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

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

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12 Keywords: dense-phase CO₂; tyrosinase; inactivation kinetics; SDS-PAGE

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14 Highlights:

15 HP-CO₂ treatments quickly inactivated mushroom polyphenoloxidase in model systems

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

17 At 20 and 35 °C, activation volume $\neq V^{\ddagger}$ was about -1000 cm³ mol⁻¹

18 HP-CO₂ did not change the electrophoretic pattern of polyphenoloxidase

19

20 **Abstract**

21 An aqueous solution containing mushroom polyphenoloxidase was exposed at 20, 35 and 45 °C for
22 up to 15 min to CO₂ at increasing pressure up to 18 MPa. Samples were analysed for residual
23 enzymatic activity and SDS-PAGE patterns. At 20 and 35 °C, HP-CO₂ allowed non-thermal and
24 irreversible inactivation of polyphenoloxidase with decimal reduction time (D_P) that decreased
25 when pressure increased. At 45 °C, complete inactivation was achieved in less than 0.2 min at all
26 CO₂ pressures. The pressure sensitivity parameter (z_P) of inactivation rate resulted similar at 20 and

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