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## Effect of flaxseed supplementation on immune response of peripheral blood mononuclear cells

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**Introduction:** The phagocytosis assay allows quantitative measurement of the percentage of phagocytes and the enzymatic activity of each phagocyte (i.e. the number of ingested antigens per phagocytic cell). Bacteria such as *Escherichia coli* are commonly used as substrates for the phagocytosis assay. Immunomodulation of fatty acids in flaxseed may alter phagocytosis activity.

**Aims and objective:** The objective of the current work was to compare the effect of feeding normal broiler chickens 15% of dietary flaxseed on phagocytic activity of monocytes and heterophils in the peripheral blood.

### Methodology:

#### *Diet and sample collection*

One-day-old male Cobb-500 broiler chicks were used. Water and feed were provided ad libitum. Upon hatching, all chicks were given the same basal diet for 13 d. Following this, dietary supplementation of flaxseed started at 14 d of ages until the end of the cycle at 35 d of age. At slaughter, samples of blood were collected from each bird.

#### *Phagocytic activity of blood*

The quantitative analysis of the phagocytic activity of peripheral blood mononuclear phagocytes in whole blood was performed using phagotest commercial kits. Results were expressed as percentage of fluorescent cells (% phagocytosing cells) and mean fluorescence intensity (MFI). Data were analysed by CellQuest™ software. Discrete populations of polymorphonuclear heterophils and monocytes were gated in the software programme based on identification by forward and side scatter and its green fluorescence histogram (FL1) was analysed. The control sample was used to set a marker for fluorescence-1 (FL1) so that the events above this marker position were considered to be positive. The overall differences between the dietary treatments were analysed using one-way analysis of variance (ANOVA) and the general linear model procedure of Minitab was applied in all the tests. Differences between the treatment groups were considered statistically different at  $P \leq 0.05$ . When significant differences occurred ( $P \leq 0.05$ ), treatment mean differences were identified by pairwise comparison using Tukey tests.

**Results:** Feeding flaxseed at 15% did not affect either the percentage of cells participating in phagocytosis, or the Mean fluorescence intensity (MFI). However, there was a trend towards a decrease in the % of monocytes involved in phagocytosis in birds fed diets containing 15% flaxseed. Also, there was a trend towards a decreased MFI ( $p=0.056$ ) for monocytes.

Overall, studies in mice showed that n-3 PUFA decreased phagocytosis. n-3 PUFA either increased or had no effect on phagocytosis activity in rats and human studies demonstrated little evidence of an effect of n-3 PUFA on phagocytosis of blood cells. Studies in the literature which investigated the effect of n-3 PUFA on phagocytosis in chickens are quite limited. Results of the current study showed no effect of flaxseed on phagocytosis of peripheral blood cells.

### Biography

Hanan Al Khalaifa has a PhD in Immunonutrition from the University of Reading- United Kingdom and MSc in Medical Immunology from the University of Manchester. She has been working in Kuwait Institute for Scientific Research since 1996. She participated in many research projects and activities. She gained skills and experience in immunological techniques, Immunonutrition approaches, biodiversity monitoring and assessment techniques, poultry production research, production of added-value products, analysis techniques including gas chromatography, proximate analysis, flow cytometry etc. She published more than 20 scientific papers in refereed journals and conferences.

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