

Evaluation of the immunological responses elicited by the *Nigella sativa* oil and comparison with Freund's vaccine adjuvant

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Abstract

This study aimed to evaluate the adaptive and innate immune responses by preparing and evaluating the immunizing and protective efficacy of an inactivated whole Gram-negative bacteria and their crude antigens with natural adjuvant *Nigella sativa* (N.S) oil compared with Freund's adjuvant (FA). then detected differential and total white blood cell count in each group in addition to cytokines responses to humoral and cellular immune responses determined by ELISA. The result of this study showed that the total leukocyte count was increased in all adjuvant groups compared with a control group and the leukocyte differential count was performed and the result indicated that the lymphocyte was increased in the group of N.S. oil adjuvant, and it was statistically significant ($P < 0.01$) in N. S. adjuvant with killed bacteria (G4). In contrast, monocyte percentage elevated in the two groups of Freund's vaccine adjuvant. Concerning adaptive immune responses, Freund's vaccine adjuvant directs the immunity toward cell-mediated immunity, on the other hand, the N. S. vaccine adjuvant directs the immunity toward humoral immunity as revealed by the results of ratio of IFN- γ /IL-4. In conclusion, the uses of N. S. vaccine adjuvant directed the immunity toward TH2 responses. On the other hand, Freund's vaccine adjuvants guide the immunity toward TH1 immune responses.

Keywords: Vaccine, Adjuvant, *Nigella sativa*, IFN- γ , IL-4.