Biochemical properties of Polyphenol oxidase(PPO) and Phenolic compounds from invitro culture of *Solanum melongena*

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Summary

Enzymatic browning is a process that occurs in fruits and vegetables by the enzyme polyphenol oxidase, which results in brown pigments reduce shelf life which indirectly causes huge domestic loss to the farmers during the post-harvesting process. In this context, the present study was carried out with the following objectives to preserve and increase the shelf life of Brinjal vegetables from enzymatic browning using ascorbic acid.

Objectives

To extract and partially purify PPO by ammonium sulphate precipitation.

To determine PPO enzyme assay and its inhibitory effect from two varieties of brinjal.

To determine total phenolic content [TPC] and protein content of the partially purified PPO extract.

To study the effect of temperature, pH , metal ions on PPO enzyme from extracted sample.

To characterize the Polyphenol oxidase using FTIR and GCMS Analysis

The seeds of Brinjal hybrid and wild were treated with (0.5-2%) concentrations of Ascorbic acid, after 21 days of treatment, the plant material was extracted, Partially purified, and analyzed for enzyme activity. The polyphenol oxidase was extracted and determined for enzyme activity, phenol content, protein concentration as well as functional group determination using FTIR analysis. The polyphenol oxidase activity decreased with an increase in ascorbic acid concentration. The study revealed that the protein content in the Brinjal hybrid variety had a maximum of 221 µg/ml whereas the wild brinjal variety possesses 180 µg /ml. The phenolic content of the hybrid Brinjal variety was found to be 67 µg/ml whereas the wild brinjal variety showed 54 µg /ml. The result of this study Suggested that Ascorbic acid can be used as novel alternative inhibitors.

The present work described the characteristics of the polyphenol-oxidases in brinjal variety(Green long and purple long) and the effect of ascorbic acid at different Concentrations (0.5%, 1%, 1.5%, 2%).Ascorbic was found to be the most suitable organic acid to increase the quality and shelf life of eggplant because it was effective at 2% concentration and it is unlikely to affect sensory parameters and, at the same time, may increase the product's nutritional value with low additional cost. FTIR Analysis of binjal PPO(Control) has characteristic peaks, which include N–H vibration and C–H vibration which is similar to treated brinjal ppo of Green and purple long.Brinjal Purple long showed significant inhibitory action of ppo compare to Brinjal green long. Further GCMS Analysis of Brinjal Purple long revealed the presence of bioactive compounds .The results, shows that the Ascorbic acid treated S. melongena contains various bioactive compounds. Thus, ascorbic acid treatment can be implemented during the processing of eggplants fruits to prevent browning. However, a more proper procedure should be proposed to meet the growing consumer demand and acquire wider applications in the inhibition of PPOs.The result of this study showed that ascorbic acid was a novel alternative inhibitor to PPO inhibitors that could be utilized in various areas such as the food industry, health care & medicine.

Keywords: Polyphenol oxidase, *Solanum melongena,* Phenol, FTIR, Enzymatic Browning, Antioxidants

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