

Title Inactivation of pepper (*Capsicum annuum*) pectin methylesterase by combined high-pressure and temperature treatments

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Abstract

Pressure and/or temperature inactivation (at mild temperature, 10–64 °C, in combination with high-pressure, 0.1–800 MPa) of the labile fraction of purified pepper pectin methylesterase (PME) was studied in a model system at pH 5.6. Inactivation of the labile fraction under mild-heat and high-pressure conditions could be accurately described by a fractional conversion model, while a biphasic model was used to estimate the inactivation rate constant of both fractions at more drastic conditions of temperature/pressure. At lower pressures ($P \leq 300$ MPa) and high temperatures (>54 °C), an antagonistic effect of pressure and temperature was observed. Pressure and temperature dependence of the inactivation rate constants of the labile fraction was quantified using the Eyring and Arrhenius relations, respectively. A third-degree polynomial model (derived from the thermodynamic model) was successfully applied to describe the temperature/pressure dependence of the inactivation rate constants of the labile pepper PME fraction.