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ANTICOCCIDIAL SCREENING OF *MELIA AZEDARACH*, LINN. (BAKAIN) IN NATURALLY INFECTED CHICKENS

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Anticoccidial screening of *Melia azedarach*, Linn. seeds (Bakain) was carried out in chickens naturally infected with a mixed gastro-intestinal Eimeria infection. Powdered *Melia azedarach* seeds were administered orally in doses of 10, 15 and 20 mg/kg body weight and their water and methanol extracts in amounts equivalent to 20 mg/kg of the powder were also administered. As a control drug Amprol Plus (R) was administered orally. Faecal oocysts per gram (OPG) counts were made by the Stoll with Hauscheer's technique. *Melia azedarach* powder as well as its extracts in methanol and water significantly ($P<0.05$) reduced the OPG counts at the dosage levels of 10, 15 and 20mg/kg. The percentage reductions in OPG counts on the 3rd, 10th and 15th days after administration of 10 mg/kg body weight of the drug were 7.2 $\pm$ 5.2, 12 $\pm$ 7.5 and 21 $\pm$ 4.0, respectively. Treatment with 15 mg/kg body weight of the *Melia azedarach* powder produced 18 $\pm$ 5, 28 $\pm$ 8 and 32 $\pm$ 11 percent reductions on days 3rd, 10th and 15th, respective. The respectively OPG reductions in the group treated with 20 mg/kg were 20 $\pm$ 7, 68 $\pm$ 13 and 83 $\pm$ 19 percent. The OPG count reductions at this dose were non-significanttly different from that of control drug on day 15th. The aqueous extract equivalent to 20 mg/kg body weight of the powder produced percentage reductions of 23 $\pm$ 6, 59 $\pm$ 10 and 66 $\pm$ 16 on 3rd, 10th and 15th days post-treatment, respectively. The OPG reductions produced by the methanol extract of *Melia azedarach* were 13 $\pm$ 6, 59 $\pm$ 13 and 79 $\pm$ 14 percent on days 3rd, 10th and 15th, respectively, showing a non-significant ($P>0.05$) difference in the OPG count reduction from the control drug on the 15th day. These data suggest that single oral administration of 20 mg/kg of *Melia azedarach* seeds and their extracts in methanol and

water in equivalent amounts are effective in controlling the Eimeria infection in chickens. However, since at higher doses mortality was observed they should not be used alone for therapeutic purposes in the poultry birds but may be recommended perhaps in smaller amounts alongwith other herbal ingredients as a mompound preparation.

INTRODUCTION

Coccidiosis is a common and fatal disease of chickens caused by *E. tenella*, *E. necatrix*, *E. brunetti*, *E. maxima* and *E. praecox* (Soulsby, 1982). Infection with a single species is rare and is usually of mixed type under natural conditions. Coccidiosis is regarded as ubiquitous in poulty management and it is really difficult to keep a flock completely free of it for any length of time. The infection incurs heavy losses due to high mortality rate in birds and the chemotherapeutic agents presently employed against it are not without hazards. *Melia azedarach*, Linn. (Bakain) seeds have been used since centuries in the folk medicine to treat various parasitic infections of man and animals (Nadkarni, 1954; Said; 1969; Awan, 1981). Therefore, in order to evaluate the anticoccidial activity of *Melia azedarach* seeds, their powder and the extracts in water and methanol were administered orally in graded doses to the chickens suffering naturally from a mixed Eimeria infection.

MATERIALS AND METHODS

A total of 72 one-day chicks of Lyallpur Silver Black breed were obtained from the Poultry Farm of the University of Agriculture, Faisalabad. These birds were kept under natural but unhygienic and warm climatic conditions and were fed a nutritionally balanced commercial chick diet. At the age of 8 weeks all the chicks were checked and were found to be infected with various coccidial species, i. e. *Eimeria tenella*, *E. necatrix*, *E. brunetti*, *E. maxima* and *E. praecox*. They were randomly divided into 6 groups of 12 birds each. As control, a group was kept untreated and another received Amprol plus (R) (25% Amprolium + 1.6% Ethopabate) marketed by M. S. D. Pakistan Ltd., Karachi at the rate of 2 g/kg of feed. The pre-treatment oocysts per gram (OPG) counts of the droppings were made by the Stoll and Hauscheer's technique (1926). Similarly, post-treatment OPG counts were determined on the 3rd, 10th and 15th days after oral administration of 10, 15 and 20 mg/kg of *Melia azedarach* seed powder and its extracts in water and methanol equivalent to 20 mg/kg body weight of *M.*

azedarach seeds. The statistical analysis of the data was performed after the methods described by Steel and Torrie (1960).

RESULTS AND DISCUSSION

Table I shows that the oocysts per gram (OPG) counts in the droppings of untreated chickens were not significantly different ($P > 0.05$) at all the time intervals checked. It also showed that the administration of a single oral dose of 10 mg/kg body weight of *Melia azedarach* seed powder has not produced any significant reduction of the OPG counts. The pre-treatment OPG count (Means $\pm$ SEM) was 14206 $\pm$ 800 and the values on the 3rd, 10th and 15th day post-treatment were 13800 $\pm$ 1770, 12500 $\pm$ 600 and 11200 $\pm$ 450, respectively.

In chicks treated with 20 mg/kg body weight of crude powder, OPG count prior to treatment was 18900 $\pm$ 1780 which was reduced to 15100 $\pm$ 1400, 7950 $\pm$ 1250 and 6950 $\pm$ 880, showing a reduction of 67 per cent on the last day. This value was significantly different on days 10th and 15th ($P<0.05$) from the pre-treatment OPG value but the mortality rate was about 67 percent in this group. Thus next higher does of this drug was not tried.

Water extract equivalent to 20 mg/kg body weight was tried in another group. Pre-treatment OPG count had a mean $\pm$ SEM of 17100 $\pm$ 1170 which was reduced to 13100 $\pm$ 1010, 7060 $\pm$ 900 and 6760 $\pm$ 630 on days 3rd, 10th and 15th, respectively. These OPG counts are significantly ($P<0.05$) lower than that of pre-treatment values on the 3rd day and highly significantly lower ($P<0.001$) on days 10th and 15th. These values showed 60 percent reduction in oocyst counts and the mortality in this group was 33 percent.

In the group treated with methanol axtract of *M. azedarach* equivalent to 20 mg/kg, the pre-treatment count was 15300 $\pm$ 1270 which was reduced to 13300 $\pm$ 480, 9070 $\pm$ 460, 6540 on days 3rd, 10th and 15th, respectively, showing a reduction of 41 per cent on 10th day and a reduction of 57 per cent on 15th day, while the mortality rate in this group was again 33 per cent.

The results of group treated with dry powder of *M. azedrach* showed maximum reduction of 67 per cent while the water extract showed a maximum reduction of 60 per cent and the methanol extract was least potent showing 57 percent reduction of oocyst counts. All these values were not comparable with

Table 1 *Mean ± SEM oocysts count per gram of faeces (OPG) and their %age reduction in chickens before and after single oral treatment with powdered MELIA AZEDARACH seeds, their aqueous and methanol extracts and AMPROL PLUS (R)*

Treatment (Oral dosege)	Pre-treatment faecal OPG counts Mean ± SEM	Post-treatment faecal OPG counts (Mean ± SEM)			Post-treatment %age reductions of OPG counts (Means ± SEM)		
		3rd Day	10th Day	15th Day	3rd Day	10th Day	15th Day
Untreated control	13900±720	13500±780	14200±820	15100±980	—	—	—
AMPROL PLUS (2 g/5kg, of feed)	12500±630	1000± 80**	230± 91**	130± 51**	91.8±16	96±19	99±16
M. azedarach (10 mg/kg, B. Wt.)	14200±800	13800±1770	12500±600	11200±450	7.2± 5	12±7.5	21± 4
M. azedarach (15 mg/kg, B. Wt.)	17900±2750	14600±2620	13100±1370	10200±1120	18± 5	28± 8	32±11
M. azedarach (20 mg/kg, B. Wt.)	18900±1780	15100±1400	7950±1250*	6950±880*	20± 7	68±13	83±19
Water extract of *M. azedarach* (20 mg/kg, B. Wt.)	17100±1170	13100±1010*	7060±900**	6760±630**	23± 6	59±10	66±16
Methanol extract of *M. azedarach* (20 mg/kg, B. Wt.)	15300±1270	13300± 480	9070±460**	6540±340**	13± 6	59±13	79±14

OPG = Oocysts per gram. Number of chickens in each group = 6.

* = Significantly ($P<0.05$) less than the pre-treatment value.

** = Highly significantly ($P<0.001$) less than the pre-treatment value.

the control drug Amprol Plus (R) (2 g/kg of feed) which had a pre-treatment count of 12,500 ± 639 and caused a significant decrease in the OPG counts even on the 3rd day. The post-treatment counts on 3rd, 10th and 15th days were 1000±80, 230±91 and 130±51, showing 99 per cent reduction in the OPG counts. These reductions were comparatively higher than the *Melia azedarach* treated groups where the maximum reduction was about 67 per cent.

It was observed during these studies that all the chicks infected with Eimeria species after about 10 days of infection started passing loose droppings and suffered from watery diarrhoea. This would have caused an electrolyte imbalance as already reported by Begum and Anwar (1981). The diseased birds showed slow reflexes, ataxia and petechial haemorrhages in the G. I. tract. The caecum was found filled with large amount of clotted blood. Therefore, it is conceiable that the mortality observed in the *M. azedarach* treated groups was due to its low efficiacy but not perhaps due to its direct toxic effect. However, further investigations are needed to clarify this point. It is suggested that *M. azedarach* should be used to cantrol coccidiosis in birds alongwith other herbal ingredients as employed in some propriety remedies.

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