

**VACCINE EFFECTS AGAINST FOWL RED  
MITES(*DERMANYSSUS GALLINAE*) INFECTION USING SOMATIC  
ANTIGENS OF HOUSE DUST MITES  
(*DERMATOPHAGOIDES PTERONYSSINUS*)**

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**Introduction**

Fowl red mites(*Dermanyssus gallinae*) is the most important ectoparasite in poultry farming industry and very difficult to control. Common and protective antigens between *D. gallinae* and house dust mite(*Dermatophagoides pteronyssinus*) were investigated as follow. By SDS-PAGE with silver stains and western blots, we found several common antigens (120, 60, 56, 52, 49, 46 kDa) both from *D. gallinae* and *D. pteronyssinus*. And we vaccinated 60 white leghorn broilers(4 weeks old). 20 broilers were vaccinated with *D. gallinae* somatic antigens(Group I), 20 with *D. pteronyssinus* antigens(Group II), and 20 with no antigens(Group III), respectively. We confirmed that antibody titers were increased both in Group I, II. Then all each groups were challenged with 1,000 fowl red mites. After 2 months, body weight, PVC were slightly significant( $p>0.05$ ) but ELISA OD value and number of mites were significant( $p<0.05$ ). These results suggest that house dust mite, which is easy to collect and maintain, can be a good vaccine candidate for fowl mites infection .

**Methods and materials**

Fowl red mites(FRM) were collected in the poultry farm located in Chonan, and House dust mites(HDM) were provided from Laboratory of Parasitology, College of Medicine, Yonsei University and maintained in our laboratory. FRM and HDM washing with Phosphate buffered saline, pH 7.4(PBS) and homogenize. After centrifuging(12,000rpm, 15minute) the supernatant was passed through a millipore filter(pore size 0.2 $\mu$ m). The extracts were stored at -20°C until use. In order to confirm the common antigenicity between somatic antigens of FRD and HDM we conducted silver stain and western blot by 12.5% SDS-PAGE (sodium dodecyl sulfate-polyacrylamide gel electrophoresis). Western blot were conducted by method of Gershoni and so on. After silver stain and western blot we conducted vaccination and challenge test. Vaccinated 60 white broilers(4 weeks old). 20 broilers were vaccinated with *D. gallinae* somatic antigens(Group I), 20 with *D. pteronyssinus*

antigens(Group II), and 20 with no antigens(Group III). We confirmed that antibody titers were increased both in Group I, II. Then all groups were challenged with 1,000 fowl mites. And during research period we conducted ELISA(enzyme-linked immunosorbant assay) for confirm of antibody titer of group I, II, II. ELISA was conducted by method of *Bornstein* and *Zakrisson* so on. In order to confirm the effect of vaccination we measure PCV( packed cell volume) and body weight of chicken and count the number of FRM in isolator with collection device after mites challenge.

## Results and Discussiion

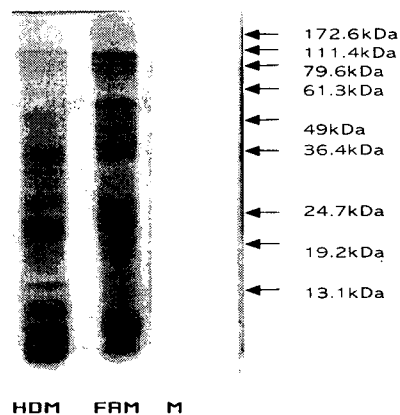


Fig. 1. Comparison of between FRM somatic antigen and HDM somatic antigen with 12.5% SDS-PAGE and silver stain

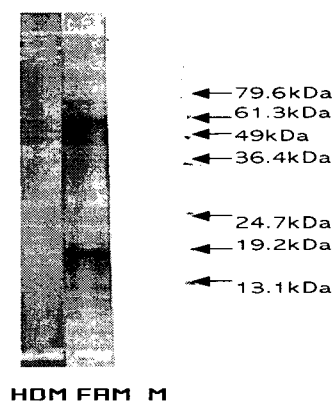


Fig. 2. Comparison of between FRM somatic antigen and HDM somatic antigen with western blot. In the results of Fig 1 and Fig2, Common antigens(120, 60, 56, 49, 46kDa) were found between FRM and HDM. These common antigens are shown vaccination possibility of HDM somatic antigen against FRM.

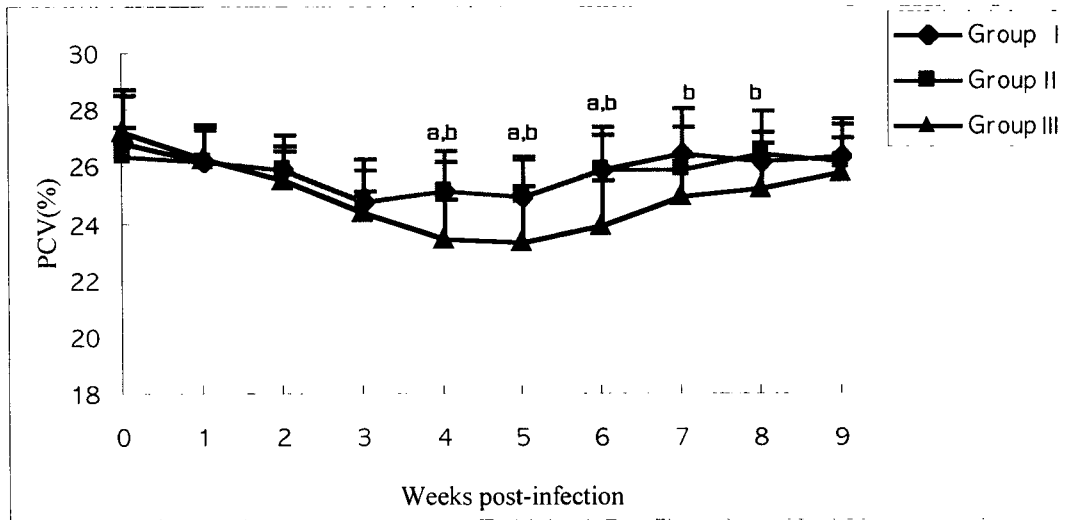


Fig.3. Mean  $\pm$  SD PCV(%) of Group I (FRM vaccination), Group II (HDM vaccination), Group (No antigens vaccination) after challenge.

A Group I significantly different from Group III ( $P < 0.05$ )

b Group II significantly different form Group III ( $P < 0.05$ )

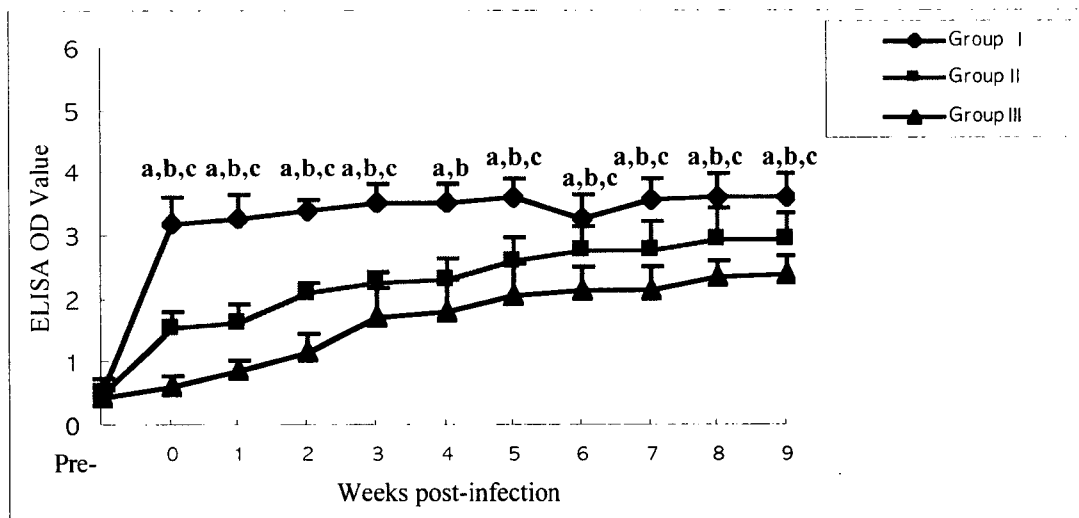


Fig. 4. Mean  $\pm$  SD ELISA OD value of Group I (FRM vaccination), Group II (HDM vaccination), Group III (No antigens vaccination) after challenge test.

A Group I significantly different from Group III ( $P < 0.05$ )

B Group II significantly different form Group III ( $P < 0.05$ )

c Group I significantly different from Group II ( $P < 0.05$ )

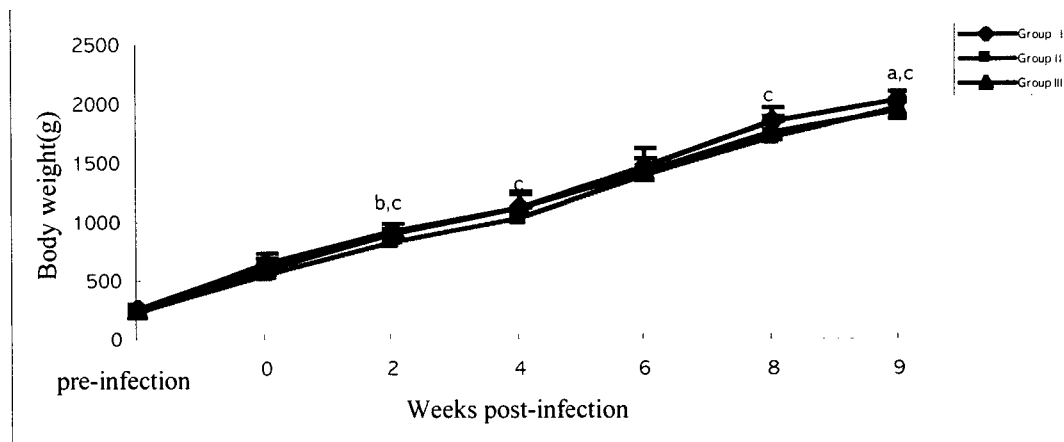


Fig. 5. Mean  $\pm$  SD body weight of Group I (FRM vaccination), Group II (HDM vaccination), Group III (No antigens vaccination) after challenge test.

A Group I significantly different from Group III ( $P < 0.05$ )

B Group II significantly different from Group III ( $P < 0.05$ )

C Group I significantly different from Group II ( $P < 0.05$ )

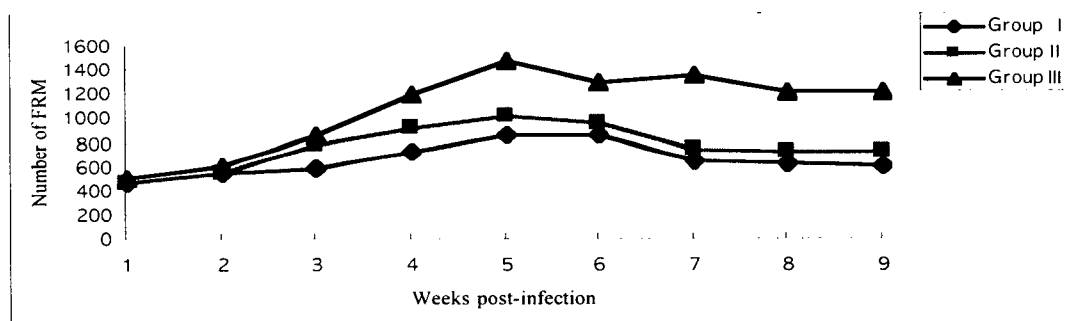


Fig. 6. Mean  $\pm$  SD FRM number of Group I (FRM vaccination), Group II (HDM vaccination), Group III (No antigens vaccination)

After vaccination and mite challenge test. PCV(%) and body weight of chicken were not significantly ( $P < 0.05$ ) in each group (Fig 3, Fig 5). But ELISA OD value and number of mites were significantly ( $P < 0.05$ ) (Fig 4, Fig 6). In the result of Fig 4, ELISA titers were higher group I, II than group III and number of FRM more decrease group I, II than group III (Fig 6).

As a result of above we know that somatic antigen of FRM could be available for vaccine and house dust mite, which is easy to collect and maintain, can be a good vaccine candidate for fowl red mites infection.

Future study, If we can obtain specific antigens (120, 60, 56, 49, 46kDa) to HDM somatic antigens, may get better vaccine effect.

### **References**

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