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Inactivation of mushroom polyphenoloxidase in model systems exposed to high-pressure carbon dioxide

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Highlights:

HP-CO_2 treatments quickly inactivated mushroom polyphenoloxidase in model systems

Pressure sensitivity (z_P) of enzyme inactivation was *circa* 5.5 MPa at 20 and 35 °C

At 20 and 35 °C, activation volume $\neq V^{\neq}$ was about -1000 cm^3 mol^{-1}

HP-CO_2 did not change the electrophoretic pattern of polyphenoloxidase

Abstract

An aqueous solution containing mushroom polyphenoxidase was exposed at 20, 35 and 45 °C for up to 15 min to CO_2 at increasing pressure up to 18 MPa. Samples were analysed for residual enzymatic activity and SDS-PAGE patterns. At 20 and 35 °C, HP-CO_2 allowed non-thermal and irreversible inactivation of polyphenoloxidase with decimal reduction time (D_P) that decreased when pressure increased. At 45 °C, complete inactivation was achieved in less than 0.2 min at all CO_2 pressures. The pressure sensitivity parameter (z_P) of inactivation rate resulted similar at 20 and