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Effect of supplementation of *Rumex acetosa* leaf meal on carcass characteristics of broiler chicken

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Abstract
An investigation was conducted to study effects of *Rumex acetos*a supplementation at different levels as feed additives on the carcass traits of broiler chicken. Two-hundred healthy day-old broiler chicks were bought from a reputable provider. For a week, the chicks were kept in battery cages for brooding. The chicks were divided into five treatment groups at random on the eighth day. viz. T1: (Control), T2: Antibiotic feed additive, T3: 0.5% *Rumex acetos*a, T4: 1% *Rumex acetos*a and T5: 1.5% *Rumex acetos*a having four replicas of 10 chicks each, totaling 40 chicks each group. The birds were raised for five weeks and reared in cages under uniform managemental conditions. The dressed yield (%) recorded was ranged from 73.68±1.37 in T4 to 76.62±0.94 in T1 groups. According to statistics, there was no discernible difference between the various treatment groups for slaughter traits viz. blood loss, feather loss and dressing yield. There were no discernible variations in carcass traits among different treatment groups. Thus supplementation of broiler diets with *Rumex acetos*a leaf powder had no adverse effect.

Keywords: *Rumex acetos*a, feed additive, carcass trait, broiler

Introduction
Poultry industry is growing very first and presently, the position of India is 3rd and 5th egg and broiler meat production in the world. The growth rate of broiler industry is very fast during the past few decades. Feed is the single largest input for the broiler rearing which accounts for about 70-80% of the total cost of production [1]. Hence, it plays an indispensable role in broiler rearing. Growing demand for poultry eggs and meat has forced the producer to incorporate feed different additives which are accepted to boost growth, improve health and also possess antioxidant and antimicrobial actions [2]. Domesticated animals are given antibiotics to promote growth and avoid disease. Antibiotic-resistant microorganisms have been related to the use of antibiotics in animal feeds, though. Therefore, sub-therapeutic antibiotic usage in production animal diets is prohibited in many nations. In place of antibiotics, phytogenic feed additives have been used in order to prevent a possible financial burden and to address the issues caused by antibiotic resistance. Phytogenics are a group of non-antibiotic natural growth promoters of plant derivatives. Recently utilization of phytogenic or plant-based feed additives in poultry rations as possible substitutes for antibiotic growth promoters has gained a lot of attention. Phytogenic feed additives are seemingly becoming a popular area of concern among scientists, nutritionists, feed producers and farmers associated with poultry industry. They can play a pivotal role as feed additives since they improve a number of crucial procedures in the animal body hence may be included in the diet to positively improve feed grade, health status as well as animal products by means of their specifically efficacious substances [3].
Phytogenic feed additives balances normal gut micro flora, prevents colonization of pathogens thereby influence poultry productivity and health status [4] and improve the production of digestive enzymes [5]. They also have certain immunological effects on the bird's body. Gut health, a major topic for research in humans and animals influences the animal as a whole, and equally alters its requirements and nutrient uptake [6]. For efficient broiler performance maintenance of healthy gut environment is a prerequisite. The advantages of medicinal herbs and their products including plant extracts or essential oils on poultry have been proven [7]. Therefore, these phytogenic feed additives have been introduced as fresh options to be used in broiler diets.
The Kashmir, which is frequently described as heaven on earth, is situated at the northernmost point of the Himalayan biodiversity hot spot [8]. The area sustains a remarkable and abundant plant life of tremendous scientific interest and promising economic advantages. *Rumex acetosa*

is a medicinal plant having a series of names by which it is called around the world is present in abundance in this region. It is commonly referred to as *Obej* in local language. Rumex acetosa is a species that is distinguished by the presence of a number of secondary metabolites such as anthraquinones, polyphenols, naphthalenes and other compounds, to-date over 50 compounds have been isolated from this wild vegetable. The antioxidant activity of sorrel (Rumex acetosa) was 8.7–47.1 mM Trolox or 7.9–42.8 mM BHA per g dry weight of plant. *Rumex acetosa* showed a very robust radical scavenging activity with IC50 value was 1.86±0.06 µg/mL [9]. Rumex acetosa's aerial portions, which have an acetone-water extract with antiviral properties, are also high in polyphenols. [10]. This antiviral activity was due to the presence of flavan-3-ols and oligomeric proanthocyanidins in the extract. The natural phenolic compounds contained in herb flowers of *R. acetosa* suppress cell division makes those herb flowers potentially helpful in the treatment and averting malignant diseases [11]. The present experiment was undertaken to know the consequence of incorporation of *Rumex acetosa* leaf powder in diets on different carcass traits of broiler chicken.

Materials and Methods

The experiment had been conducted out at Poultry Farm, Division of Livestock Production and Management, Faculty of Veterinary Sciences and Animal Husbandry, SKUAST-Kashmir, UT of Jammu and Kashmir, India. Two hundred day old commercial broiler chicks were procured from a reputed supplier and brooded under standard managemental conditions. On eighth day, the chicks were distributed randomly into five treatment groups, each with four replicates of ten birds each. The plant material was gathered and the leaves were stripped, washed and dried at ambient temperature. Then the leaves were powdered, ground up, and put to the experimental diets. The control group (T1) was fed basal diet, group T2 was fed basal diet + Antibiotic feed additive (@ 25g/100 kg of feed), group T3 was fed basal diet + 0.5% *Rumex acetosa* leaf powder, group T4 was fed basal diet + 1% *Rumex acetosa* leaf powder, group T5 was fed basal diet + 1.5% *Rumex acetosa* leaf powder. The birds were raised in cages for a period of five weeks under uniform managemental conditions. At the end of the trial, a total of 40 healthy selected broiler chickens (8 birds per treatment) were made available for carcass trait study. The birds were kept off fed overnight and only plain water was provided. Before slaughter live weight was recorded. The birds were slaughtered and then the various carcass traits were measured. The carcass was cut into uniform pieces such as breast, thighs, drumsticks, wings, back and neck and each part weighed separately. The data was analyzed as per standard statistical procedure [12].

Results and Discussion

Influence of *Rumex acetosa* leaf powder supplementation to broiler chicken on the various carcass parameter is depicted in Table 1. The blood loss ranged from 3.71±0.08% in T1 to 4.18±0.25 in T2 groups. The dressed yield (%) recorded was ranged from 73.68±1.37 in T4 to 76.62±0.94 in T1 groups. No significant difference was seen in blood loss, feather loss and dressed yields. Non-significant but slightly higher blood loss in broiler chicken than in that in the present study was recorded [13]. Sheikh and Chatterjee [14] also observed same non-significant results in Vanaraja bird species. Sheikh *et al.* [15] recorded slightly higher blood loss and lower feather loss in broiler chicken fed sheep manure based diets but both are non-significant. Zaffer *et al.* [16] recorded non-significant dressed yield in broiler chicken fed diets supplemented with Duck weed. Among the cut up parts, the breast yield (%) was highest ranged from 31.32±0.32 in T1 to 32.36±0.60 in T4 groups and neck yield was lowest ranging from 4.87±0.19 in T4 to 5.76±0.47 in T2 groups. However, no significant difference was seen on different cut-parts of broilers fed diets supplemented with *Rumex acetosa* leaf powder. Sheikh *et al.* [15] also recorded similar results in broiler chicken fed sheep manure based diets. Shaista *et al.* [17] also observed similar result with non-significant effect while supplemented with *Artemisa absinthium* leaf powder with or without enzyme on carcass traits in broilers. The different intensities of cumin and wormwood essential oil supplementation in broilers diet did not show any significant effect on carcass yield and relative weights of liver, intestine, heart, gizzard, thigh, breast and abdominal fat at 42 days of age [18]. Khursheed *et al.* [19] also recorded similar values in broiler chicken fed mint leave as feed additive with or without enzyme supplementation. However, Sheikh *et al.* [15] recorded slightly lower but non-significant dressed yield in broiler chicken fed sheep manure based diets.

Table 1: Effect of *Rumex acetosa* supplementation *on* Carcass traits of broiler chicken

Carcass traits (%)	Treatment Groups				
	T_1	T_2	T_3	T_4	T_5
Blood loss	3.71±0.08	4.18±0.25	3.96±0.16	3.93±016	4.06±0.10
Feather loss	7.88±0.33	8.05±0.61	8.56±0.51	8.47±0.47	8.45±0.52
Dressing	76.62±0.94	75.07±0.93	74.33±1.58	73.68±1.37	74.39±0.59
Breast	31.32±0.32	32.15±0.65	31.61±0.75	32.36±0.60	31.61±0.77
Drumsticks	13.44±0.32	13.48±0.12	13.27±0.30	13.21±0.38	13.57±0.24
Thighs	14.16±0.34	14.27±0.33	13.85±0.26	13.88±0.08	14.27±0.35
Wings	12.30±0.25	12.61±0.15	12.19±0.35	12.91±0.55	11.90±0.29
Back	16.87±0.29	16.38±0.49	16.94±0.62	17.94±0.29	16.45±0.61
Neck	5.06±0.28	5.76±0.47	5.12±0.61	4.87±0.19	5.20±0.78
Heart	0.54±0.02	0.59±0.04	0.57±0.03	0.55±0.02	0.58±0.05
Liver	1.18±0.07	1.92±0.08	1.82±0.06	1.84±0.08	1.73±0.07
Gizzard	3.55±0.10	3.38±0.09	3.44±0.29	3.05±0.13	3.15±0.20

Rows without superscript did not differ significantly ($p<0.05$)

Conclusion

It is concluded that the *Rumex acetosa* leaf powder upto 1.5% level could be supplemented in diets broiler chicken as growth promoter in place of antibiotic. The result indicated carcass characteristics remain unaffected in broiler chicken. Hence, obej can be utilized as a source of plant based feed

additive in the diets of broiler for safe poultry meat production.

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