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Inhibition of Pigmentation due to a Copper-Containing Enzyme, Tyrosinase, by Oxalates and Aromatic Sulfinates

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Abstract:

It has been revealed that pigmentation based on the oxidative polymerization of 3,4-dihydroxyphenylalanine (dopa) by the action of a copper-containing enzyme, tyrosinase, is suppressed by free oxalic acid and its salts (oxalates) as well as by sodium benzenesulfinate (NaBS) and sodium p-toluenesulfinate (NaTS). The results of this investigation on the inhibition mechanisms suggested that oxalates non-competitively inhibit the activity of tyrosinase due to the formation of a chelate linkage with the functional copper ions in the enzyme molecule and that the two aromatic sulfinates react with dopaquinone formed by the enzymatic oxidation of dopa to afford their stable derivatives which are no longer transformed and polymerized.

Key words: tyrosinase, pigmentation, inhibitor, oxalates, aromatic sulfinates



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