Title Green beans (*Phaseolus vulgaris*, L.) quality loss upon thawing

Author R. C. Martins and C. L. M. Silva

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Abstract

Frozen green beans (*Phaseolus vulgaris*, L.) thawing is one of the operations that compromises significantly quality. The present research aims at studying the effects of thawing, at environmental and refrigeration temperatures, on the quality profile of a frozen green beans package. Quality losses were computationally evaluated, using a simulation system based on object-oriented technologies. Simulations show that sensory parameters, such as flavour and colour, are more sensitive to thawing at environmental temperatures, than nutritional parameters, such as vitamin C and starch contents.

The study demonstrates that green beans quality retention is also influenced by packaging materials, with different degrees of thermal insulation, and environmental conditions, such as temperature and surface heat convection coefficients.

Important conclusions are discussed on shelf-life limiting quality parameters during thawing and temperature abuses, as well as on thawing green vegetables to maximise their quality profile. Results emphasise that the principle of high-temperature–short-times is not directly applicable to frozen green beans thawing. Furthermore, simulations lead to the conclusion that overall quality profile is maximised by thawing under refrigeration temperatures.