

Optimising Conditions for Encapsulation of *Salacia chinensis* Root Extract enriched with Phenolic Compounds

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Background: *S. chinensis* extract contains bioactive compounds, which exhibit high antioxidant activities. However, for commercial uses, it is necessary to encapsulate the extract to protect it from degradation.

Objective: This study aimed to optimise spray-drying conditions and then compare spray-drying with freeze-drying to identify the most suitable conditions for the encapsulation of *Salacia chinensis* L. root extract.

Method: Three factors of spray-drying encapsulation, including maltodextrin concentration, inlet temperature, and feed rate, have been tested for the impacts on the physical and phytochemical properties of *S. chinensis* root extract. Based on the optimal conditions, the spray-drying was then compared with freeze-drying.

Results: The results showed that maltodextrin concentration, inlet temperature, and feed rate had significant impacts on recovery yield, phenolics, mangiferin, and antioxidant activity of the spray-dried extract. The optimal spray-drying encapsulation conditions were maltodextrin concentration of 20%, inlet temperature of 130°C, and a feed rate of 9 mL/min. Under these optimal conditions, the encapsulated extract had comparable solubility, total phenolics, mangiferin, antioxidant activity, lower bulk density, moisture content, and water activity as compared to encapsulated extract made using the freeze-drying technique. These optimal spray-drying conditions are recommended to encapsulate the extract of *S. chinensis* root.

Conclusion: Spray-drying was found to be more effective for the encapsulation of *S. chinensis* root extract than freeze-drying. Therefore, spray-drying is recommended for further applications.

Keywords: *Salacia chinensis*. encapsulation, spray-drying, freeze-drying, phenolics, mangiferin.