

THE EMPOWERMENT OF CRUDE EXTRACT ANTIGEN-GOF INSECT ON GOATS IMMUNITY ENHANCEMENT AN ENTOMOLOGY CONTRIBUTION IN ANIMAL HUSBANDRY

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Abstract

The study was conducted to evaluate the proportion level of insect antigens and its effect on goat immuno-response by detecting the immunoglobulin serum level. Twenty-four young goats were used in this experiment maintained in traditional farms without health control. The animals were divided in three groups, respectively control group (0μ Ag-G/L) and the others were treated with 0.5 ml of antigen-G by subcutaneous injection which had a concentration of 100μ Ag-G/L. The parameter observed was the serum immunoglobulin level. The mean value of serum immunoglobulin level between treated and control groups were compared by t-test. There was a significance different of parameter between groups observed ($P < 0.05$) which showed that corpus crude extract antigen-general of *Bombyx mori* was able to enhance the immune-response of goats.

Key words: Antigen, insect, goats, immunoglobulin.

INTRODUCTION

Through entomology science many secrets of immunogen originated from insect could be discovered to contribute in the animal husbandry improvement. A fact that is in extensive farming with traditional maintenance, the animals exposed a high mortality level.

The local goats breed kept without special hygienic control caused health problems that led a difficulty to the farmer for getting profit on it. Consequently an alternative solution needed to overwhelm the problems, par example by studying the effect of corpus crude extract general antigen (CCE/Ag-G) to the young goat's immunity.

The insect antigens take an important role in immunogen enhancement substance in animal husbandry although this sciences information were still rarely publicized. Therefore empowerment of the insect antigens for mammalian livestock immunity has a good prospect to be revealed. In this line, our study used crude extract antigen total body liquid of *Bombyx mori* as general antigen (antigen-G).

The immunity improvement by using protein of saliva insect species of *Haematobia irritans*

showed the ability to reduce the development of the flies which consumed blood of animal immunized with this type of proteins (Cuop et al., 2004).

Ameri et al., (2008) revealed that the saliva gland extract of stable flies dominated by immunoglobulin binding protein. This antigen has been studied for the immuno-reactive in cows.

In other side antigen in the venom of bees or *Vespidae* and a group of ubiquitous protein in other organisms included the snake venom be used by this organism to defend or to attack their preys and their enemies.

The function of this protein family presents in several ways as toxin and as *ion channel blockers* as exist in the snake venom (Yamazaki and Morita, 2004). The saliva of the flies consisted of immunogen which dominated by the antigen-5.

This immunogen protein produced in granular cells and accumulated in the saliva gland. Beside that this substances functioned for the ingestion process. The molecules categorized with this function also called *defensin* (Lehan et al., 1997). The antigen protein could move from epithelia cells to the surface of saliva

glandular through a process of exostosis which located in prothorax segment (Uetiet al., 2009).

MATERIALS AND METHODS

The corpus crude extract general antigens (CCE/Ag-G) were extracted from insect of *Bombyx mori* caterpillars aging more than two weeks.

The larvae were selected to get the uniform of body compartments, and then euthanized to proceed for getting the crude extract antigen.

The characterization was done by simple procedure using spectrophotometry (N1E).

The level of antigen extract were categorized in three classes: LAg1, LAg2 and LAg3 which were respectively equaled to ($LAg1 > 23^{\circ} \rightarrow > 60 g \cdot L^{-1}$; $LAg2 > 21^{\circ} \rightarrow > 40 g \cdot L^{-1} < 60 \cdot L^{-1}$; $Ag2 < 21^{\circ} \rightarrow < 60 g \cdot L^{-1}$).

This experiment used twenty-four goats of local breed traditionally maintained in open system environment without any special health control.

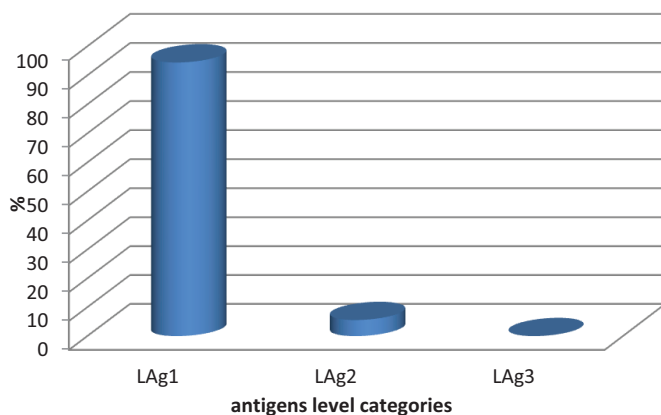


Figure 1. Proportion of CCE/Antigen-G Level Obtained

Experimental Design

There were twelve samples of young goats as control ($0 \mu CCE/Ag-G \cdot L^{-1}$) and twelve others were treated with 0.5 ml of antigen-G by subcutaneous injection which had a concentration of $100 \mu CCE/Ag-G \cdot L^{-1}$.

The parameter measured in this study was the level of immunoglobulin protein in serum. Blood samples were obtained through vena jugular after 12 days of treatment.

Statistical analysis

The mean value of serum immunoglobulin level between treated and control groups were compared by t-test according to the procedure of Zar (1996).

RESULTS AND DISCUSSIONS

The figure 1 presented that almost of the samples were categorized as LAg1 which

achieved 94.4% of total sample observed while decreased sharply in the level of LAg2 that reached only 5.5% and LAg3 level did not existed in the CCE of the *B. mori*.

This value indicated that the level content of corpus crude extract of antigen-G from this insect was relative qualified to be applied in the experiment to reveal its immune-response in mammalian animals.

The conversion of the containing of organic compound in the CCE of *B. mori* was $60 g \cdot L^{-1}$ of general antigen, even though there was not clear which specific antigen proteins took effect as primary immune-response.

Ma et al., (2010) reported that the antigen-5 proteins were the most important compound and immunogenic protein in the venom secretory duct of stinging insect.

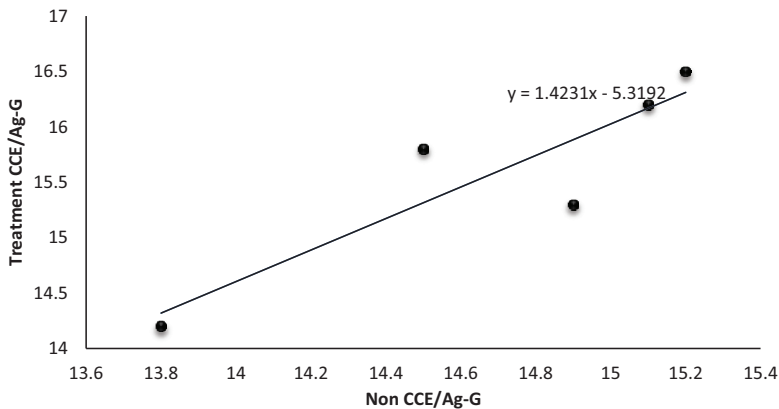


Figure 2. Comparison of Treatment and Control on Serum Immunoglobulin Level in Goats

Compared to the control, the general antigens extracted from *Bomby x mori* treated to goats resulted a significant response ($P < 0.05$) on serum immunoglobulins level in goats.

This achieved value was $15.6 \pm \text{SEM } 0.43$ mg/ml while the mean value of the proteins serum observed in experiment animal without receiving antigen-G was lower than the others treated which obtained only 14.9 ± 0.25 mg/ml. In the level of serum immunoglobulin in young animals influenced by many factors included the colostrum consummation (Bulla et al., 2004).

The increasing of the total Ig up to 14.9 mg/ml could be caused by the reaction of antigen-G immunisation to the animal experiments. This response related to the report Ameri et al. (2008) that antigen-V originated from salivary gland extract of stable flies was able to stimulate the antibody level in cows.

This substance led to improve the mammalian individual immunity system. The ability of the mammalian individual to modulate the immunoglobulin production depended also on the presentation of antigens in the body (Pritchard et al., 2013) which facilitated by the T cell and CEF (*Chemoattractant Expression in Fibroblasts*) to activate the immunoglobulin.

CONCLUSIONS

Corpus Crude Extract Ag-G could be an alternative agent for immunity enhancement in goats especially in an extensive farming where the hygienic control does not exist.

In the next future we need to continue this works to identify the most important immunogenic antigens in these extract substances.

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