

The effect of combinations of UV-C exposure with ascorbate and calcium chloride dips on the enzymatic activities and total phenolic content of minimally processed yam slices

ABSTRACT

Enzymatic browning is a major factor limiting the shelf life of minimally processed yam slices. The effect of ascorbic acid and calcium chloride (AACCl) dip and UV-C treatment on the browning index (BI), browning related enzymes (i.e. polyphenol oxidase, PPO; peroxidase, POD; phenylalanine ammonia lyase, PAL) and total phenolic content of yam slices during a 10 days storage period at 4 ± 1 °C was investigated. Results showed that untreated yam slices had significantly ($p < 0.05$) higher BI, PPO and POD activities throughout the storage period. In the case of PAL activity, yam slices treated with only UV-C at 13.68 KJ m^{-2} exhibited significantly high ($p < 0.05$) PAL activity throughout the storage period as compared to other treatments. In addition, untreated yam slices had the lowest total phenolic content during the storage period. Yam slices treated with the AACCl dip and a UV-C dosage of 6.84 KJ m^{-2} were found to be the best as they showed significantly low ($p < 0.05$) BI, PPO, POD and PAL activities throughout the storage period. In addition, this treatment also maintained a high but insignificant ($p > 0.05$) total phenolic content throughout the storage period. In summary, AACCl dip plus a UV-C dosage of 6.84 KJ m^{-2} could be useful in preventing browning of minimally processed yam slices under storage at 4 ± 1 °C.

Keyword: Browning index (BI); Enzymatic browning; UV-C treatment; Polyphenol oxidase (PPO); Peroxidase (POD); Phenylalanine ammonia lyase (PAL); Total phenolic content (TPC)