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## Effect of supplementation of Arjuna bark powder (*Terminalia arjuna*) as herbal feed additive on carcass characteristics of broiler chicks in arid region of Rajasthan

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### Abstract

Aim of this experiment was to investigate the use of Arjuna Bark Powder (*Terminalia arjuna*) in broiler feed as a feed additive on carcass characteristics of broilers in arid region of Rajasthan. Total 150 one day old broiler chicks (Cobb-430) were used in experiment. The broiler chicks were divided into five dietary treatments groups (T<sub>1</sub>-T<sub>5</sub>) and each treatment group was also divided into three replicates (R<sub>1</sub>-R<sub>3</sub>). The T<sub>1</sub> group was fed on basal diet without feed additive and kept as control. Whereas treatment groups (T<sub>2</sub>-T<sub>5</sub>) were supplemented with graded levels of Arjuna Bark Powder (*Terminalia arjuna*) in the basal broiler starter and finisher ration, respectively. The T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub> group were supplemented with Arjuna Bark Powder @ 0.50%, 0.75%, 1% and 1.25% in the basal broiler starter and finisher ration, respectively. A feeding trial was conducted for duration of 42 days after this broiler were slaughtered to assess the alteration in carcass characteristics of Arjuna supplemented groups than control group. The findings revealed that the supplementation of Arjuna Bark Powder at graded levels improves the carcass characteristics of broilers *i.e.*, improved dressing, eviscerated weight per cent, giblet yield and weight per cent of organs (liver, heart and gizzard). However, it did not bring any significant effect on carcass characteristics of broiler.

**Keywords:** Broiler, carcass characteristics, dressing percentage, eviscerated weight, organ weight

### 1. Introduction

Poultry rearing is a traditional practice in India and among the Indian livestock-based vocations, poultry production occupies a pivotal position due to its enormous potential to bring about rapid economic growth with low investment and currently it is recognised as a dawn sector with a CAGR (Compound Annual Growth Rate) of egg production is 6.77% (Anonymous, 2023)<sup>[3]</sup> and 7.52% in egg and broiler production (Anonymous, 2019)<sup>[2]</sup>. Poultry meat remains the foremost driver of the growth in total meat production in India and it contribute comparatively more protein than other edible animal product like milk, pork, mutton, and beef while considering per unit of human consumption, and are predicted to be the highest consumed animal protein items by 2025 (Pica-Ciamarra and Otte, 2010, Henuk, 2018)<sup>[12, 7]</sup>. The main axis of economics of poultry industry is based on the feed. Feed plays pivotal role in poultry industry's economics and it accounts for 70-75% of total production costs in the broiler industry, so the efficiency with which poultry convert feed to meat is critical to the industry's economics Prajapat *et al.* (2020)<sup>[13]</sup>. Various exertions have been made over time to lessen production costs by letting down feed costs. The feed additives are termed as "growth promoters" and are often called non-nutrient feed additives (Singh and Panda, 1992)<sup>[15]</sup>. The foremost motive of adding feed additives is to enhance performance of broiler chickens by augmenting growth rate, ameliorate FCR, body growth, resistance against diseases, and lower mortality in poultry birds. An ideal feed additive should be readily biodegradable, free from environmental hazards, non-toxic, involved with transferable drug resistance, and improves performance effectively and economically. Presently, there are many restrictions on the use of various AGPs (antibiotic growth promoters) and other chemical and synthetic medicinal products in the poultry diet, since they were seriously criticized by consumers due to their

harmful effects like bacterial resistance and possible transmission of antibiotic, any other chemical/synthetic feed additive's residue into the human food chain. These serious concerns have been the greatest worry of poultry production (Panda, 2008; Daramola, 2019) [10, 5]. To overcome from health hazard of AGPs, the use of alternative feed additives is emphasized by various producers and consumers. Herbs and plant extracts are searched to be incorporated in poultry feed as alternative feed additive (Alloui *et al.*, 2013) [11]. Hence, use of herbs like Arjuna Bark Powder has advantage because they are safe, economical, effective and easily available. However, the information on the role of Arjuna on broiler performance in arid region is limited. So, present study was taken up to evaluate the efficacy of different levels of Arjuna Bark Powder in improving the carcass characteristics in broiler chicken.

### Materials and Methods

A total of 150 experimental day old, unsexed, apparently healthy broiler chicks (Cobb-430) were individually weighed and randomly divided into five treatment groups *i.e.*, T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>5</sub>, with 30 chicks in each group. Each group of 30 chicks was again subdivided into three sub groups having 10 chicks in each replicate (R<sub>1</sub>-R<sub>3</sub>). Arjuna bark Powder (*Terminalia arjuna*) was supplemented at a graded level. The control group were fed only on basal diet without any supplementation and other treatment groups were supplemented with 0.5%, 0.75%, 1%, and 1.25% of Arjuna Bark Powder in the experimental broiler starter and finisher ration, respectively. For evaluation of carcass characteristics *viz.*, dressed weight percentage, eviscerated weight percentage, giblet and organ weight percentage broilers were sacrificed at the end of 6<sup>th</sup> week from each replicate. The birds were weighed immediately before slaughtering. Dressed weight was calculated as:

$$\text{Dressed wt. (\%)} = \frac{\text{Live wt.} - \text{Wt. of blood, feather, shank and head}}{\text{Live wt.}} \times 100$$

**Table 2:** Effect of Arjuna Bark Powder (*Terminalia arjuna*) on percent weight of different organs

Treatment groups	Heart weight %	Liver weight %	Gizzard weight %	Giblet weight %
T <sub>1</sub>	0.58	1.81	1.60	3.98
T <sub>2</sub>	0.58	1.85	1.63	4.05
T <sub>3</sub>	0.57	1.88	1.66	4.10
T <sub>4</sub>	0.59	1.93	1.71	4.22
T <sub>5</sub>	0.58	1.84	1.66	4.06
SEM	0.013760	0.030150	0.039654	0.065001

The findings of giblet yield and certain organ weight (%) has been presented in Table 2 and revealed that the giblet yield and certain organ weight (%) was higher in Arjuna supplemented groups than the control group indicating positive effect of Arjuna Bark Powder in broilers. The mean values of liver weight, heart weight, gizzard weight and giblet yield (% of live weight) ranges from 1.81 to 1.93, 0.57 to 0.59, 1.60 to 1.71 and 3.98 to 4.22 respectively. The statistical analysis of data of giblet yield and certain organ weight % revealed no significant ( $p > 0.05$ ) effect due to supplementation of Arjuna Bark Powder in diet of broilers. Giblet and certain organ weight per cent were within normal weight range indicating no adverse effect on the internal organs upon inclusion of phyto-genic feed additive in broilers diet. The results obtained in present study regarding giblet yield, heart, liver and gizzard weight % are in accordance with findings of

The dressed birds were eviscerated by giving a median cut in the abdomen and removing the crop, gullet, trachea and viscera. The lungs were scrapped off. Heart, liver, pancreas, spleen and gizzard were separated from gastrointestinal tract. The giblets (heart, liver and gizzard) were cleaned and retained along with the carcass to record eviscerated weight and expressed as percentage of pre-slaughter weight. From the sacrificed birds, giblet (heart, liver and gizzard) was separated carefully and weighed with the help of electronic balance to observe the effect of different dietary treatments on growth and development of certain organs.

### Results and Discussion

The findings of dressing yield (%) and eviscerated yield (%) has been presented in Table 1 and revealed that the carcass yield was higher in Arjuna supplemented groups than the control group indicating positive effect of Arjuna Bark Powder in broilers. The overall mean values of dressing yield (%) and eviscerated yield (%) were recorded to be 73.67 to 76.33 and 64.48 to 65.47 respectively. Upon comparison of means, the mean values of dressing yield (%) and eviscerated yield (%) did not vary significantly among various treatment groups. The results obtained in present study regarding dressing yield (%) and eviscerated yield (%) are in accordance with findings of Biswas and Wakita (2001) [4], Mehala and Moorthy (2008) [9], Depar *et al.* (2021) [6] and Pasaribu *et al.* (2021) [11].

**Table 1:** Effect of Arjuna Bark Powder (*Terminalia arjuna*) on carcass yield in broiler chicks

Treatment groups	Dressing weight %	Eviscerated weight %
T <sub>1</sub>	73.67	64.48
T <sub>2</sub>	74.99	65.40
T <sub>3</sub>	76.14	64.92
T <sub>4</sub>	75.94	65.47
T <sub>5</sub>	76.33	65.12
SEM	0.710275074	0.380431308

Issa and Omar (2012) [8], Weerasingha and Atapattu (2012) [16] Shohe *et al.* (2019) [14]

### Conclusion

This experiment was conducted to determine the optimum level of supplementation of Arjuna Bark Powder in the diet of broilers and its effect on the carcass characteristics of broilers in arid region of Rajasthan. The mean values of dressing yield (%) and eviscerated yield (%) did not vary significantly among various treatment groups. Even though, there is numerical increase in dressing yield (%) and eviscerated yield (%) of phyto-genic feed additive supplemented groups as compared to control, at the same time the giblet and certain organ weight per cent were within normal weight range indicating no adverse effect on the internal organs upon inclusion of phyto-genic feed additive in broilers diet and somewhat some improved dressing yield (%) and eviscerated

yield (%) found in phytogenic feed additive supplemented groups. So, it could be concluded that supplementation of Arjuna Bark Powder at graded level up to 1.25% is quite safer and could be a viable proposition for lucrative broiler farming for meat production. Though the results are concrete and indicative but replication of feeding experiments with large number of broilers are recommended before reaching to final recommendation for incorporation of Arjuna Bark Powder in the broiler feed for wellbeing of broiler industry.

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