Effect of different pasteurisation temperature on physicochemical properties, bioactive compounds, antioxidant activity and microbiological qualities of reconstituted pomegranate juice (RPJ)

ABSTRACT

Reconstituted pomegranate juice (RPJ) was thermally treated with high-temperature pasteurisation (HTP) at 95°C and mild-temperature pasteurisation (MTP) at 80°C for 30 s respectively. As a comparison, the effect on physicochemical properties, including antioxidant activities and microbial inactivation was eavluated. Both MTP and HTP showed effective inactivation of microbial growth to negligible level with MTP taking almost half pasteurisation-time (-46.3%) as compared to HTP, indicating possible less energy usage. MTP and HTP treatment delivered insignificant difference in pH, titratable acidity, total soluble solids and colour changes (ΔE) based on Commission Internationale de l'Elcairage (CIE) colour system. A significantly higher CIE a values and reduction in L and b were obtained for MTP-juice indicating an increase in red tonalities due to increase in anthocyanin contents. As for antioxidant activity and extractability of bioactive compound, interestingly HTP delivered better results due to more phenols and anthocyanin were released during the heating, leading to further release of initially membrane-bound phenols. These findings suggested that both HTP and MTP are able to meet the microbiological safety and comparable physicochemical qualities. Nonetheless, HTP has shown higher functional values due to higher extractability of antioxidant compounds.

Keyword: High-temperature; Pasteurisation (HTP); Mild-temperature pasteurisation (MTP); Physicochemical properties; Reconstituted pomegranate juice; Anthocyanin; Microbial inactivation