

## **Polyphenoloxidase in fruit and vegetables: inactivation by thermal and non-thermal processes**

### **ABSTRACT**

The activity of endogenous quality degrading enzymes together with spoilage microorganisms and/or other non-enzymatic (i.e. oxidative reaction) reactions considerably shorten the shelf life of fruit and vegetable products. Enzymatic browning by polyphenoloxidase (PPO) causes color and flavor degradation of fruit and vegetable products during processing and storage. This imposes significant economy loss to the fruit/vegetable processing industry (e.g. juices). PPO is conventionally inactivated by heat or thermal processing in the range of 80 to 90 °C. As consumers have been choosing preservative free and fresh-like foods, there is global trend to reduce the use of chemical food additives. Therefore, alternative non-thermal food preservation technologies such as high pressure processing (HPP), ultrasound processing (US) and pulsed electric fields (PEF) have been researched and implemented commercially. In this chapter a review of the effect of thermal and major non-thermal food preservation technologies (alone or combined with moderate heat) on PPO inactivation was carried out, resumed in five original Tables and discussed. The information collected can assist fruit/vegetable manufacturers to select appropriate processing conditions to avoid fruit browning during processing, storage and distribution. The PPO residual activity results are very variable, depending on the fruit/vegetable cultivar and the technology employed.

**Keyword:** Browning; Polyphenoloxidase; Polyphenol oxidase; Enzyme inactivation; Heat; Thermal Processing; Blanching; Non-thermal; High pressure processing; High pressure thermal processing; Ultrasound; Thermosonication; Pulsed electric fields; Fruit; Vegetable; Cultivar; Juice; Puree