

# Inhibitory effect of chlorogenic acid on polyphenol oxidase and browning of fresh-cut potatoes

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## Abstract

In our study, the inhibition mechanism of chlorogenic acid (CGA) on PPO was investigated by enzyme kinetic analysis, fluorescence quenching, thermodynamic parameters analysis, circular dichroism and molecular docking. Our results showed that CGA inhibited PPO activity in a reversible mixed-type manner and  $K_i$  was estimated to be  $3.577 \times 10^{-4} \text{ mol L}^{-1}$ . PPO activity was significantly inactivated by CGA in a dose-dependent manner and  $IC_{50}$  was calculated as  $1.55 \times 10^{-4} \text{ mol L}^{-1}$ . CGA interacts with PPO and quench its intrinsic fluorescence. Furthermore, results indicated that CGA bound with PPO by hydrophobic interaction. In addition, CGA changed the hydrogen bonding network of PPO and resulted in rearrangement of secondary structure. The molecular docking results suggested that CGA bound to active site of PPO. Importantly, the efficacy of CGA inhibiting the enzymatic browning of fresh-cut potato slices was confirmed by the inhibition of PPO. Therefore, based on the inhibition of PPO, CGA might represent a new type of inhibitor for fresh-cut potatoes.