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Development of Gamma-aminobuytric Acid (GABA)-Enriched Dark Chocolate

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Introduction:

Gamma-aminobutyric acid (GABA) is a four-carbon non-protein amino acid that is regarded as a bioactive component and is well-known for its physiological activities as a diuretic, neurotransmitter, blood pressure regulator, and anti-stress agent. Its inclusion in snacks like chocolate may have positive health effects. GABA-enriched dark chocolates had been developed in this study by partially replacing sugar syrup with GABA pure powder at concentrations of 0.05% (F1), 0.10% (F2), and 0.15% (F3). The control formulation contained 45% (w/w) of syrup, 27.5% (w/w) of cocoa powder, 27% (w/w) of cocoa butter, and 0.5% (w/w) of lecithin. The effects of GABA enrichment on the quality of chocolate in terms of nutritional composition, textural, rheological, melting, shelf-life, and sensorial properties were then studied. The relative compositions of the control and GABA-enriched chocolates were almost same. Even while the GABA concentration of all the chocolates with GABA additions was higher than that of the control, only the F3 chocolate exhibited a significant increase ($P<0.05$) of GABA content after processing, with a total of 21.09 mg/100g GABA. The addition of GABA had remarkably increased the hardness of chocolate but did not affect the apparent viscosity and melting properties of chocolate. According to the accelerated shelf-life test results, all the chocolate samples were found to be microbiologically safe for consumption for at least 21 days of storage at both 20°C and 30°C. Among the GABA-enriched chocolates, the panelists preferred F2 with 0.10% GABA the most owing to its glossiness and sweetness. However, F3 chocolate had the highest in vitro inhibitory activity of the angiotensin-I-converting enzyme (79.54 1.53%). An efficient strategy to control hypertension is to block the angiotensin converting enzyme (ACE). Therefore, F3 chocolate might be a potential functional food for regulating hypertension.

Biography

Dr. Koh Wee Yin is a senior lecturer in the Faculty of Food Science and Nutrition, Universiti Malaysia Sabah (UMS). She has a Bachelor of Food Science degree with Honours in Food Technology and Bioprocessing from UMS and Doctor of Philosophy (Ph.D.) in Functional Food from Universiti Sains Malaysia. She worked with the food industry for two years and trained as a graduate research assistant for five years before joining UMS as a lecturer in 2021. Her main research interests include the study of probiotics as food adjuncts, indigenous fermentation technology, and functional food product development. She and her research team had developed many food products from plant resources available in Malaysia. She and her team won numerous national and international innovation awards for utilizing plant resources such as seaweeds, pumpkin fruits, and coconuts as fermentation substrates of potential probiotics like water kefir, kombucha, and Lactobacillus microbial strains. She participated in many conferences at national and international levels presenting and publishing research articles on the nutrient composition, antioxidative, physicochemical properties, fermentation kinetics, as well as biological activities and health benefits of plant-based functional foods.

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