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Influence of Green, White and Black Tea Addition on the Production of Probiotic Yogurt: Effects on Antioxidant Activity and Microbial Viability during Refrigerated Storage

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The effects of green, white and black tea (*Camellia sinensis*) on lactic acid production, antioxidant activities and viability of *Streptococcus thermophilus* and *Lactobacillus spp.* in yogurt during 3 weeks of refrigerated storage were investigated. Three types of tea water extracts were separately added into a milk-starter culture mixture and incubated at 42 °C until the pH was reduced to 4.5. All yogurts were then refrigerated (4 °C) for up to 21 days and samples were analyzed for pH, titratable acid and viable counts of yogurt bacteria. Higher pH values ($p < 0.05$) were shown in tea yogurts than plain yogurt (PY). Green tea yogurt (GTY) showed the highest pH followed by black tea yogurt (BTY) and white tea yogurt (WTY), respectively for the overall storage period. However, higher acid production was observed in all tea yogurts (0.78–0.99% lactic acid equivalent; LAE) than plain yogurt (0.70–0.91% LAE). All yogurts were analyzed for total phenolic content (TPC), identification of phenolic compounds and antioxidant potential using diphenyl picrylhydrazyl radical scavenging (DPPH), ferric reducing antioxidant power (FRAP) and ferrous ion chelating (FIC) assays. Green tea yogurt showed the highest phenolic content ($p < 0.05$) followed by white tea yogurt and black tea yogurt. LCMS/MS analysis revealed the absence of several phenolic compounds in tea yogurts, despite their presence in tea water extracts, as well as the presence of new phenolic compounds. All tea yogurts showed higher ($p < 0.05$) FRAP and FIC values than respective control during 21 days of storage. However, BTY showed the lowest values of DPPH scavenging activity and FRAP during storage period. In addition, the antioxidant activity for all tea yogurts remained almost constant throughout the storage period. All the three types of tea yogurt maintained a high level of *S. thermophilus* and *Lactobacillus spp.* counts during refrigerated storage. In conclusion, green, white and black tea can be successfully employed to improve the antioxidant properties of yogurt and sustained the probiotic population during storage.

Biography

Dr. Ahmad Salihin Baba is an Associate Professor in Biochemistry Division, Institute of Biological Science and Faculty of Science at University of Malaya, where he has been since 1992. He received a B. Sc (Hons, Physiology) from Monash University in 1985 and Ph.D. in Nutritional Biochemistry from the University of Nottingham in 1992.

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