

Effect of Banana Peel Addition on Physicochemical Properties of Yoghurt

Nur Ezzatul Husna Zainuddin^a, Fadhilah Lamun^{ab*}

Structured Abstract

Background: Banana peels are often underutilised and typically discarded, despite containing substantial quantities of fibre, minerals, and antioxidative compounds. Thus, yoghurt made from banana waste byproducts may promote food sustainability and a circular economy. This study will measure the crude fibre and total phenolic content of four banana cultivars at maturity index 5: *Pisang Emas*, *Berangan*, *Abu*, and *Tanduk*. The peel powder of the selected cultivar was added to yoghurt, and its physicochemical properties were observed over a 14-day storage period at chilled temperatures.

Methods: Banana peels were immersed in 0.2% sodium metabisulfite followed by lyophilization, powdered, and sieved through a 40-mesh screen prior to crude fibre and total phenolic analysis. Yoghurt was prepared with the incorporation of 0%, 1%, and 3% of selected cultivars of banana peel powder (BPP). Physicochemical properties, including pH, colour, viscosity, acidity, and syneresis, were monitored at one-week intervals upon storage at chilled temperatures.

Results: The results demonstrated that *Pisang Emas* exhibited the highest crude fibre 6.03 ± 0.03 and total phenolic content 1327.00 ± 0.04 , making it the selected cultivars for yoghurt fortification. Yoghurt fortified with 1% and 3% BPP showed increased crude fibre and phenolic content over time, with 3% BPP yielding the highest values with the amount of $1.58\% \pm 0.56$ to $1.72\% \pm 1.07$ and 37.69 ± 0.08 to 77.00 ± 0.35 mg GAE/g respectively. Fortified yoghurt also demonstrated a significant decrease in syneresis and pH, along with an increase in acidity. Additionally, BPP fortification influenced the yoghurt's colour resulting in a decrease in L^* (darker appearance), a decrease in a^* (greenness), and an increase in b^* (yellowness). Viscosity increased with higher BPP concentrations, with the 1% BPP formulation achieving the ideal texture.

Conclusion: In conclusion, These findings demonstrated the potential of "*Pisang Emas*" cultivar particularly addition of 1% BPP enhanced physicochemical properties and nutritional value of yoghurt making it ideal for functional yoghurt development.

Keywords: Banana Peel Powder (BPP), Yoghurt Fortification, Physicochemical Properties

*Correspondence: fadhi478@uitm.edu.my

^a School of Industrial Technology, Faculty of Applied Sciences, Universiti Teknologi MARA, Shah Alam, Malaysia

^c Food Science Research Group, Universiti Teknologi MARA, Shah Alam, Malaysia