Molecular Biology Research Communications 2014; 3 (Suppl. 1): 290 MBRC
Poster – P213 Open Access
The National Conference on Protein & Peptide Sciences: From Basic to Medical & Industrial Applications
Shiraz University 10 & 11 December 2014

Study of 2-mercaptobenzoic acid and 2-pyridinethiol as inhibitors on the cresolase and catecholase reactions of mushroom tyrosinase

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ABSTRACT

Catecholase and cresolase activities of mushroom tyrosinase (MT) were studied in the presence of 2-mercaptobenzoic acid (thiosalicylasaure) and 2-pyridinethiol inhibitions. Caffeic acid and p-coumaric acid were used as natural substrate for the enzyme for the catecolase and cresolase reactions, respectively. The catecholase and cresolase activities of MT in the presence of 2-pyridinethiol as inhibitor achieved in the concentrations of (1.5, 3, 4.5 and 6 μM). In addition, the cresolase and catecholase activities of MT in the presence of 2-mercaptobenzoic acid used in presence of (2.5, 5, 10 and 15 μM). The inhibition constant (Ki) values of 2-pyridinethiol obtained 0.84 and 5.37 μM for catecholase and cresolase reactions, respectively, with noncompetitive pattern. But for the 2-mercaptobenzoic acid revealed a competitive mode of inhibition with the inhibition constants of 5.45 and 9.35 μM, for catecholase and cresolase reactions, respectively. Thus, the results showed that the carboxyl and sulfydryl functional group of these organosulfur compounds play a crucial role in the inhibition of MT. Their Ki values showed that they are among the good inhibitors of enzyme.

Key words: Mushroom tyrosinase; 2-mercaptobenzoic acid; 2-Pyridinethiol; Inhibition; Sulfur