Abstract

Changes of the main sensory attributes of three fresh-cut leafy vegetables (Iceberg and Romaine lettuce and chicory) were investigated at selected temperatures (2–20 °C). The aim of this work was to develop and apply a kinetic approach to model sensory quality changes in order to establish the appropriate function that describes the time–temperature dependence of each attribute. The changes of the sensory characteristics followed first order reaction kinetics and the temperature dependence of rate constants followed the Arrhenius relationship. The limiting quality factor, which determined the sensory shelf life for the three fresh-cut vegetables assayed, at any temperature, was the general appearance of the products. The activation energies obtained for general appearance were 71.1 kJ mol^{-1} for fresh-cut Iceberg lettuce, 69.5 kJ mol^{-1} for fresh-cut Romaine lettuce and 65.7 kJ mol^{-1} for fresh-cut chicory. Additional experimental tests showed that the predicted and experimental sensory shelf life for individual fresh-cut vegetables at constant temperature were not different ($P > 0.05$). Under dynamic temperature conditions (sequence of different temperatures), the predicted and experimental values of browning, wilting, and off-odour were also not different ($P > 0.05$), but the general appearance loss model overestimated the quality loss from 10 to 30%. The models of quality change for individual vegetables were used to predict the sensory shelf life of fresh-cut mixed vegetables. The experimental validation tests proved that these models provide a good approach to evaluate the shelf life of the mixed product. Results showed that the general appearance of fresh-cut Iceberg and Romaine lettuce dominated the sensory perception of mixed product.