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# Comparison of the thermal inactivation kinetics of Byssochlamys fulva and three enzymes used as TTI?s for various food processes under conventional and ohmic heating

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Ohmic heating technology has regained interest for aseptic food processing of highly viscous fluids (e.g. fruit pulps and purees) or particulate fluids. The industrial application of this technology is fully dependent on its validation with experimental data in order to evaluate the effects of the electric field on microorganisms, enzymes and biological tissues. This work aims at determining the effect of an electric field on the thermal inactivation kinetics of a highly heat resistant microorganism (Byssochlamys fulva - an ascospore producer thermophilic fungus) and also on the inactivation kinetics of several enzymes used as time-temperature integrators (TTI's) (lipoxygenase - LOX, polyphenoloxidase - PPO and alkali phosphatase - PA). For both ohmic and conventional processes, and for similar samples' thermal histories, the corresponding D-values were determined, leading to the calculation of the z-value, the activation energy (Ea) and the pre-exponential factor (k) of Arrhenius equation. B. fulva death kinetics were determined in an industrial strawberry pulp (14.5 ºBrix, pH=4.0); PA inactivation was determined in raw milk and PPO and LOX inactivation was determined in buffer. In all cases first order inactivation kinetics were observed. The experimental D values for B. fulva obtained under ohmic heating (Doh) conditions were half the ones obtained for conventional heating (Dconv) (T=85 ºC, Dconv=7.23; Doh=3.27). Similar results were found for PPO: ohmic D values were three times lower than those for conventional heating (T=75 ºC, Dconv=61.61; Doh=19.37). For LOX, D values were lower for ohmic heating but z and Ea values were slightly higher when compared to conventional heating. For PA no significant differences were found between the two heating processes in terms of D, z or Ea values. The electric field reduces the D values for both enzymes and microorganisms but z and Ea values are not greatly affected by the electric field. The obtained kinetics will be used to validate thermal processing in a pilot scale continuous ohmic heater.