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## Investigation of antioxidant activity of black seed oil loaded microcapsules

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Antioxidants possess the ability to scavenge free radicals allowing the body to control oxidative stress. Therefore, antioxidants can be considered as protective agents which play an important role in preventing diseases such as cancers where free radicals are known to be involved in the diseases causing process. Black seed oil is one of the most prominent traditional medicines with significant antioxidant activity. The microencapsulation process can preserve the antioxidant activity of black seed oil, control release property, and prevent degradation of the oil. The main objective of this research was to investigate the antioxidant activity of black seed oil loaded synthesized microcapsules by using 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay and Folin-Ciocalteu assay. First, black seed oil was microencapsulated through complex coacervation using the gelatin-sodium alginate system. A very small quantity (two drops) of lemongrass oil was used to mask the odour of black seed oil. Finally, the antioxidant activity of synthesized microcapsules was measured. According to DPPH assay, 65.5% of radical scavenging activity (% RSA) was observed for crushed microcapsules and 77.4% of RSA was observed in an equal amount of unencapsulated oil. According to Folin-Ciocalteu assay, 278.1  $\mu\text{g}$  PGE/mg antioxidant capacity (AOC) was observed in synthesized, crushed microcapsules and 333.8  $\mu\text{g}$  PGE/mg AOC was observed in an equal amount of unencapsulated oil. All assays were carried out in triplicate. These results provide evidence to conclude that the antioxidant activity of black seed oil was not significantly reduced due to the microencapsulation process. Here, ascorbic acid was used as the reference in DPPH (% RSA-39.4) and pyrogallol was used as the standard for Folin-Ciocalteu assay. Therefore, there is a potential of applying black seed oil loaded microcapsules as an antioxidant agent either directly on the skin or by using microcapsules embedded cotton gauzes or smart wristbands and can be developed further as an anticancer agent.

**Keywords:** Antioxidant, DPPH, Folin-ciocalteu, black seed oil, microcapules

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