



# **Effect of Fresh Pudina (*Mentha arvensis*) Leaves Paste with Water on the Performance of Broilers**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

An experiment was conducted on 45-day-old broiler chicks reared up to five weeks of age to investigate the Effect of Pudina leaves paste on the Growth and Performance of Broilers. 45-day-old Broiler chicks were randomly divided into five groups with four sub-groups of 4 chicks. The control (first) group received a standard broilers diet. Chicks in, the second, third, fourth and fifth groups received standard broilers supplemented with Pudina leaves paste 0.25, 0.50, 0.75 and 1.0 g, respectively. Results revealed that there was a significant effect of different levels of Pudina leaves paste on body weight, feed intake and gain in weight of broilers. The feed efficiency of broilers was also improved on feed supplemented with Pudina leaves paste.

**Keywords:** *Pudina leaves; broilers; chicks; feed conversion ratio.*

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## 1. INTRODUCTION

The poultry industry in India has witnessed remarkable growth, positioning the country as a significant player on the global poultry map. India ranks third in egg production, churning out a staggering 138.38 billion eggs annually [1], trailing only behind China and the USA. Additionally, India stands as the fifth-largest producer of poultry meat, contributing approximately 3.2 million tons to the world market alongside heavyweight poultry producers: the USA, China, Brazil, and Mexico (2011-12).

“Over the past decade, the chicken population in India has witnessed remarkable growth, with an impressive annual growth rate of 7.3%” [2]. “The organized sector, which accounts for nearly 70% of the total poultry output, plays a pivotal role in driving this expansion. Presently, India boasts approximately 230 million layers (chickens raised primarily for egg production) and a whopping 2,300 million broilers (chickens raised for meat production)” [2,3].

The surge in poultry processing has been significant, constituting 20% of the overall broiler production. This growth not only enhances economic prospects but also generates employment opportunities for rural communities, thereby contributing to their livelihoods in a remarkably short period.

The transformation of the Indian poultry industry has been profound. From a modest backyard activity, it has evolved into a robust commercial enterprise. Large integrated players now dominate the landscape, and the successful implementation of contract poultry farming on a large scale has further fuelled this growth.

Over the years, broiler production in India has witnessed meteoric growth, escalating from a mere 4 million in 1971 to an astounding 1,563 million in 2005. Key states such as Andhra Pradesh, Kerala, Karnataka, and Tamil Nadu collectively account for 40% of the market share. Additionally, Maharashtra and Goa contribute around 15%, while the remaining share is distributed across the Central, Northern, and Eastern regions of the country<sup>1</sup>. This dynamic evolution underscores India's pivotal role in shaping the global poultry industry.

Poultry, today, stands as the primary source of meat in India, accounting for a substantial 28% of total meat consumption—a remarkable leap from

the 14% recorded a decade ago. It has outstripped its competitors, including beef, veal, and buffalo meat. Several factors contribute to poultry meat's ascendancy: the high prices of mutton, religious restrictions on beef and pork, and the limited availability of fish beyond coastal regions. Consequently, poultry meat has become the preferred and most widely consumed meat across the country.

The surge in domestic production and the growing integration of poultry farming have driven down poultry meat prices, further fuelling its consumption. Rewinding to 1980, when the poultry sector yielded 10 billion eggs and 30 million broilers, the employment landscape within the sector was less promising. However, as income and employment opportunities in crop-related activities dwindled, a significant shift occurred toward the non-crop sector, which encompasses poultry and dairy farming [4].

The indispensability of broilers cannot be overstated. Their rapid growth cycle—ready for marketing within 36-42 days—ensures swift returns for farmers. Broiler meat enjoys widespread popularity, and both eggs and poultry meat serve as excellent protein sources. Notably, poultry meat is not only nutritious and flavourful but also boasts lower fat content, making it a health-conscious choice with no adverse effects on well-being (Jakir Ahmed, 2012). The humble broiler plays a pivotal role in meeting the ever-growing demand for protein in our diets.

## 2. MATERIALS AND METHODS

The experiment was conducted at the Department of Poultry Production, Sam Higginbottom University of Agriculture, technology and Science (SHUATS) during the period from 18 March 2017 to 21 April 2017. To complete the research, the following steps were done: -



**Fig. 1. Pudina leaves**

**Collection of plant material (Pudina leaves):**

Pudina (*Mentha arvensis*) leaves were selected to search out the efficacy of this leaf extract in broiler production. Adequate amounts of mature and disease-free Pudina leaves were collected from the local market of Mahewa.

**Preparation of Pudina leaves water extract:**

**Materials Required:**

- Pudina leaves
- Micro-grinder
- Freshwater
- Beaker

**The procedure of Pudina (*Mentha arvensis*) leaves water extract preparation:**

At first, Pudina leaves will be washed with fresh water properly. The leaves will be ground in the mixer grinder. After grinding, the paste will be mixed in drinking water and offered to the broilers.

The initial weight of each chick was recorded on arrival and then weekly to obtain the growth rate. The feed consumption was also recorded weekly to determine the feed efficiency of chicks. The mortality rate of chicks was also recorded during the experimental period.

**Statistical analysis:** Data were analyzed using a Completely Randomized Design (CRD), with means and standard errors computed according to Snedecor and Cochran (1994). The significant differences between treatment groups were determined using Duncan’s Multiple Range Test (DMRT).

**3. RESULTS AND DISCUSSION**

The study was carried out at Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Science, Allahabad, Uttar Pradesh, India on 45-day-old broiler chicks which were divided randomly into five groups with four sub-groups comprising four chicks in each serve as replicates based on following dietary regimes:

T <sub>0</sub>	Water with 0% Pudina Paste
T <sub>1</sub>	Water with 0.25% Pudina Paste
T <sub>2</sub>	Water with 0.50% Pudina Paste
T <sub>3</sub>	Water with 0.75% Pudina Paste
T <sub>4</sub>	Water with 1.00% Pudina Paste

The results of the study are presented and discussed in this chapter. The data on the body

weight of chicks, gain in weight, feed intake, and feed conversion ratio (FCR) of the broilers is presented in Tables 1 to 5.

**Body Weight of Broilers:** The data regarding the body weight of broiler chicks from day old to five weeks of age are presented in Tables 1 to 5.

**Body weight of day-old chicks (g):** The data regarding body weight of day-old chicks randomly distributed into control (T<sub>0</sub>) and four different treatments (T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> & T<sub>4</sub>) are presented in Table 1. The following observations were made:

1. In general, the body weight of day-old chicks ranged from 45.25-49.50 g.
2. The body weight of day-old chicks in five treatments viz T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> ranged from 45.75-47.75, 45.75-48.75, 45.50-47.25, 45.25-48.75, and 49-50 g, respectively.
3. The mean body weight of day-old chicks in different treatments viz T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> was 46.94, 47.13, 46.31, 47.19 and 48.56 g, respectively.
4. The differences in the body weight of day chicks between different groups (treatments) were non-significant.

From the perusal of data on body weight of day-old chicks randomly distributed in different treatments contained in Table 1, it was noted that irrespective of treatments the body weight of chicks in general ranged from 45.25-49.50 g. “The highest mean body weight of chicks was recorded in T<sub>4</sub> (48.56 g) followed by T<sub>3</sub> (47.19 g), T<sub>1</sub> (47.13 g), T<sub>0</sub> (46.94g) and T<sub>2</sub> (46.31 g). The differences in these values between the treatments were found non-significant which indicated that the random distribution of the chicks among the different groups of treatments of the experiments was proper and unbiased” [5].

**Body weight of broiler chicks at one week of age:** The data regarding the body weight of chicks at one week of age are presented in Table 2. The following observations were made:

1. In general, the body weight of broiler chicks at one week of age ranged from 141 to 177 g.
2. The body weight of broiler chicks at one week of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> ranged from 144 - 177, 143 - 161, 145 - 160, 141 - 168 and 144.50 - 168 g, respectively.

3. The mean body weight of broiler chicks at one week of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> was 159, 150, 151, 151 and 157 g, respectively.
4. The differences in the body weight of chicks at one week of age due to treatments were significant.

“From the perusal of data on the body weight of one-week-old chicks contained in Table 2, it was noted that irrespective of treatments, the body weight of chicks at one week of age ranged from 141 to 177 g. The highest mean body weight of chicks at the first week of age was recorded in T<sub>0</sub> (169) followed by T<sub>4</sub> (157 g), T<sub>3</sub> (151 g) T<sub>2</sub> (151 g) and T<sub>1</sub> (150). The differences in these values were found to be significant; indicating there by a significant effect of fresh Pudina leaves paste supplementation in water on the body weight of chicks at the first week of age. The broilers in T<sub>0</sub> registered significantly highest body weight compared to other treatments” [5]. However, it was found at par with T<sub>4</sub>. The differences in body weight of broilers in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> were non-significant being at par. The broilers in T<sub>1</sub> registered significantly lowest body weight at one week of age. The results revealed that there is a beneficial effect of supplementation of fresh Pudina leaves passed in the water of broilers on body weight. The results are in agreement with Aporn [6].

**Body weight of chicks at two weeks of age:**  
The data regarding the body weight of chicks at two weeks of age are presented in Table 3. The following observations were made:

1. In general, the body weight of broiler chicks at two weeks of age ranged from 343 to 424 g.
2. The body weight of broiler chicks at two weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> ranged from 362 - 422, 347 - 402, 379 - 397, 347 - 424 and 343 - 417 g, respectively.
3. The mean body weight of broiler chicks at two weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> was 392, 375, 385, 379 and 386 g respectively.
4. The differences in the body weight of chicks at two weeks of age due to treatments were significant.

From the perusal of data on body weight of two-week-old chicks contained in Table 3, it was noted that irrespective of treatments the body weight of chicks ranged from 343 to 424 g. The highest mean body weight of broiler chicks at two weeks of age was recorded in T<sub>0</sub> (392 g) followed by T<sub>4</sub> (386 g), T<sub>2</sub> (385 g), T<sub>3</sub> (379 g) and T<sub>1</sub> (375 g), and the differences in these values were found to be significant, indicating there by a significant effect of treatments on body weight of chicks at two weeks of age. The broilers in T<sub>0</sub> had the largest recorded body weight by a substantial margin [7-9]. It was discovered to be comparable to the broiler body weight in treatments T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub>, with no statistically significant difference between them. The findings demonstrated the advantages of adding fresh Pudina leaves to the broiler water supplement.

**Table 1. Average Body weight (g) of day-old broilers in five different treatments**

Replication	Body weight of Day-old-chicks (g)				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	45.75	46.75	45.50	48.00	49.50
R <sub>2</sub>	47.50	45.75	46.00	46.75	48.00
R <sub>3</sub>	46.75	47.25	47.25	48.75	48.50
R <sub>4</sub>	47.75	48.75	46.50	45.25	48.25
Mean (g)	46.94	47.13	46.31	47.19	48.56

**Table 2. Average Body weight (g) of day-old broilers at first week of age in five different treatments**

Replication	Average body weight (g) of first week in different treatments				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	167	151	145	168	160
R <sub>2</sub>	177	143	160	147	168
R <sub>3</sub>	144	146	150	141	155
R <sub>4</sub>	148	161	148	151	144
Mean (g)	159	150	151	151	157

**Table 3. Average Body weight (g) of broilers at two weeks of age in five different treatments**

Replication	Average body weight (g) at two weeks of age				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	405	381	381	424	396
R <sub>2</sub>	422	347	397	382	417
R <sub>3</sub>	362	369	383	347	386
R <sub>4</sub>	377	402	379	362	343

**Body weight of broiler chicks at three weeks of age:** The data regarding the body weight of chicks at three weeks of age are presented in Table 4. The following observations were made:

1. In general, the body weight of broiler chicks at three weeks of age ranged from 611 to 779 g.
2. The body weight of broiler chicks at three weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> ranged from 652 - 702, 611 - 779, 635 - 724, 630 - 730 and 658 - 745 g, respectively.
3. The mean body weight of broiler chicks at three weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> was 690, 699, 693, 680 and 701 g, respectively.
4. The differences in the body weight of chicks at three weeks of age due to treatments were significant (Table 4).

From the perusal of data on the body weight of three-week-old chicks contained in Table 4, it was noted that irrespective of treatments the body weight of chicks ranged from 611 - 779 g. The highest mean body weight of broiler chicks at three weeks of age was recorded in T<sub>4</sub> (701 g) followed by T<sub>1</sub> (699 g), T<sub>2</sub> (693 g), T<sub>0</sub> (688 g) and T<sub>3</sub> (680 g). The substantial changes in these values were discovered, suggesting that the treatments had a noteworthy impact on the chicks' body weight at three weeks of age. When compared to the other treatments, the broiler in T<sub>4</sub> recorded the highest body weight by a wide margin. But it was discovered to be comparable to T<sub>1</sub> and T<sub>2</sub> [10-13]. The broiler body weights in T<sub>3</sub>, T<sub>2</sub>, and T<sub>1</sub> were all at par, with no significant differences. The study's findings show that adding fresh Pudina leaves to broiler water supplementation has a positive impact on body weight.

**Table 4. Average Body weight (g) of broilers at three weeks of age in five different treatments**

Replication	Average body weight (g) at three weeks of age				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	700	718	635	730	696
R <sub>2</sub>	702	611	719	682	745
R <sub>3</sub>	652	688	695	630	658
R <sub>4</sub>	698	779	724	680	707
<b>Mean (g)</b>	690	699	693	680	701

**Body weight of chicks at four weeks of age:** The data regarding the body weight of chicks at four weeks of age are presented in Table 5. The following observations were made:

1. In general, the body weight of broiler chicks at four weeks of age ranged from 905 to 1174g.
2. The body weight of broiler chicks at four weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> ranged from 991 - 1081, 923 - 1168, 958 - 1119, 905 - 1129 and 1011 - 1174 g, respectively.
3. The mean body weight of broiler chicks at four weeks of age in T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> was 1029, 1061, 1049, 1014 and 1077 g respectively.
4. The differences in the body weight of chicks at four weeks of age due to treatments were significant.

From the perusal of data on the body weight of four-week-old chicks contained in Table 5, it was noted that irrespective of treatments, the body weight of chicks ranged from 905 - 1174g. The highest mean body weight of broiler chicks at four weeks of age was recorded in T<sub>4</sub> (1077 g) followed by T<sub>1</sub> (1061 g), T<sub>2</sub> (1049 g), T<sub>0</sub> (1029 g) and T<sub>3</sub> (1014 g). The differences in these values were found to be significant, indicating thereby a significant effect of treatments on the body weight of chicks at four weeks of age. The body weight of broilers in T<sub>4</sub> registered significantly the highest body weight compared to all other treatments. However, it was found at par with T<sub>1</sub>. The body weight of broilers in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> did not differ significantly being at par. The results indicate a beneficial effect of fresh Pudina leaves past in water supplementation on the body weight of broilers.

**Table 5. Average Body weight (g) of broiler at four weeks of age in five different treatments**

Replication	Average body weight (g) of four weeks of age				
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
R <sub>1</sub>	1081	1121	958	1129	1053
R <sub>2</sub>	992	923	1059	954	1174
R <sub>3</sub>	991	1032	1059	905	1011
R <sub>4</sub>	1051	1168	1119	1066	1072
<b>Mean (g)</b>	1029	1061	1049	1014	1077

#### 4. CONCLUSION

The study titled "Effect of Fresh Pudina Leaves Paste with Water on Performance of Broilers" was conducted at the Small Animal Laboratory, Animal Husbandry & Dairying, Sam Higginbottom University of Agriculture, Technology and Sciences in Allahabad, Uttar Pradesh, India, in 2017. The objective was to evaluate the impact of fresh pudina (mint) leaf paste supplementation on broiler performance.

The experimental design involved randomly dividing 45-day-old chicks (DOC) from the same hatch into five groups: T<sub>0</sub> (Control), T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub>. Each treatment group had four subgroups, with four birds in each subgroup. Broilers in T<sub>0</sub> received a standard diet based on National Research Council (NRC) recommendations (CP 22 and ME 2900). Broilers in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, and T<sub>4</sub> received the same standard diet (T<sub>0</sub>) supplemented with different levels of fresh pudina leaves paste (0.25 g, 0.50 g, 0.75 g, and 1.0 g, respectively). All broilers had ad libitum access to water.

The broilers were housed in deep litter conditions in the small animal laboratory, with a 40-watt bulb left on each block. The floor space provided was 0.75 sq. ft per bird, and all birds were managed under identical conditions.

Weekly measurements were recorded for feed intake, body weight, and feed conversion ratio (FCR). Statistical analysis was performed on the collected data. The mean body weights of DOC in different treatment groups were as follows: T<sub>0</sub> (control): 46.94 g, T<sub>1</sub>: 47.13 g, T<sub>2</sub>: 46.31 g, T<sub>3</sub>: 47.19 g, and T<sub>4</sub>: 48.56 g. There were no significant differences in body weight among the treatment groups.

In conclusion, supplementation of fresh pudina leaves paste in water did not significantly affect the body weight of broilers. Further studies may be needed to explore other potential benefits or effects of pudina supplementation on broiler

performance. While fresh pudina leaf paste did not lead to significant changes in body weight, it remains an interesting area for future research in poultry nutrition.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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