ABSTRACT

Powdered Thai galanga supplements (Alpinia galanga Linn.) were included in broiler feeds at 0, 2, 4, and 6%, w/w, respectively. These feed formulations were then fed to 1-day old broilers up to 21 days. Then, one ml of Eimeria tenella suspension (40,000 oocysts/ml) was inoculated to each broiler (to induce coccidiosis). Broilers were then euthanized after 6 or 8 days. Oocyst counts and lesion scores were assessed. There was a significant difference (p<0.01) in lesion scores between treatment and control groups at the higher inclusion rate of Thai galanga. In this study, at the 6% inclusion rate of the supplement, the lesion score reduced to 1.58 (±0.78), which indicates that damage from coccidia was adequately controlled.

Keywords: Thai galanga, Alpinia galanga Linn., coccidiosis, broilers
INTRODUCTION

Organic broiler production is an emerging trend of broiler production focused on consumer safety. Thailand aims to supply the world with safe and wholesome chicken for consumption. It is therefore important that locally produced and consumed chicken and exported product are of the same high quality. Antibiotic use in broiler production had become less problematic in both developed and developing countries due to consumer awareness of health and food safety, and concerns regarding potential for antibiotic residue.

Thai galanga (Alpinia galanga Linn.) is a medicinal plant, well known for its human health benefits. It is a common household herb used for cooking as well as for ethnoveterinary purposes among smallholder chicken farms. Its well-documented human medicinal effects include amylase inhibition, angiotensin converting enzyme inhibition, antibacterial activity, antifungal activity, antileishmaniasis, antimutagenic, antinematodal, antitumor promoting, antiyeast, beta-glucuronidase inhibition, carcinogenesis inhibition, carconogenic activity, diastase inhibition, insect repellent activity, larvicidal activity, protease (HIV) inhibition, spermicidal and uterine effects (Cheah and Gan, 2000; Chevallier, 1996; Farnworth and Bunyapraphatsara, 1993; Folkard, 1996). Thai galanga has been recently examined for its effect as a growth stimulant and disease control agent in animal production (Noppon et al., 2002, 2004; Warameet et al., 2003). It is therefore of interest to organic production and reduced antibiotic use in chicken for human consumption.

Coccidiosis is one of the major diseases in the Thai broiler industry and a cause of poor growth, performance and welfare of intensively and extensively reared chickens. There are many existing strategies to combat and control the disease, most involving some form of antibiotic or coccidiostatic medication. Various medications were used such as ivermectin, sulfamethazine, diclazuril solutions, and combinations of the drug of choices (Kajaysri et al., 2000; Sangmaneedet et al., 2003). This paper reports one of several investigations into Thai galanga demonstrating its efficacy for coccidiosis control in broiler production.

MATERIALS AND METHODS

Completely randomized design (CRD) was used in this experiment. Four replicates were performed including 6 birds each. Ninety six one-day old broilers were fed ad libitum using a typical non-commercial broiler starter diet (without coccidiostat) until 21 days of age. Then, 1 ml of Eimeria tenella (40,000 oocysts/ml) suspension was inoculated to each broiler to induce coccidiosis. Broilers were then euthanized using 70% ethanol into occipital condyles after the appearance of clinical signs of the disease, 6 or 8 days following inoculation. This method has
been extensively used and is known to be a method of choice for poultries. After excision of the caecum and its contents, oocysts were counted and caecal lesion scores were assessed. Oocyst counts were performed using a haemocytometer as a counting chamber and caecal lesion scores were assessed using the classical lesion scoring system of Johnson and Reid (1970), from +1 to +4.

**Preparation of feeds/supplements:** Thai galanga chips were dried and ground to a powder form. Samples were analyzed using the proximate analysis for nutritive value and then included in the broiler feed as a supplement at 0, 2, 4 and 6%, w/w, respectively. The nutritive values of galangal powder were 3.87% protein, 0.21% calcium, 0.17% phosphorus, 4.59% fat, 12.21% fiber, 6.38% total ash, 9.44% moisture and 4,312.50 kilocalories/kg total energy.

**Preparation of oocyst inoculum:** Fresh *Eimeria tenella* suspensions were prepared in potable tap water. The concentration of oocysts was standardized to 40,000 oocysts/ml using haemocytometer counting chamber. One ml of the inoculum was then fed to each 21 day-old broiler manually by oral syringe.

**Data analysis:** ANOVA at the 99% confident interval was used. The Duncan’s new multiple range test were analyzed, and p<0.01 was regarded as a significant difference in comparing lesion scores between control and galangal treated groups.

**RESULTS**

Results showed that oocyst counts among control and galangal treated groups were not significantly different (p>0.05). The oocyst counts were 6.52 (± 0.09), 6.18 (± 0.59), 6.38 (± 0.19) and 6.47 (± 0.17) log oocyst/ml for 0, 2, 4 and 6%, w/w, galangal treated groups, respectively.

However, as shown in Table 1, at day 8th after inoculation, lesion scores were significantly lower when the highest concentration (6%) of Thai galangal powder was included into broiler feeds compared with control. This indicates significantly less damage to the caecum in birds on this treatment. Figure 1 illustrates the appearance of lesion scores of broilers in this study where (a) is caeca partly excised showing a score of +4, (b) is an intact caecal sample with +4 scores and (c) is excised caecum of +4 scores.
Table 1  Lesion score after the induction of coccidiosis in broilers on day 8th after the inoculation

<table>
<thead>
<tr>
<th>Treatment with Thai galanga</th>
<th>Lesion score (± SD)</th>
<th>N</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>2.458 (± 1.22)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>2%</td>
<td>2.347 (± 1.11)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>4%</td>
<td>2.043 (± 0.71)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>6%</td>
<td>1.583 (± 0.78)</td>
<td>12</td>
<td>&lt; 0.01</td>
</tr>
</tbody>
</table>

Note:  N= number of birds per treatment, that is 3 birds x 4 replicates

DISCUSSION AND CONCLUSION

Oocyst counts showed no significant difference between control and galangal treated groups indicating that the inclusion of the galangal powder had no effect on the viability of *Eimeria tenella* in the caecum. However, caecal lesions due to coccidiosis as measured by the lesion score were significantly reduced when 6%, w/w, ground Thai galanga was included in the feed, i.e. 1.58. Comparing to the use of diclazuril solution in 6 week-old broilers in another study (Sangmaneecedet, 2003), the average lesion score of caecum in control group, 5 ppm for 48 hrs,
and 15 ppm for 8 hrs treated groups were 2.8, 0.7, and 2.0, respectively. Regardless of broilers’ ages, the 6% galangal in this study may be used to substitute the 15 ppm diclazuril solution for 8 hrs to render a better lesion scoring of the disease and of course, a less severe clinical sign. As mention earlier, Thai herbal plants have been extensively examined in a hope that it can be used in place of present medications which may cause drug residues in broiler meats. There fore, consumers are protected from consuming unsafe meats. The present study also indicates the possibility of using Thai galanga as the herbal feed supplement in broiler productions to reduce the severity of clinical signs in broilers. Further study is warranted to determine the mechanism of effect and optimal inclusion rate and treatment regimes using Thai galanga.

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REFERENCES


