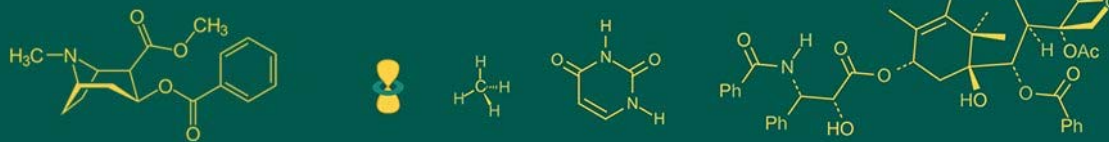


## International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693  
 ISSN Online: 2617-4707  
 IJABR 2025; SP-9(2): 431-433  
[www.biochemjournal.com](http://www.biochemjournal.com)  
 Received: 03-12-2024  
 Accepted: 08-01-2025

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## Effect of different bedding materials on the haematological parameters of broiler chicks reared in sub-humid zone of Rajasthan

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DOI: <https://doi.org/10.33545/26174693.2025.v9.i2Sf.3790>

### Abstract

This study was conducted to decipher the effects of different bedding materials *viz.*, Saw dust, Sand and Wheat Straw, on the haematological parameters of broiler chicks reared on deep litter system in the sub-humid zone of Rajasthan. A total of three hundred sixty (360) unsexed, apparently healthy, day-old 'Vencobb-430' strain broiler chicks were included in the study and raised on either Saw dust, sand or wheat straw as bedding material. The study was conducted over a period of six weeks and blood samples were taken from 12 birds of each treatment group. The data on haematological parameters did not reveal any significant ( $p < 0.05$ ) effect of bedding materials on the Haemoglobin (g/dl), PCV (%), Albumin (g/dl), Globulin (g/dl) as well as the total protein levels (g/dl). Our study indicate that choice of bedding material does not have significant impact on the haematology and protein profile of broiler chicks.

**Keywords:** Broiler, bedding material, saw dust, haematology

### Introduction

Poultry farming forms an essential component of the food and livelihood security of masses of India. Poultry meat is a go-to choice for millions across globe. The demand for poultry meat in India has been on the rise since the last two decades, a trend that is going to increase further owing to the burgeoning population (FAO, 2019) [5]. The Indian poultry industry has seen a quantum leap in the last two decades ushered by improved technology and increased intensification. The management interventions aimed at increasing the productivity from poultry are mainly targeted at improved housing, feeding, or breeding aspects of the birds.

There has been growing intensifications in broiler production in India, owing to transformation of broiler farming from a backyard venture to a full-fledged industry and high demand for poultry meat (Damodaran, 2024) [2]. The intensification of broiler production has resulted in concerns regarding broiler health and welfare. The housing of broiler as a result has become a key area of poultry research aimed at identifying suitable strategies in terms of type of housing, the bedding materials, building materials and other factors that could influence the productivity and health of birds (Linden, 2013) [8].

Poultry is one of the fastest growing sectors of the agricultural sector in Rajasthan, with a growth rate of about eight percent per year. There has been a paradigm shift in the structure and operation of the Poultry sector in Rajasthan, from a backyard activity to a major commercial agro-based industry over a period of four decades. Continued efforts in the upgrading, modification and application of new technologies paved the way for multidisciplinary and multilateral development in Poultry and allied sectors. The state ranks seventeen with 14.6 million of the country's total Poultry population (20th Livestock Census) [1].

Among key management interventions, bedding material is an important factor that directly impacts the health and welfare of birds and thus defines the productivity of birds (Huang *et al.*, 2009; Şen *et al.*, 2023) [6, 10]. The poultry bedding material has significant say in the productivity and health of broiler chickens raised in deep litter system as the birds spend most of its life in contact with the bedding material (Strašifák, J., & Juhás, 2023) [13].

As a result, the type of bedding material and its associated property is a key determinant of poultry health and welfare. The choice of bedding material however is based on many considerations ranging from availability, cost and impact on birds (Diarra *et al.*, 2021) [4]. Among bedding material, sand, saw dust and wheat straw are commonly used in Indian conditions. However, studies concerned with the impact of bedding materials on poultry bird's haematology and serum protein profile are very limited when it comes to Udaipur district of Rajasthan. Therefore, the current study was designed to evaluate the impact of choice of bedding materials on the haematological parameters and serum protein profile of broiler chicks.

### Materials and Methods

**Location of Study Area:** The experiment was carried out at the Poultry Farm, Livestock Farm Complex unit, College of Veterinary and Animal Science Navania, Vallabh Nagar, Udaipur. The Poultry unit is situated at an altitude of 598 meters above the mean sea level in the IVA Agro-climatic zone of Rajasthan in the area forming a part of the sub-humid Southern plains and Aravalli hill zone.

**Plan of Work:** The research was carried out to evaluate the effect of different bedding materials (sand, saw dust and wheat straw) on the haematological parameters and blood protein profile of broiler chicks reared under deep litter system. Day old Broiler chicks were randomly and uniformly distributed in total 12 treatment groups comprising of 30 birds in each group. Each group were further divided into three replicates of 10 birds each. Birds were reared on the different bedding materials according to their groups with uniform managerial practices during the experimental period.

**Sampling and Determination of Blood Parameters:** At the end of trial, two birds from each replicate were randomly picked for blood sample collection and estimation of haematological parameters. Among haematological parameters, haemoglobin was determined by Sahli's method and PCV was determined by standard Micro-Haematocrit method. While the total protein was calculated by Biuret method, total albumin by bromocresol green end point assay method and total globulin was calculated as:

$$\text{Globulin (g/dl)} = \text{Total protein (g/dl)} - \text{Albumin (g/dl)}$$

**Statistical Analysis:** Statistical analysis was done to derive the analysis of variance (ANOVA) as described by Snedecor and Cochran (1989) [12] using SPSS 24 and significant

difference in mean between groups was identified using post-hoc Duncan multiple range test.

### Results and Discussion

The data on various haematological parameters of broiler chicks at the end of the experiment has been presented in table 1 and depicted in figure 1. The results revealed that the haemoglobin levels in the broiler chicks reared on various bedding materials to be 11.08 g/dl, 11.07 g/dl, and 11.00 g/dl, in Sand bedded, Sawdust bedded and Wheat Straw bedded groups, respectively. The statistical analysis did not reveal any significant difference in haemoglobin levels of birds reared on varied bedding materials. Similar results were also reported by Deora *et al.*, (2022) [3] in broiler chicks reared on different bedding materials, which is in agreement with our findings. Our findings are in contradiction with the earlier findings of James *et al.*, (2019) [7], who found significant effect of choice of bedding material on the haemoglobin levels of broiler chicks reared on rice hulls, sand, wood shaving. Similar observations of significant effect of bedding on haemoglobin levels was also reported by other researchers (Siyak *et al.*, 2024; Obikaonu, Obiora, and Obiagwu, 2020) [11, 9]. The PCV of broiler chicks reared on Sand, Sawdust and Wheat Straw as bedding material was 30.77 percent, 31.29 percent, and 30.48 percent, respectively. Similar to haemoglobin, no statistically significant difference existed between the PCV levels of broiler chicks reared on different bedding materials. This is in agreement with the findings of James *et al.*, (2019) [7] and Deora *et al.*, (2022) [3] who did not find any significant difference in PCV levels of broiler chicks reared on different bedding materials. In contradiction to our findings, Siyak *et al.*, (2024) [11] and Obikaonu, Obiora, and Obiagwu, (2020) [9] found significant effect of bedding materials on the PCV levels of broiler chicks.

The blood protein profile of broiler chicks reared on different bedding materials was: 2.62 g/dl, 2.67 g/dl and 2.49 g/dl of albumin in the chicks of sand, sawdust and wheat straw bedded groups, respectively. For globulin levels, the values were 4.35 g/dl, 4.42 g/dl and 4.29 g/dl in the chicks of sand, sawdust and wheat straw bedded groups, respectively. Further, the total protein levels were 6.97 g/dl, 7.09 g/dl and 6.78 g/dl in the chicks of sand, sawdust and wheat straw bedded groups, respectively. Statistical analysis did not show any significant difference between the albumin, globulin as well as total protein levels in the blood of chicks reared on the different bedding materials. The data on globulin levels and total protein are in concurrence with the findings of James *et al.*, 2019 [7], who did not find any significant effect of choice of bedding material on the protein profile of broiler chicks.

**Table 1:** Haematological Parameters of Broiler Chicks reared on Different Bedding Materials

	Hemoglobin (g/dl)	PCV (%)	Albumin (g/dl)	Globulin (g/dl)	Total Protein (g/dl)
Sand	11.08	30.77	2.62	4.35	6.97
Sawdust	11.07	31.29	2.67	4.42	7.09
Wheat Straw	11.00	30.48	2.49	4.29	6.78
SEM	0.117	0.95	0.11	0.12	0.18

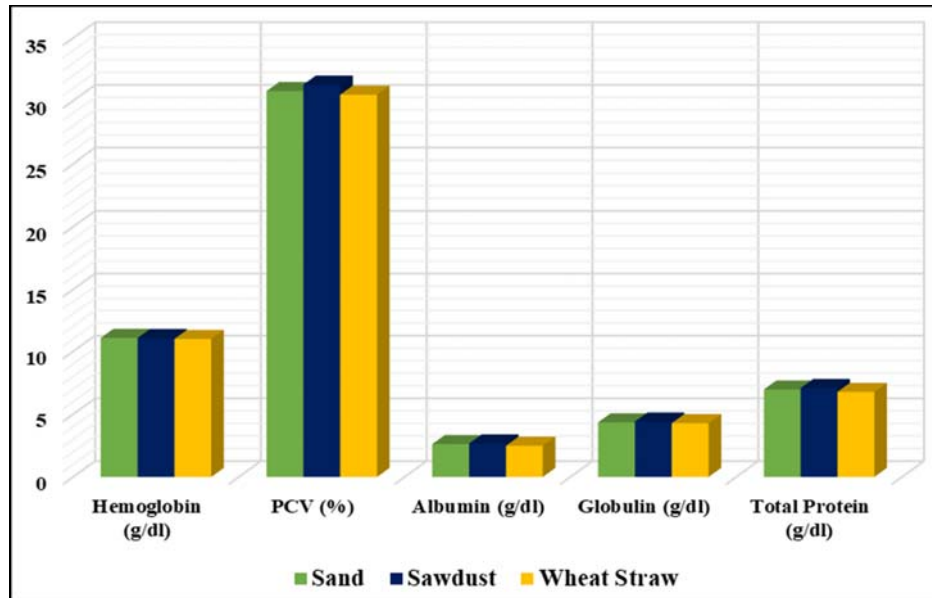


Fig 1: Haematological Parameters of Broiler Chicks reared on Different Bedding Materials

### Conclusion

The results of our study indicate that the choice of bedding materials does not have any significant effect on the haematological and protein profile of broiler chicks.

### Availability of data and material

The datasets reported and presented in the current study are available from the corresponding author on reasonable request.

### Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Authors' contributions

#### Acknowledgements

The authors thank the financial support received from RAJUVAS, Bikaner and help received from CVAS, Navania, Udaipur in the successful completion of this research work.

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