

Title Partial purification and property of Mg-dechelataase from harvested banana fruit

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Abstract

Banana fruit fail to develop a fully yellow peel when ripening at tropical temperature ($>24^{\circ}\text{C}$), resulting in “green-ripe” fruit. Our previous study showed that the inhibition of Mg-dechelataase activity in banana peel at 30°C might contribute to a repressed chlorophyll degradation, leading to uneven degreening appearance. In the present study, Mg-dechelataase was partially purified from banana peel tissues by ammonium sulfate fractionation and the property of the enzyme was characterized. A 2.21-fold purification of Mg-dechelataase was obtained using 45-90% ammonium sulfate fractionation. However, Mg-dechelataase lost most of its activity when further subjected to a phenyl-sepharose CL-6B chromatography. High stability of the enzyme was observed at a temperature range of $30\text{-}70^{\circ}\text{C}$ and about 48% of the activity was maintained after incubated at 100°C for 40 min. The optimum reaction temperature of Mg-dechelataase was determined to be $40\text{-}50^{\circ}\text{C}$. Mg-dechelataase activity gradually increased with increasing pH values at a range of 6.5-9.5. The K_m for banana Mg-dechelataase with chlorophyllin as a substrate was 8.09 nmol/L. The activity of the enzyme was strongly inhibited by β -mercaptoethanol and L-ascorbic acid (ASA), but to an extent by Na^+ , Mg^{2+} , citric acid, reduced glutathione (GSH). However, Fe^{2+} , Ca^{2+} and H_2O_2 had a marked activation effect on the banana Mg-dechelataase activity.