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ATR-FTIR and spectroscopic methods for analysis of black seed oil from alginate beads (Article) [\(Open Access\)](#)

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Abstract

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Objective: This study aimed to use attenuated total reflectance-fourier transform infrared spectroscopy (ATR-FTIR) for rapid quantification of black seed oil (BSO) from alginate beads and to develop simple analysis method for in vitro release study based on turbidity measurement. Methods: Guluronic acid-rich (high-G) sodium alginate was used to encapsulate BSO with the aid of Tween 80 as a stabilizer. ATR-FTIR method was developed for quantification of encapsulation efficiency of BSO by applying Beer-Lambert law after selection of a few wave number combinations. UV-vis method based on measurement of emulsion turbidity at 600 nm was also developed to quantify BSO during the releasing from alginate beads in simulated intestine buffer. Results: ATR-FTIR method exhibited linearity in the range of 25-300 mg_{BSO}/ml_{emulsion} (mg_{BSO}/ml_E) with R²=0.998, RSD=8.4%, LOD=0.28 mg_{BSO}/ml_E and LOQ=0.87 mg_{BSO}/ml_E. BSO-alginate beads was found to completely encapsulate BSO with around 100.5% efficiency. UV-vis method exhibited linearity in the range of 50-300 mg_{BSO}/ml_E, R²=0.9931, RSD=1.34%, LOD=0.89 mg_{BSO}/ml_E, and LOQ=2.71 mg_{BSO}/ml_E. In addition, the method showed that total amount of BSO was released at 110 min. Conclusion: These methods are considered as a practical method for quantification of BSO for encapsulation efficacy and release. They will help to accelerate and improve routine characterization of encapsulated BSO in food and pharmaceutical technology. © 2018 The Authors. Published by Innovare Academic Sciences Pvt Ltd.

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