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## Screening of electrospray-operating parameters in the production of alginate – royal jelly microbeads using Factorial Design (Article) (Open Access)

Shaiqah, M.R.[a], Salahuddin, H.M.[a,b,c] ✉, Huda, A.Y.A.A.[a], Izzuddin, M.[a], Nur Shafiq, N.I.M.[a], Nur Hakimah, M.A.[a], Radziah, R.S.[a], Doolaanea, A.A.[a,b,c], Budipratama, A.A.[c]

[a]Department of Pharmaceutical Technology, Kulliyyah of Pharmacy, International Islamic University Malaysia, Kuantan, Malaysia
[b]Industrial Pharmacy Research Group, Kulliyyah of Pharmacy, International Islamic University Malaysia, Kuantan, Malaysia
[c]IKOP, Kuantan, Malaysia

### Abstract

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Introduction: Royal jelly (RJ) has been consumed as food or as a supplement because of its high nutritional and medicinal values. A fresh harvested RJ is yellowish to whitish in color and contains proteins, free amino acids, lipids, vitamins, and sugar. Without proper storage conditions, such as at 4°C, the color of RJ changes to much darker yellow and produces a rancid smell. To prolong its shelf life, RJ is usually mixed with honey. Alginate , a natural and edible polymer derived from seaweed, is commonly used to encapsulate drugs and food due to its ability to form gels by reacting with divalent cations. However, there is a lack of research on the microencapsulation of RJ in alginate using electrospray. The electrospray technique has the advantage in producing consistent size and shape of alginate microbeads under optimum parameters . Aim: This research aimed to optimize electrospray-operating parameters in producing alginate –RJ microbeads . Materials and Methods: Optimization of alginate –RJ microbeads electrospray parameters was carried out using $2^4$ factorial design with three center points (19 runs). The studied parameters were flow rate, high voltage, nozzle size, and tip-to-collector distance, whereas the responses were particle size, particle size distribution, and sphericity factor. The responses of each run were analyzed using Design -Expert software. Results: Nozzle size is a significant parameter that influences the particle size. Flow rate is a significant parameter influencing the sphericity factor. Conclusion: Screening of the electrospray-operating parameters paves the way in determining the significant parameters and their design space to produce consistent alginate –RJ microbeads . 

### SciVal Topic Prominence

Topic: Royal Jelly | 10-Hydroxy-2-Decenoic Acid | Hypopharyngeal Glands

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Salahuddin, H.M.; Department of Pharmaceutical Technology, Kulliyyah of Pharmacy, International Islamic University Malaysia, Kuantan, Malaysia; email:solah@iium.edu.my