

## Dietary vitamin E modulates immune responses to *Salmonella typhimurium* in chickens

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Supplementation of poultry diets with Vitamin E (VE) can enhance the immune response and improve resistance to disease. In chickens VE supplementation has stimulated increased macrophage phagocytosis and increased production of immunoglobulin G (IgG) and IgM (1,2). However, the effect of dietary VE on IgA antibody, which acts as the first line of defence of the intestinal mucosa, has not been evaluated. Recent work by the authors identified increased IgA antibody production at the intestinal site in birds immunised with tetanus toxoid and receiving diets supplemented with VE (3). The present study was designed to determine whether improved antigen-specific IgA antibody production could be stimulated in birds receiving VE supplemented diets and immunised with killed *Salmonella typhimurium*, which commonly colonises the chicken through the intestinal mucosa and, poses a serious public health risk.

From the day of hatch chicks were placed on a maize-based diet containing 50 mg VE/kg which was supplemented with either 100, 250, 2500 or 5000 mg VE [BASF, Lutavit E 50 Special]/kg. At day 21 all chickens were intraperitoneally immunised with killed whole *Salmonella typhimurium* in a vegetable oil based adjuvant. Two weeks later they received an oral booster of killed whole *Salmonella typhimurium*. Samples of serum, intestinal scrapings (IS) and bile were collected on the end of the experiment, day 42, and *Salmonella typhimurium* specific IgA antibody titres were determined by enzyme-linked immunosorbent assay (4).

On day 42 birds receiving 250 mg VE supplementation /kg had significantly higher mean anti-*S. typhimurium* IgA antibody titres in serum ( $P < 0.05$ ) and IS ( $P < 0.02$ ) and, notably higher anti-*S. typhimurium* IgA titres in bile, compared to birds receiving the basal diet. Birds receiving 2500 mg VE supplementation /kg had a significant increase ( $P < 0.04$ ) in serum anti-*S. typhimurium* IgA antibody, but there was no notable alteration in the IgA antibody titre in either the IS or bile.

These results demonstrate the capacity for vitamin E supplementation of poultry diets to enhance the immune response in chickens and, in particular, anti-*Salmonella typhimurium* IgA antibody titres at the intestinal mucosa following immunisation with killed whole *Salmonella typhimurium*. The potential for vitamin E supplementation to enhance the immune response when included in the diet for periods less than 42 days is being investigated.

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