

Modelling and optimisation of *Eurycoma longifolia* extraction utilising a recirculating flow extractor

Abstract

In this study, Tongkat Ali was extracted with a newly designed recirculating flow extractor with temperature and flow rate as the operating parameters. The optimum duration and ratio for extraction were found to be 90 min and 40:1 w/w, respectively. The determination of optimal operating parameter value for this extractor was based on maximum percentage extract yield and solid diffusivity, D_s . From the experiments, it was found that the temperature and flow rate that produce the highest yield and solid diffusivity value were at 90°C and 400 rpm (22.47 mL sec⁻¹), respectively. The optimal operating parameter values were used to compare the recirculating flow extractor performance with a batch extraction at 90°C. The comparison showed that the batch extraction was able to extract more rapidly than the recirculating flow extractor. The solid diffusivity, D_s , value for the batch extraction was found to be 3.12×10^{-11} m² sec⁻¹ while the recirculating flow extractor had a solid diffusivity, D_s , value of 2.98×10^{-11} m² sec⁻¹ which indicated the difference in extraction rate. However, by utilizing the recirculating flow extractor, a higher final yield than batch extraction was produced which is 7.70% (w/w) for the recirculating flow extractor and 6.67% (w/w) for the batch extraction. This is possibly caused by the higher rates of solvent losses through evaporation for batch extraction. © 2007 Asian Network for Scientific Information.