

## Variation of Natural Immunity in Red Jungle Fowl, Native Chicken and Commercial Chicken

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### Abstract

Red Jungle Fowl (wild type), native and commercial laying chicken were studied for variation of natural immunity by determining the activity of the alternative complement pathway (ACP50). The activities of ACP50 in each variety had highly significant differences, whereas sex of chickens did not significantly affect ACP50 ( $p > 0.05$ ). The results showed that the wild type and native chickens had higher activities and higher variation of natural immunity than the commercial laying chickens. This indicates that both, the wild type and native chicken, may represent potential genetic resources which could be of use for development and genetic improvement of chicken lines in terms of disease resistance and adaptability traits.

**Keywords:** Red Jungle Fowl, Native chicken, Commercial laying chicken, Alternative complement activity, Genetic resources

### Introduction

Breeding for improved immune defence in livestock may potentially reduce the problem of drug resistance in farm animals and also decrease antibiotic residues in animal products. Immunological factors are generally considered to be of great importance of host defence mechanism. The activity of alternative complement pathway (ACP) represents a major mean of natural immune resistance to microorganisms in the absence of specific antibody. The chicken sera can lyse mammalian erythrocytes or *Trypanosoma Cruzi* both *in vivo* and *in vitro* within minutes (Koch et al 1982; Kierszenbaun et al., 1976). The haemolytic complement activity has been found to be genetically controlled in rabbit (Tsuneo et al., 1979), cattle (Lie et al., 1983) and pig (Wimmers et al., 1999). In the present situation of commercial chicken production many drugs and vaccines are used to prevent disease whereas the native chicken especially wild type chicken do not receive medicine or vaccine. The aim of this study was to determine the phenotypic variation of alternative complement pathway activity in Red Jungle Fowl (wild type), Thai native chicken and commercial laying chicken.

### Materials and methods

Animals: Blood sample were taken of 60 animals, adult male and female, of Red jungle fowl (n=20), Thai native chicken (n=20) and commercial laying chicken (n=20) in the North of

Thailand. Serum was collected from blood sample after they were left 1 hour at room temperature to clot. The serum samples were stored at - 20 °C until analysed.

Haemolytic activity assay: The total haemolytic activity of the alternative complement pathway (ACP) in chicken serum was determined according to the method described by Ohta et al. (1984) using rabbit erythrocytes which were lysed by complement factors of the chicken serum. Data of ACP were transformed to ACP50 (Unit/ml) by the method of Von Krogh. (1916).

## Results

The activity of the alternative complement pathway (ACP50) in Red Jungle fowl and Thai native chicken and commercial laying chicken, showed highly significant differences ( $p < 0.01$ ). Gender of chickens did not significantly affect ACP50 ( $p > 0.05$ ). The Red Jungle fowl and Thai native chicken had higher average haemolytic complement activities than the commercial laying chicken. The means of ACP50 of wild type, native and commercial laying chicken were  $273.74 \pm 12.86$ ,  $210.09 \pm 11.92$  and  $176.45 \pm 8.18$  Unit/ml, respectively (Figure 1). The ACP50 of the wild type and native chickens had higher variation than that of the commercial laying chickens (Figure 2). The range of ACP50 was 152.27 - 376.90, 123.44 - 334.20 and 113.28 - 250.86 Unit/ml for wild type, native and commercial laying chicken, respectively.

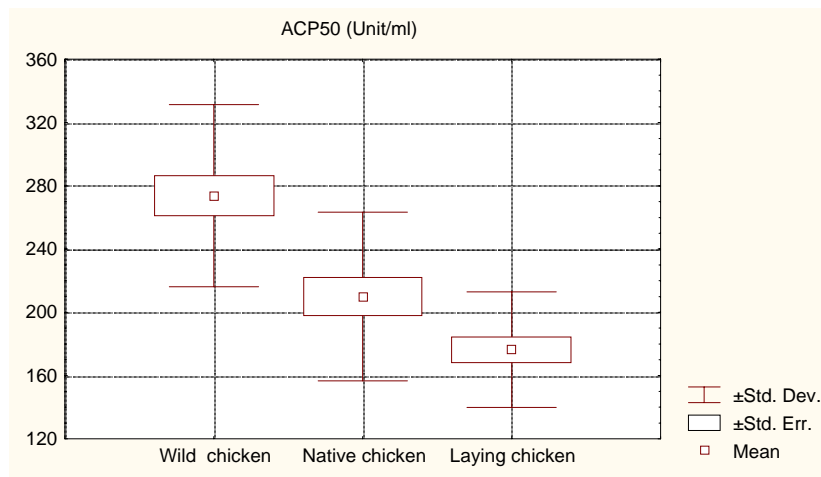


Figure 1.: Mean values of ACP50 of wild type, native and commercial laying chicken

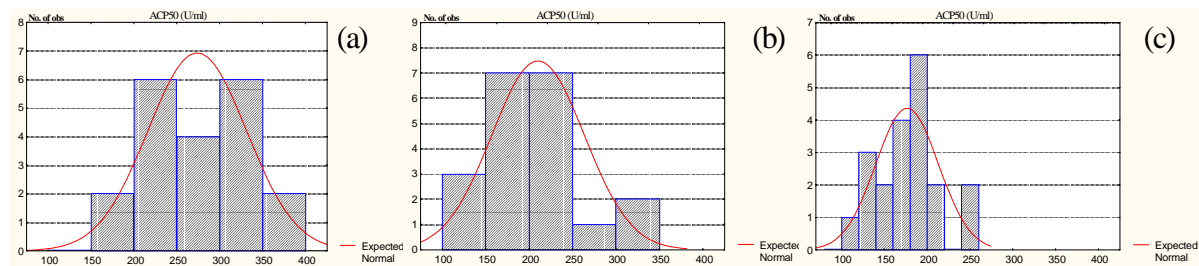


Figure 2.: Distribution of ACP50 values of Red Jungle Fowl (a), native chicken (b) and commercial chicken (c).

## **Discussion**

The alternative complement pathway activity is a potent non-specific immune mechanism of host defence. In this experiment it is shown that the ACP50 activity of the wild type and the native chicken was higher than in the commercial laying chicken. These results were similar to those published before (Mekchay et al., 1997). No significant differences were found in alternative complement pathway activity between male and female chicken in each variety as was reported in broiler chickens and turkeys (Skeeles et al., 1980). This preliminary study indicates that both, the wild type and native chicken, may represent potential genetic resources which could be useful for development and genetic improvement of chicken lines in terms of disease resistance and adaptability traits.

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