

Utilization of Mangosteen (*Garcinia mangostana* L.) Peel Powder Extract for the Production of Functional Stirred Yoghurt

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Mangosteen (*Garcinia mangostana* L.) peel powder (MPP) extract was incorporated to develop stirred yoghurt rich in functional properties. Mangosteen peels are seasonal agricultural waste, rich in phenolic compounds and antioxidant activity. Ethanol (80 %) with MPP (10:1) extract was prepared. Stirred yoghurt was produced using pasteurized cows' milk (3.25 % fat, 23 % total solids) incorporating 1.0, 1.5 and 2.0 ml of MPP extract/kg of yoghurt mixture as treatments. Sensory evaluation in nine point hedonic scale was conducted to determine the best level of MPP extract that suit for the best sensory attributes in stirred yoghurt. The control was prepared without MPP extract. Total phenolic content (TPC) and antioxidant activity [DPPH radical scavenging activity (RSA %)] of MPP extract and the treatments were determined using the standard procedures. pH profile during storage of yoghurt was recorded. Physico-chemical analysis and microbiological parameters were determined. Sensory evaluation was conducted using nine point hedonic scale and data was analyzed by Kruskal-Wallis test, non parametric one-way ANOVA test at $P < 0.05$. Among all treatments MPP extract treated (1.5 mL/kg) yoghurt was selected as the best. Total phenolic content (mgGAE/g) of MPP, best treatment and control were showed 115.10 ± 0.05 , 3.88 ± 0.14 and 2.5 ± 0.04 respectively. Antioxidant activity (RSA %) in MPP extract was 57.81 ± 6.56 % while in treated yoghurt was not detected. Results revealed that organoleptically acceptable, microbiologically safe stirred yoghurt rich in functional properties could be developed by incorporating MPP extract at 1.5 mL/kg yoghurt. pH reduction was significantly higher ($P < 0.05$) in best treatment compare to the control samples. Acceptability of the best selected sample was lower than the control due to the presence of noticeable aftertaste. The best selected yoghurt with MPP extract 1.5 mL/kg has possessed 26 days of shelf life compared to the control (24 days) at 4 ± 1 °C without adding preservatives.

Keywords: Mangosteen peel powder extract, Stirred yoghurt, Total phenolic content