

Title Comparison of the inactivation kinetics of pectin methylesterases from carrot and peach by high-pressure carbon dioxide

Author Linyan Zhou, Yan Zhang, Xiaosong Hu, Xiaojun Liao and Jinfeng He

Citation Food Chemistry, Volume 115, Issue 2, 15 July 2009, Pages 449-455

Keywords High-pressure carbon dioxide; Pectin methylesterase; Inactivation; A fractional-conversion model

Abstract

The inactivation of pectin methylesterases (PMEs) from carrot and peach in buffer by high-pressure carbon dioxide (HPCD) at 55 °C was investigated. The two PMEs were effectively inactivated by HPCD, their residual activity (*RA*) decreasing with increasing pressures. The *RA* of the two PMEs exhibited a fast decrease firstly and reached a constant after a prolonged treatment time; their inactivation kinetics was adequately modelled by a fractional-conversion model. The non-zero $RA(A_{\infty})$ of the two PMEs was 6-7%, with increasing pressures the kinetic rate constant, *k*, increased and the decimal reduction time, *D*, decreased for the HPCD-labile fraction of the two PMEs. The labile fraction of carrot PME was more susceptible to HPCD than that of peach PME; the activation volume, V_a , and Z_p (the temperature increase needed for a 90% reduction of *D*) was -1079.37 cm³/mol and 5.80 MPa for carrot PME, and -130.51 cm³/mol and 48.31 MPa for peach PME.