

Abstract:

Fruit and vegetable processors, faced with the challenge of gaining and maintaining a healthy position in the competitive fruit and vegetable sector, are optimising traditional processes towards product quality. Using frozen potatoes as a case study, the aim of this study was to evaluate the potential of improving the texture of potatoes by modifying the processing conditions. The texture of processed frozen potatoes is the result of the integral effect of the unit operations applied through the production chain. Production of frozen potatoes includes a blanching, a freezing, thawing/cooking step before being served. In this study, blanching temperatures from 70 to 97 °C up to 10 minutes were tested and combined with freezing by two freezing methods, impingement and air-blast freezing. The texture was measured after cooking of frozen potatoes in boiling water. Besides texture, water holding capacity, microstructural evaluation and pectinmethylesterase (PME) activity were determined. Blanching of potatoes prior to freezing can both improve water holding capacity and texture of potatoes, but this effect depends on the freezing rate and blanching temperature. Potatoes frozen with fastest freezing method are firmer and hold more water than the ones frozen by air-blast freezing. Blanching at 70 °C can lead to potatoes that after cooking retain a firmer texture, compared with blanching at 90 °C. The duration of the blanching treatment has also an important effect on texture changes. The studies of PME activity showed a good correlation between texture and PME for blanching at 90 °C, but for blanching at 70°C and longer times, the development of texture does not seem to be solely related to PME activity. Microstructural studies showed that the differences in texture are due to differences in the degree of starch gelatinisation and integrity of the cellular structure.