

## **Browning assessment methods and polyphenol oxidase in UV-C irradiated Berangan banana fruit**

### **ABSTRACT**

Ultraviolet (UV) light especially UV-C has been used to sterilize fruits and vegetables. However, overdose of UV-C irradiation could cause brownish-red colouration to products such as banana fruit. Therefore, the objectives of this study were to: (1) examine the effect of UV-C irradiation at different doses on the surface colour of Berangan banana fruit during ripening; (2) determine polyphenol oxidase (PPO) activity after irradiated with different doses of UV-C, and (3) examine the effectiveness of three browning assessment methods (subjective score, browning index derived from Lab colour space and optical density of 420 nm) in response to PPO activity of UV-C irradiated Berangan banana fruit. Mature green Berangan banana fruit were irradiated with 0, 0.01, 0.02, 0.03 and 0.04 kJ/m<sup>2</sup> UV-C. After irradiation, the fruit were initiated to ripening using 1 mL/L ethylene for 24 h. Then, the fruit were allowed to ripen in 27°C and fruit of day 0, 1, 3 and 5 were sampled for peel colour (L\*, a\*, b\*, C\* and h<sub>o</sub>), browning assessment (three methods) and PPO assay. The peel colour, browning assessment using subjective score and optical density, and PPO activity of Berangan banana fruit were affected significantly ( $P \leq 0.05$ ) by interaction of radiation dose x ripening day. The values of L\*, b\*, C\* and h<sub>o</sub> decrease while a\* values increase as fruit irradiated with 0.03 and 0.04 kJ/m<sup>2</sup> UV-C indicating brownish-red has occurred. Fruit irradiated with 0.04 kJ/m<sup>2</sup> UV-C discoloured by ripening day 3 while those irradiated with 0.03 kJ/m<sup>2</sup> discolored by day 5. Similar result was obtained when fruit assessed for its browning using subjective score and optical density. A contrary result was obtained in PPO activity where UV-C irradiation has inhibited Berangan banana fruit PPO activity by ripening day 5. Correlation analysis showed that browning index that derived from colour space is highly related to PPO activity with coefficients of 0.93. As conclusion, the lethal dose causing browning for Berangan banana fruit is 0.03 kJ/m<sup>2</sup> and browning index that derived from colour space is most effective to correlate browning with PPO activity.

**Keyword:** Browning index; Browning score; Colour; PPO; Ripening