

Effects of simultaneous ultrasonic and cysteine treatment on antibrowning and physicochemical quality of fresh-cut lotus roots during cold storage

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Abstract

The effects of ultrasound (US) power of 200 w at a constant frequency of 40 kHz for 2 min, 0.01 % cysteine (Cys) and combinative application of US and Cys (US + Cys) on browning prevention and quality of lotus root slices were compared during storage at 4 °C for 12 d. The visual appearance, colour attributes including L^* , b^* , hue, chroma, whiteness index (WI), browning index (BI) and colour difference (ΔE^*), browning enzymes activities such as polyphenol oxidase (PPO) and peroxidase (POD), total phenols concentration, texture, total sugars concentration and antioxidant activities were evaluated. US + Cys retarded browning incidence being greater than Cys, US and control treatments, respectively. The browning retardation was concomitant with the retention of high L^* and WI values and low b^* , chroma, BI and ΔE^* value. Cys and US + Cys controlled the increased PPO activity rather than US. All treatments delayed the increased total phenols concentration compared to control. All treatments maintained hardness of lotus root slices, especially US, and did not affect total sugars concentration. Both sonication treatment enhanced ferric reducing antioxidant potential (FRAP) whilst free radical scavenging activity was enhanced by Cys. In conclusion, both of the Cys and US could prevent browning and maintain physicochemical quality of lotus root slices and the simultaneous US and Cys treatment exhibited synergistic antibrowning effect.