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Characterisation and Storage Stability of Encapsulated Chlorophylls from Different Maturity of Pandan (*Pandanus amaryllifolius*) leaves

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Structured Abstract

Background: Pandan leaves (*Pandanus amaryllifolius*) are a naturally occurring colorant and flavour enhancer that are frequently used in culinary applications. Pandan is a tropical plant. These leaves have volatile compounds that give food items colour and aroma, as well as chlorophyll, which gives food a green tint. Given that chlorophyll is essential for defining its final colour, pandan leaves are often used as a natural food colouring ingredient due to their high chlorophyll concentration. Chlorophyll in pandan leaves has therapeutic benefits in addition to being a colorant.

Methods: In the research, pandan leaves aqueous extracts at various maturity stages (young, mature, over mature) obtained by blending with water using 1:3 ratio. Then, the concentrated filtrates were dispersed in maltodextrin and gelatin to encapsulation process. The resulting powders after spray dried underwent characterization using Fourier-transform infrared spectroscopy and differential scanning calorimetry. Physicochemical properties, such as chlorophyll content, total phenolic content, antioxidant activity, and visual colour values, were evaluated. Storage stability of encapsulated chlorophyll was tested at different temperatures for 3 and 9 days. The research aimed to identify optimal conditions and maturity stages for extracting the green pigment, contributing to the development of a natural colorant.

Results: This study shows the results from FTIR analysis shows that all samples exhibit the functional groups contained in these samples. Hence, the results show that the control at over mature samples have the most stable chlorophyll as exhibit the higher onset temperature also contain higher total phenolic content (353.4) while low in IC_{50} (432.78). As for the chlorophyll content, the gelatin sample at over mature stages have the higher hue angle (76.95°) represent close to greenness. The chlorophyll content in the control and over mature samples also showed a decreasing trend when stored longer when the chlorophyll content at day 0 (45.15) > day 3 (16.580 at 4°C and 10.313 at 40°C) > day 9 (12.710 and 6.247 at 4 and 40°C) respectively.

Conclusion: In conclusion, the findings of this study indicated the control at over mature stages will be the most suitable to be develop as natural colorant in food industry.

Keywords: Natural colourant, *Pandanus amaryllifolius*, Encapsulated chlorophylls.

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