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Exploring optimal supplement strategy of medicinal herbs and tea extracts for bioelectricity generation in microbial fuel cells



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This first-attempt study used extracts of appropriate antioxidant abundant Camellia and non-Camellia tea and medicinal herbs as model electron shuttles (ESs) to stably augment bioelectricity generation performance in microbial fuel cells (MFCs). As ESs (or redox mediators) could stimulate electron transport phenomena by considerable reduction of electron transfer resistance, the efficiency of power generation for energy extraction in microbial fuel cells (MFCs) could be appreciably augmented. That is, using environmentally friendly natural bioresource as green bioresource of ESs is the most promising to sustainable practicability. As comparison of power-density profiles indicated, supplement of Camellia tea extracts would be the most appropriate, then followed non-Camellia-Chrysanthemum tea and medicinal herbs. Moreover, antioxidant activities, total phenolic contents and power stimulating activities were all electrochemically associated. In particular, the extract of unfermented Camellia tea (i.e., green tea) was the most promising ESs to augment bioenergy extraction compared to other refreshing medicinal herb extracts.

Biography

Bor-Yann Chen has expertise in Biomass Energy and Environmental Biotechnology. His serial studies focused on applications in wastewater treatment, bioremediation engineering and biofuel cells. He has completed PhD from University of California, Irvine in 1995 and used to be NRC awarded Research Associate to work in NRMRL/US EPA, Cincinnati Ohio. He is a Professor in the Department of Chemical and Materials Engineering, National I-Lan University, Taiwan. He has published 150+ SCI-peer reviewed papers in reputed journals and has many National Awards (e.g., Professor Yen-Ping Shih Best Paper Awards of 2007, 2011, 2013 and 2016 from Taiwan Institute of Chemical Engineers).

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