Characterization of polyphenol oxidase from mango (Mangifera indica L. cv. Chokanan) peel

ABSTRACT

Plant polyphenol oxidase showed positive effect in the production of coca, black tea and flavonoid-derived colorants and antioxidants. High activity and stability in a wide range of pH and temperature of plant enzyme make it suitable and also inexpensive for use in industry. For these reasons, there is growing interest in seeking more plant sources of polyphenol oxidase. Mango (Mangifera indica L. cv. Chokanan) peel can be a potential source of polyphenol oxidase, which has been extracted and purified from peel of mango using the aqueous two-phase system (ATPS). In the present study, the effects of different temperatures, pH, inhibitors and metal ions on the stability and activity of polyphenol oxidase from mango peel were investigated. In addition, the molecular weight of this enzyme was estimated at 133 kDa by sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE). The highest enzyme activity of polyphenol oxidase to catalyze catechol in sodium phosphate buffer was achieved at 55°C at pH 5.5. Furthermore, the enzyme was stable at temperatures of 10 to 60°C and pH 3 to 6. Beta-mercaptoethanol, ascorbic acid, l-cysteine and pyrogallol were effective inhibitors of the enzyme. Also, activity of polyphenol oxidase was increased in the presence of some metal ions such as Ca2+, Mg2+ and Cu2+ which implies that the enzyme involved metal ions. Therefore, polyphenol oxidase extracted from mango (Mangifera indica L. cv. Chokanan) peel has potential applications in various industries because it is thermostable under high temperatures in either acidic medium, or when there is the presence of metal ions.

Keyword: Characterization; Mango (Mangifera indica L. cv. Chokanan) peel; Enzyme; Polyphenol oxidase; Temperature stability; Optimum pH; Molecular weight