

Title Shelf life of minimally processed potatoes. Part 1. Effects of high oxygen partial pressures in combination with ascorbic and citric acids on enzymatic browning

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Abstract

The shelf life of minimally processed potatoes is limited by enzyme-catalysed browning reactions. Generally, this phenomenon is controlled by the use of chemical reagents such as ascorbic acid, citric acid, or 4-hexyl resorcinol, but it seems that “oxygen shock” treatments are also particularly effective in inhibiting enzymatic browning. The aim of this work was to study the effects of high oxygen partial pressures in combination with ascorbic and citric acid on the development of the enzymatic browning of peeled and cut potatoes (‘Primura’ variety) that were packaged in flexible pouches and stored at 5 °C for 10 days. Different treatments, chosen in according to a central composite design, were applied to the sliced potatoes. The browning development during storage was measured by a tristimulus colorimeter. Second-order polynomial models were computed for three periods of storage (3, 7 and 10 days) to relate the independent variables (oxygen partial pressure, ascorbic and citric acid concentrations) to the colour function attributes.

The effectiveness of the statistical approach offered the possibility to investigate the effects of several processing conditions involved in the enzymatic browning of minimally processed potatoes, while the response surface methodology allowed the identification of the optimum range of the independent variables which prevented browning.