Protective Immunity of Eimeriaacervulina Oocysts Protein against Intestinal Coccidiosis

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Protective Immunity of *Eimeriaacervulina* Oocysts Protein against Intestinal Coccidiosis

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Abstract

The study was carried out to assesst the protective immune efficacy of *E.acervulina* oocyst protein against homologous challenge in chickens. Immunization was applied on 14th and 18th day of age subcutaneously with that protein at dose of 50 µg per chicken. Immunized chickens were challenged at 32nd day of age, demonstrated that oocyst protein could provide protection around 62% when compared with unimmunized chickens, while parasite development in intestine asses in histological section revealed decreased proliferation. The study results demonstrated that relatively sufficient protection against coccidia by the use of*E. Acervulina* oocyst protein as vaccine in broilers.

Key words : *E.acervulina*, oocyst protein, protective immunity

Coccidiosis in poultry is caused by protozoan parasites of the genus *Eimeria*. Coccidiosis is a self limiting infection; primary infections can stimulate solid immunity to homologous challenges (Allen and Fetterer, 2002). An immunological approach is considered more important since a live vaccine containing a virulent or attenuated *Eimeria* strain is available but its use is limited in the poultry industry because of its high cost. Additionally these vaccines consist of several *Eimeria* species makes them labouries as well as higher cost of production. Also, these types of vaccine may revert back to a pathogenic form (Sharman *et al.*, 2010).Therefore, research efforts undertaken in the development of an anticoccidial protein vaccine consisting of antigens as an alternative to live vaccines.One of protein exploration can be done to oocysts to induce protective immunity. The present study used the oocyst extract as a vaccine to protect broilers from *E. acervulina* parasite.

Materials and Methods

A total number of 12 day old broiler chicks were divided into 2 groups, each group containing six chicks. Group 1 was immunized subcutaneously in the neck with two doses: first dose at 4th day of age with Freund's Complete Adjuvant(FCA) emulsified inPBS and booster dose was given at 18th day of age with Freund's Incomplete Adjuvant(FICA) emulsified in PBS. Group 2 was immunized subcutaneously on the neck with two doses: first dose at 4th day of age with 50 µg antigen (oocyst protein) emulsified in FCA and booster dose was given at 18th day of age with 50 µg antigen emulsified in FICA. After two weeks of last immunization the both groups were challenged orally 1 x 10^4 of virulent *E. acervulina*. The protective efficacy against homologous challenge in chickens evaluated by using protein of *E. acervulina* oocyst was represented through oocyst production and histopathological changes examination (Liu *et al.*, 2018).

Results and Discussion

Immunized birds were challenged at 32nd day of age, demonstrated that oocyst protein could provide chickens with protection rate around 62%, oocysts number from chickens in the immunized group with oocysts protein significantly decreased than the unimmunized group (Fig. 1). Then few development and proliferation of parasites was seen by histopathological changes (Fig. 2).The immune response to vaccine demonstrated humoral and cellular protection. Li *et al.*[2012] reported specific

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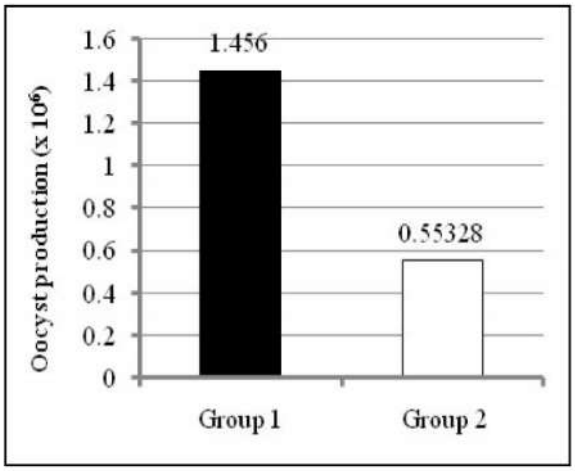

Fig 1. The comparison of oocyst production after homologous challenge with *E. acervulina* oocysts which previously non immunized and immunized with *E.acervulina* oocysts protein. Group 1, non immunized; Group 2, immunized.

IgG antibody responses against *E. tenella* was generated in the chickens immunized with recombinant rhomboid like protein expressed in *E.coli* and this protein is capable of eliciting humoral response and activating cell- mediated immunity in birds. Akhtar *et al*.[2001] showed the humoral and challenge responses when the supernatant from sonicated sporulated oocyst was used which induced a strong protection as immune chicks revealed high level of antibodies to resist heavy dose of challenge. Sporozoite that used as protein vaccine gives 66.7 per cent protection (Badawy and Aggour, 2006), while in another studies by Subramanian *et al*. (2008) and Geriletu *et al*. (2011) gave 60% and 77.3%, respectively with the use of recombinant *E. tenella* sporozoite antigen. Finally it was found that in order to get a better protective immunity by using parasite extracts, itrequires the inclusion of the correct antigens and exclusion of the irrelevant ones is necessary (Wallach *et al*., 1994)

Summary

E. acervulina oocysts protein can generate protective immunity against homologous challenge through reduction of proliferation parasite and the presence of parasites disabilities. The further study for investigating efficacy of *E. acervulina* oocysts protein in induction of protective immunity against heterologous challenge is required.

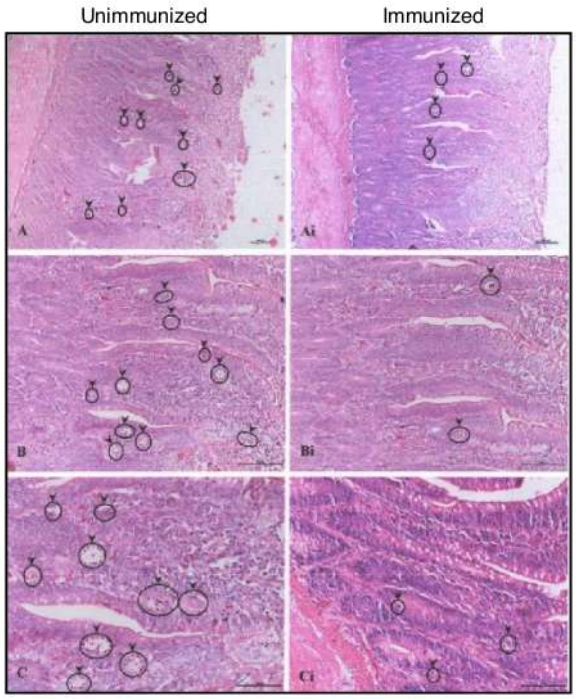

Fig 2. The Comparison of histological section of intestine of each groups non immunized and immunized with *E. acervulina* oocysts protein after challenged with *E. acervulina* oocysts homologous. head arrow, oocysts; (A & Ai, x100; B & Bi, x200; C & Ci, x400; H&E).

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PAGE 1

PAGE 2

PAGE 3