT

APPLICATION OF SHELF LIFE MODELLING OF CHILLED SALAD PRODUCTS TO A TTI BASED DISTRIBUTION AND STOCK ROTATION SYSTEM

Authors: P.S. Taoukis, M. Bili, M. Giannakourou

Keywords: Shelf life, Time-Temperature Indicator (TTI), chilled salad

Abstract:
The shelf life of two chilled products, widely consumed in Greece, russian salad and eggplant salad, was studied. These products were microbiologically stable through application of hurdle technology principles and had a target refrigerated shelf life of 2 to 3 months. For such microbiologically stable, complex foods, end of shelf life is usually signalled by an unacceptable loss of sensory attributes. Shelf life testing was conducted at 4 to 15°C. The end of shelf life, was based on overall organoleptic unacceptability and development of rancidity. Use of Weibull Hazard Analysis facilitated shelf life determination and modelling of sensory evaluation data. Relatively low activation energies of shelf life loss were estimated for the two products ranging from 21 to 31.5 kJ/mol. The response of Time Temperature Indicators (TTI) was also kinetically studied. Two types of enzyme based TTIs, having a time temperature dependent colour change, had activation energies of 48.3 and 68 kJ/mol.

Simulation studies at variable storage temperatures showed the applicability of these TTI as shelf life monitors of the chilled products under study. The correlation error was smaller with the TTI that had the lower Ea, closer to the Ea of the foods. Finally a distribution and stock rotation system based on the TTI and using the principle of LSFO (Least Shelf life First Out) instead of the FIFO (First In First Out) was studied. Using temperature distribution data from the chill chain, the advantages of the LSFO system are demonstrated.