

IMPACT OF METHANOLIC EXTRACT OF *PEGANUM HARMALA* ON THE WEIGHT GAIN, FEED CONVERSION RATIO, FEED COST AND GROSS RETURN OF BROILER CHICKS

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ABSTRACT

The present study was carried out to explore the potential of *Peganum harmala* (*P.harmala*) methanolic extract on the weight gain, feed conversion ratio, feed cost and gross return of broiler chicks. For this purpose, 120 seven days old chicks of approximately same weight were used. The chicks were divided into four treatment groups; Ph-0, Ph-200, Ph-250 and Ph-300 receiving methanolic extract of *P. harmala* at the rate of 0, 200, 250 and 300 mg/L of drinking water respectively. Each group was replicated 3 times having 10 chicks per replicate. Significantly ($P<0.05$) higher weight gain was recorded in group Ph-250 at all recorded stages as compared to the control. Better Feed Conversion Ratio (FCR) was recorded in group Ph-250, followed by Ph-200 and Ph-300. Mean feed cost per chick was not affected by methanolic extract of *P.harmala*, however, numerically it was lowest for group Ph-250. Gross return per chick was significantly ($P<0.05$) higher in group Ph-250. The study showed that methanolic extract of *P.harmala* has improved the overall performance of broilers. The dose rate of 250 mg/L of drinking water has significantly improved the weight gain and gross return.

Key words: Broilers, *Peganum harmala*, feed conversion ratio, feed cost, gross return.

INTRODUCTION

Medicinal plants have been used for centuries as remedies for human and animal ailments. To cure the disease new and better drugs are needed. The use of antibiotics as feed additive is a common practice, although has adverse effects as well, like development of resistance and residual effect in the product. Medicinal plants as natural feed additives are recently used in poultry diet to enhance the performance and immune response of chicken (Abaza *et al.*, 2008). The use of natural feed additives as a substitute for antibiotic in poultry production has become an area of great interest (Kumar *et al.*, 2003). Scientists are attempting to study rationally and scientifically, the resource of medicinal plants (Azaizah *et al.*, 2003). Medicinal plants or herbs consists of many pharmacologically active chemical compounds which may act as diuretic (Vohra and Khan, 1981), as anthelmintic (Al-Khalil, 1995), as an appetizer (Al-yahya, 1986), antibacterial (Desta, 1993) and antifungal (Rathee *et al.*, 1982). Herbs are expected to serve as safer alternative as growth promoter due to their suitability and preference, lower cost of production, reduced risk of toxicity, minimum health hazards and environment friendly nature (Devegowda, 1996).

Peganum harmala (locally known as harmal) belongs to family Zygophylaceae and is a multipurpose medicinal plant (Herraiz *et al.*, 2009). Harmaline,

harmine, harmalol and harmol are the main beta carboline alkaloids in *Peganum harmala* extracts. (Herriaz *et al.*, 2009). *Peganum harmala* has great variety of pharmacological and biological activities such as antibacterial and antifungal (Abdel-Fattah *et al.*, 1997), anticancer (Adams, 1983), analgesic and anti-inflammatory (Monsef *et al.*, 2004), disinfectant (shahverdi *et al.*, 2005), growth promoting (Walid, 2009), cholesterol lowering and hepatoprotective effects (Hamden *et al.*, 2008). Limited reports are available regarding the impact of *Peganum harmala* on growth performance of broiler chicks. Present study was therefore conducted to evaluate the effect of methanolic extract of *P. harmala* on overall performance of broiler chicks.

MATERIALS AND METHODS

Present study was conducted to explore the potentials of methanolic extract of *Peganum harmala* (*P. harmala*) on the overall performance and economic importance of broiler. A total of 200 day-old broiler chicks were obtained from commercial market and were reared for a pre-experimental period of 7 days. Out of them 120 chicks of approximately similar body weight and appearance were selected on day 8th, and divided into four groups; Ph-0, Ph-200, Ph-250 and Ph-300, receiving methanolic extract of *P. harmala* at the dose

rate of 0, 200, 250 and 300 mg/L of drinking water respectively. Each group was carrying three replicates (10 chicks/ replicate). All the chicks were grown in an open-sided shed in pens. Saw-dust was used as litter. Feeder, drinker, bulb and other essential equipments were provided in each pen to maintain identical management. Experiment was continued for 28 days.

Preparation of extract: Methanolic extract was prepared from *P. harmala* seeds at Hussain Ebrahim Jamal Research Institute of Chemistry, University of Karachi, Karachi. For the preparation of extract, one kg of *P. harmala* seeds were dipped in 3 liters of 80% aqueous methanol for five days, filtered and then methanol was evaporated using rotary evaporator under low pressure.

Body weight gain: Data was recorded for body weight gain on weekly basis. Chicks were weighed at the start of experiment and then at the end of each week. Initial weight was subtracted from final weight to obtain weight gain. Total weight gain was calculated at the end of study.

Feed conversion ratio (FCR): FCR was calculated at the end of each week throughout the experiment for each replicate using the following formula;

$$\text{FCR} = \text{Feed Intake} / \text{Weight gain}$$

Economics of the use of *P. harmala*: Economics of the research study was calculated in terms of total expenditure incurred and gross return. Mean feed cost per chick was calculated according to the market rate. The cost of *P. harmala* extract used was included. Mean gross return per chick was calculated according to market rate of live bird on per kg basis.

Data Analysis: The data was statistically analyzed with the standard procedures of analysis of variance (ANOVA) using Completely Randomized Design. Means were compared for significance of differences by least significant difference (LSD) as suggested by Steel *et al.*, (1997). Statistical package SAS (1988) was used to perform the above analysis on computer.

RESULTS AND DISCUSSION

Weight gain: Weekly weight gain of broiler chicks is presented in Table 1. Methanolic extract of *Peganum harmala* (*P. harmala*) affected body weight gain at all recorded stages. Body weight gain was significantly ($P < 0.05$) higher at all recorded stages in group Ph-250. Group Ph-200 performed similar to group Ph-250 on day-21, 28 and 35. Overall weight gain was significantly ($P < 0.05$) higher in group Ph-250 as compared to all other groups. So these effects individually or collectively might have contributed to the increased weight gain in chicks (Ahmed *et al.*, 2004). Present study reported significantly

higher weight gain in treated groups as compared to the control. This indicated the positive effect of *P. harmala* on weight gain. However when the dose was increased to 300 mg/L, the weight gain was significantly reduced. Similar to the present findings of Bashar and Abubakar (2001) reported significant reduction in body weight by *P. harmala*. The author may have used *P. harmala* in high doses which may have reduced the weight gain. Ikpi and Akinwumi (1981); Nworgy (2004); Nworgu (2002); Nworgu and Egbunike (2000) reported that *P. harmala* individually or in combination with other medicinal plants has best effect on body weight gain of broilers than using antibiotics which is in agreement to the present findings. Present findings are in agreement with those of Nworgu (2002) who reported that body weight of the treated rats was increased by ethanol and chloroform extract of *P. harmala*

Table 1. Effect of administration of different levels of methanolic extract of *Peganum harmala* on mean weight gain (g) in broiler chicks

Group	Age				Overall Body Weight gain
	Day-14	Day-21	Day-28	Day-35	
Ph-0	216.00 ^d	351.00 ^b	449.67 ^c	501.00 ^b	1518 ^d
Ph-200	278.66 ^b	438.67 ^a	551.33 ^a	585.33 ^a	1854 ^a
Ph-250	295.00 ^a	435.00 ^a	556.33 ^a	567.67 ^a	1854 ^a
Ph-300	238.00 ^c	375.33 ^b	508.33 ^b	523.67 ^b	1645 ^c

Means within a column with different superscripts are significantly different at $\alpha = 0.05$

Ph = represents *Peganum harmala* levels; 0-300 = 0-300 mg/L of drinking water

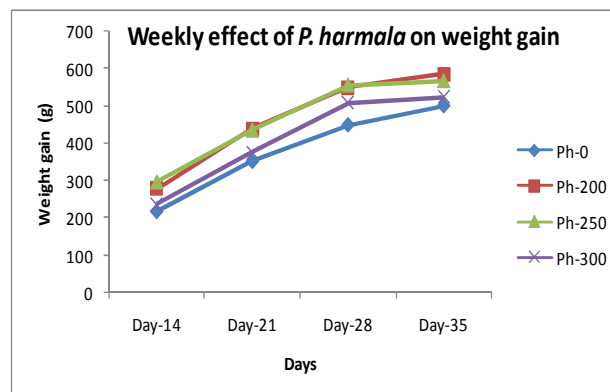


Fig 1: Weekly effect of administration of different levels of methanolic extract of *Peganum harmala* on weight gain in broiler chicks

Feed conversion ratio (FCR): Mean feed conversion ratio is presented in Table 2. FCR was significantly affected by methanolic extract of *P. harmala* at all stages except day-35 and was the best in group Ph-250 as

compared to the control. FCR was the same in group Ph-200 and Ph-250 at day 21 and 28. The best FCR was found in the group that was fed with Ph-250 mg/L of water, followed by Ph-200 and Ph-300. During this study, it was found that there were significant differences in the FCR between treated groups as compared to control groups and among the treated groups as well. The best FCR was found for the group Ph-250. Our findings are in agreement with that of Ahmed *et al.* (2004) who used leaves and flower extract of *Calendula officinalis* in broilers at the rate of 2.8 ml/bird/day which resulted in improvement of 3% in FCR. Our findings are also in agreement with those of Bashar and Abubakar (2001), whom used six medicinal plants at three different levels in the diet of broiler chicks as natural growth promoters and concluded that *P. harmala* seeds at the rate of 2.5 kg/ton had the best conversion ratio. Our findings are also in agreement with that of Jegede *et al.* (2006), whom stated that all natural feed additives used in his experiment significantly improved feed conversion ratio as compared to control.

Table 2. Effect of administration of different levels of methanolic extract of *Peganum harmala* on mean feed conversion ratio (FCR) in broiler chicks

Group	Age				Overall FCR
	Day-14	Day-21	Day-28	Day-35	
Ph-0	2.01 ^a	2.14 ^a	2.16 ^a	2.03	2.09 ^a
Ph-200	1.98 ^{ab}	1.93 ^b	1.95 ^b	1.94	1.94 ^c
Ph-250	1.83 ^b	1.93 ^b	1.94 ^b	1.86	1.89 ^d
Ph-300	2.01 ^a	2.05 ^{ab}	2.00 ^b	1.95	2.00 ^b

Means within a column with different superscripts are significantly different at $\alpha = 0.05$

Ph = represents *Peganum harmala* levels; 0-300 = 0-300 mg/L of drinking water

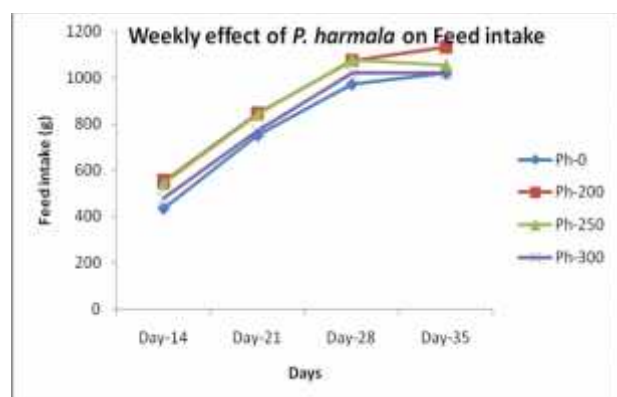


Fig 2: Weekly effect of administration of different levels of methanolic extract of *Peganum harmala* on feed intake in broiler chicks

Economics of the Study: Mean feed cost and gross return per chick is given in Table 3. No difference ($P < 0.05$) was found in the mean feed cost of all groups. Mean gross return was highest ($P < 0.05$) in group Ph-250. Gross return was the same in group Ph-200 and control. Lowest gross return was found in group Ph-300. Our findings are in agreement to those of Nworgu *et al.* (1999); Akinsoye (1989); Nwajiuba (1998), whom reported less feed cost and maximize gross return per bird for the treated groups as compared to control group.

Table 3. Effect of administration of different levels of methanolic extract of *Peganum harmala* on feed cost and gross return in broiler chicks.

Group	Mean feed cost (Rs) per Chick	Mean gross return (Rs) per Chick
Ph-0	37.50	85.525 ^b
Ph-200	37.500	83.925 ^b
Ph-250	34.500	94.975 ^a
Ph-300	36	80.450 ^c

Means within a column with different superscripts are significantly different at $\alpha = 0.05$

Ph = represents *Peganum harmala* levels; 0-300 = 0-300 mg/L of drinking water

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