Influence of blanching treatments on colour, texture, chlorophylls content and sensory quality of broccoli (*Brassica oleracea* L.)

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Blanching is a thermal treatment often used to improve quality of frozen vegetables, since it inactivates endogenous enzymes responsible for quality degradation during storage under frozen conditions. However, the severity of the process should be controlled in order to preserve colour, texture, flavour, and nutritional characteristics of the products. Optimisation of the blanching processes requires the knowledge of the relationship between quality parameters and thermal process temperature.

The main objective of this work was to evaluate texture (using Kramer Shear cell), colour (CIE *L**a*b* coordinates), chlorophylls and pheophytins content and sensory characteristics of thermal processed broccoli, under five isothermal conditions ranging from 70º to 90ºC.

Results showed that, for all quality parameters analysed, significant differences ($p<0.05$) were detected as temperature increased. Textural (maximum force and energy) and colour (a/b and hº) parameters were modelled using a zero-order kinetic model, assuming an Arrhenius-type dependence of the rate constants on temperature. The model parameters, rate constant at a reference temperature, $k_{80ºC}$, and activation energy, Ea, were estimated by non-linear regression analysis. The $k_{80ºC}$ and Ea values were 38.8, 268.5, 0.005 and 0.23 min^{-1} and $158x10^3$, $155x10^3$, $28x10^3$ and $29x10^3$ $Jmol^{-1}$, respectively for maximum force, energy, a/b and hº.

High correlations were found between physical measurements (maximum force and a/b colour parameter) and texture and colour sensory perceived changes ($R^2=0.95$ and $R^2=0.78$, respectively).

Keywords: Broccoli, thermal treatment, quality, kinetics