

Title Thermal inactivation of polyphenol oxidase from Swiss chard (*Beta vulgaris*) stems
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Abstract

To ensure a self-life around three weeks without spoilage of their organoleptic and nutritional quality, sous-vide cook-chill, vegetables must experience a low heat treatment. For a correct processing of vegetables in this form, and an adequate selection of the temperature-time combination, is vital to know the thermal resistance of the enzymes responsible of the browning, as the polyphenol oxidase (PPO; EC 1.10.3.1). Swiss chard stem is a vegetable which quality may be affected by this enzyme and, due to his gastronomic characteristics, a potential "V gamme" product. The present work studies the inactivation kinetics of PPO of Swiss chard stems using a method of thermal gradient. The enzyme is extracted at different pHs (4, 5, 6 and 7) from internal and external stems of the plant. The PPO activity increases when pH does, being higher for the inner stems. The results show that the thermodestruction kinetic of the PPO is of first order, adjusting to a classical D, z model ($R^2 > 0.98$). At the pH corresponding to the physiological value (pH=5), the enzymes present in internal stems have a higher thermoresistance ($D_{80^\circ\text{C}} = 146,4 \pm 5,7$ s, $z = 13,3 \pm 1,6$ °C) when are compared to those of external ($D_{80^\circ\text{C}} = 52,9 \pm 6,8$ s, $z = 11,9 \pm 0,4$ °C).