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## Synthesis and characterisation of rice husk ash silica drug carrier for $\alpha$ -mangostin (Article)

 Iqbal, A.<sup>a</sup> , Muhammad Shuib, N.A.<sup>b</sup>, Darnis, D.S.<sup>b</sup>, Miskam, M.<sup>a</sup>, Abdul Rahman, N.R.<sup>a</sup>, Adam, F.<sup>a</sup> 
<sup>a</sup>School of Chemical Sciences, Universiti Sains Malaysia, USM, Pulau Pinang, 11800, Malaysia

<sup>b</sup>Department of Chemistry, Kulliyah of Science, International Islamic University Malaysia, Kuantan Campus, Kuantan, Pahang, 25200, Malaysia


### Abstract

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The potential of rice husk ash (RHA) silica prepared via sol-gel method (RHA-Si) as a drug carrier was investigated. The nitrogen adsorption-desorption isotherm of RHA-Si indicates the presence of mesopores and some small percentage of micropores. The Brunauer, Emmett and Teller (BET) surface area of RHA-Si was 589 m<sup>2</sup> g<sup>-1</sup> and the Barrett-Joyner-Halenda (BJH) pore size was 5.1 nm. The adsorption of  $\alpha$ -mangostin was confirmed by Fourier transform infrared (FTIR) spectroscopy and thermogravimetric analysis (TGA). The sample containing  $\alpha$ -mangostin was labeled as RHA-Si- $\alpha$ . The BET surface area of RHA-Si- $\alpha$  was 110 m<sup>2</sup> g<sup>-1</sup> with the BJH pore size of 24.4 nm. The X-ray powder diffraction (XRD) showed that the RHA-Si and RHA-Si- $\alpha$  were amorphous. The disappearance of crystallinity of  $\alpha$ -mangostin indicates that the solubility and dissolution of  $\alpha$ -mangostin have been improved. The drug release profile indicated a burst release corresponding to 47% of the total drug loading in the first 15 min. The burst release was caused by physically adsorbed drug molecules. The findings suggest that RHA silica has potential application as nano drug carrier. © Penerbit Universiti Sains Malaysia, 2018.

### SciVal Topic Prominence

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### Reaxys Database Information

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### Author keywords

 Drug carrier Rice husk Silica Sol-gel  $\alpha$ -mangostin

### Indexed keywords

Engineering controlled terms:

 Amorphous silicon Fourier transform infrared spectroscopy Gas adsorption Pore size  
 Silica Sol-gel process Sol-gels Targeted drug delivery Thermogravimetric analysis  
 X ray powder diffraction

Engineering uncontrolled terms

 Barrett-joyner-halenda BET surface area Burst release Crystallinities Drug carrier  
 Drug molecules Nitrogen adsorption desorption isotherms Rice husk

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- 1 Devi, V., Jain, N., Valli, K.  
Importance of novel drug delivery systems in herbal medicines  
(2010) *Pharmacognosy Reviews*, 4 (7), pp. 27-31. Cited 49 times.  
doi: 10.4103/0973-7847.65322  
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- 2 Tiwari, G.  
Drug delivery systems: An updated review  
(2012) *Int. J. Pharm. Invest*, 2, pp. 2-11. Cited 301 times.  
<http://doi.org/10.4103/2230-973X.96920>

- 3 Ahmad, M., Yamin, B.M., Mat Lazim, A.  
A study on dispersion and characterisation of  $\alpha$ -mangostin loaded pH sensitive microgel systems ([Open Access](#))  
(2013) *Chemistry Central Journal*, 7 (1), art. no. 85. Cited 12 times.  
<http://journal.chemistrycentral.com/content/7/1/85>  
doi: 10.1186/1752-153X-7-85  
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