

Title Use of tea extracts for inhibition of polyphenoloxidase and retardation of quality loss of Pacific white shrimp during iced storage

Author Nilesch Prakash Nirmal and Soottawat Benjakul

Citation LWT - Food Science and Technology, Volume 44, Issue 4, May 2011, Pages 924-932

Keywords Green tea; Mulberry tea; Antioxidant; Polyphenoloxidase; Pacific white shrimp; Melanosis

Abstract

Green tea and mulberry tea powder with and without prior chlorophyll removal were extracted with water and ethanol (800 mL L⁻¹). Extraction yield and total phenolic content of green tea extract were higher than those of mulberry tea extract, regardless of extraction media ($P < 0.05$). Extracts from green tea with and without prior chlorophyll removal showed the higher polyphenoloxidase (PPO) inhibitory activity, compared with mulberry tea extract, at the concentration used (0.1, 0.5 or 1 g L⁻¹). Additionally, green tea extracts had the higher reducing power, 2,2-diphenyl-1-picryl hydrazyl (DPPH) radical scavenging activities and copper chelating activity, compared with mulberry tea extract ($P < 0.05$). Ethanolic green tea extract with prior chlorophyll removal contained (+)-catechin (C), (–)-epicatechin (EC), (–)-epigallocatechin (EGC), (–)-epigallocatechingallate (EGCg) and (–)-epicatechin gallate (ECG) at the levels of 242, 33.4, 125.6, 140.6 and 25.2 g kg⁻¹ dry extract, respectively. Whole white shrimp (*Litopenaeus vannamei*) treated with ethanolic green tea extract with prior chlorophyll removal at concentrations of 5 and 10 g L⁻¹ and stored in ice for up to 12 days had the lower psychrophilic bacterial count and lipid oxidation, compared with the control and shrimp treated with 12.5 g L⁻¹ sodium metabisulfite (SMS) ($P < 0.05$). Shrimp treated with 5 g L⁻¹ ethanolic green tea extract with prior chlorophyll removal possessed the lower melanosis, compared with the control, and showed similar score to those treated with SMS ($P > 0.05$). Furthermore, ethanolic green tea extract with prior chlorophyll removal had no adverse impact on sensory attributes of treated shrimp.