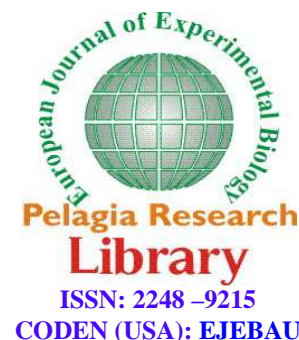




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European Journal of Experimental Biology, 2014, 4(4):73-77



## Haematological parameters of Indian goats fed dried *Clitoria* leaves-based diets

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### ABSTRACT

The study was conducted to investigate the effects of feeding dried leaves of both variety of *Clitoria ternatea* L. using grass as basal feed, on the haematological parameters of Indian goats. The study lasted for 90 days during which haematological parameters were monitored in 9 healthy male goats. At the start of the experiment, packed cell volume (PCV) ranged from 16 to 16.3 while haemoglobin concentration (Hb) and RBC ranged from 4.10 to 4.16 g/dl and 8.2 to 8.4 n/cumm, respectively. White blood cells reduced from 7.6 to 6.4 thousand/cumm as dried clitoria leaves increased in the diets. At the end of the trial, there was a slight increase in the values of PCV and Hb in the diets. Blue variety leaves showed good results as compare to the white variety. The study revealed that inclusion of dried clitoria leaves in the diets of goats had no deleterious effects on the haematological parameters of goats and could therefore be included in ruminant diets.

**Keywords:** *Clitoria* leaves, Goats, Haemoglobin, Packed cell volume, White blood cell.

### INTRODUCTION

It has been reported that there has been an alarming increase in number of diseases and disorders caused by synthetic drugs prompting a switch over to traditional herbal medicine. Considerable research on pharmacognosy, chemistry, pharmacology and clinical therapeutics has been carried out on ayurvedic medicinal plants. Selection of scientific and systematic approach for the biological evaluation of herbal formulations based on their use in the traditional systems of medicine forms the basis for an ideal approach in the development of new drugs from plants [1].

Among the promising forage crops that could receive more attention is *Clitoria ternatea* L. belongs to family Fabaceae commonly known as "Gokarn" in Kolhapur district, Maharashtra. The blue and white variety of *Clitoria* can be grown both by rain and under irrigation. It is a high yielder and drought tolerant. Food legumes have become a major source of dietary proteins in developing countries. Although the protein content of legumes ranges from 20-50%. Since, these wild plants grow abundantly in poor, developing areas. They could possibly become a good, low-cost food for domestic animals. Goats are efficient users of low quality feeds to produce both milk and meat. Most dairy farmers rely on natural pastures from the farm or cut and carried to the animals from roadsides and fallow land off-farm. These pastures are of variable quality and in cases of severe droughts may not be available. The other available option farmers have is to feed their animals on crop residues. As a result of this, addition of a readily available source of nitrogen or energy is essential to benefit its use as animal feed [2]. The commercial protein

sources are expensive and alternatives such as leguminous forages are needed. This study, therefore aimed to assess the effect of *Clitoria ternatea* (both variety) leaves on haematological parameter of Indian goat.

### MATERIALS AND METHODS

The animals for trial selected 9 healthy young goats (male) for control and treatment. In each of about five months of age and similar body weight approximately 4 kg. These are divided into three groups. Group 1 (T) selected 3 kids fed abundant grasses with 250g wheat grain. In group 2 (T1) 3 kids were fed 10g blue variety leaves meal and 250g wheat grain with grasses. In third group (T2) fed 10g white variety leaves meal and 250g wheat grain with grasses. All goats were maintained under the same feeding management. Water was available free choice to kids. The trial started Jan. to Feb. 2014. The animals were adapted for 60 days to consume leaves powder of *C. ternatea* (blue and white variety) i.e. 10g (1 tablespoon) supplementing morning and evening with its regular diet. The collection of blood sample from each animal was collected using EDTA impregnated tube from jugular vein at 0, 15, 30, 45 and 60 days on the experimental diet. The uncoagulated blood was used for haematological assessment viz. Haemoglobin (Hb), WBC, RBC and packed cell volume (PCV). The Hb and PCV were estimated using standard procedures as described by Benjamin (1985) [3] and Hawk (1965) [4] respectively. The WBC and RBC were estimated by automated hematology analyzer MEK-6450 (Nikon kohden, Japan).

### RESULTS AND DISCUSSION

Goats are numerically and economically very important and promising animal resource in the developing countries especially in Asia and Africa [5]. The importance of this is strongly emphasized for their versatile production profile and valuable contribution like meat and milk. The health status of an animal is usually revealed when blood parameters are assessed. This is because blood plays a vital role in physiological, nutritional and pathological status of organism [6]. Physiological parameter is a valuable means of diagnosing a disease [7&8] and protein status in goats [9]. Much research has been done on the composition and metabolism of certain compounds [10] and effects of chemical [11] on livestock. Despite the wide acceptance of plants as source of medicaments by many countries, only very few of these plants (herbs) used have been properly identified and documented [12&13]. Plant secondary metabolites have varied pharmacological, physiological and biochemical activity [14]. Different parts of the medicinal plants provide animal diet with certain antioxidant compounds, vitamins like vitamin C, vitamin E and pro-vitamin A. In view of the diverse medicinal and nutritional properties of *Clitoria ternatea*, current study was designed to examine the effects of the leaves basal diet (blue and white variety) on performance and some blood constituents of goat kids.

In present study haematological profile of goat kids was done at 0 to 60 days of experimental feeding. The results were presented in respective graphs (fig.1-6). The level of haemoglobin (g/dl) was  $4.16 \pm 0.23$ ,  $4.15 \pm 0.02$ ,  $4.1 \pm 0.2$  and  $7.3 \pm 0.18$ ,  $8.88 \pm 0.09$ ,  $9.1 \pm 0.08$  at 0 and 60 days of experimental feeding. However they were slightly different among the treatment group. RBC (m/cumm) and PCV (%) level was significantly increased in T1 and T2 after 30 days of feeding, as compare to T group. The body weight of kids at 0 days (initial weight) and at 60 days (final weight) was in the range of 4-4.3 kg and of 6-7kg respectively. The WBC reduced in treated group as compare to control. In present study also reveals that food intake capacity increased in the group (T1 & T2).

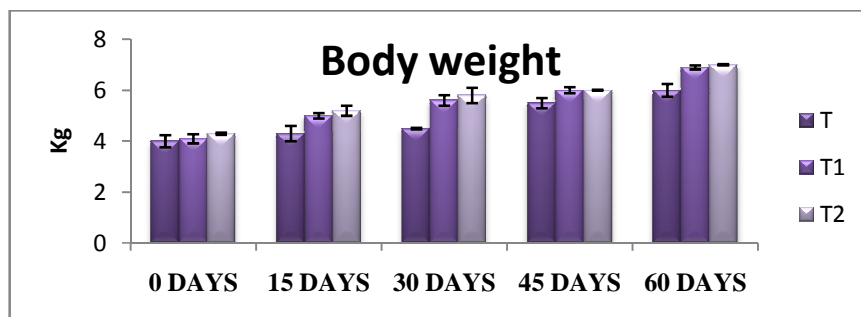


Fig 1: Body weight changes in Indian goat fed dried *Clitoria* leaves-based diets

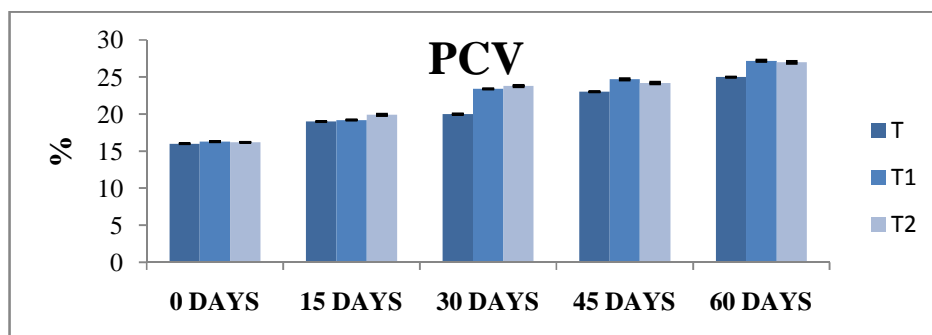


Fig 2: Representation of packed cell volume (PCV) in control and treated goats

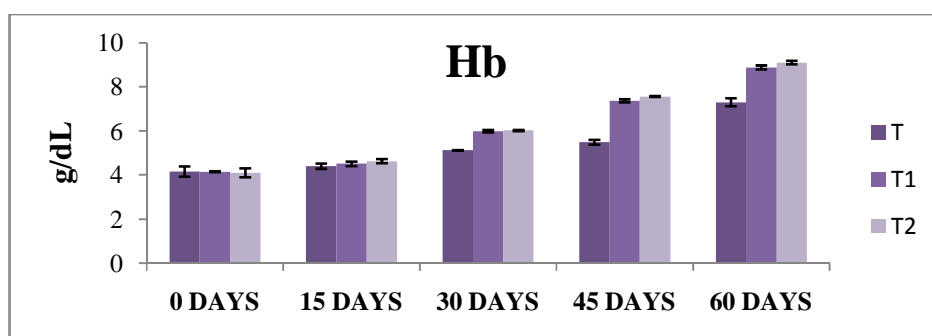


Fig 3: Representation of haemoglobin (Hb) in control and treated goat

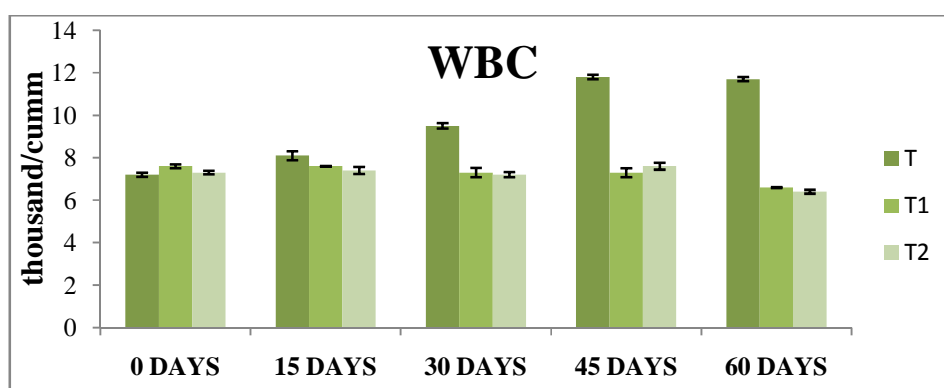


Fig 4: Representation of white blood cells (WBC) in control and treated goats

In current study, the values of mean Hb, PCV, WBC and RBC were within the normal range for goats [15, 16 &17]. Hb and PCV are very important in the assessment of anemic condition. The total RBC counts in this study fell within the values reported by [18] for WAD- bucks and Red Sokoto goats. The red blood cells are very important in the transport of respiratory gases and the increase in total RBC counts and Hb may be an indication of oxygen transport to the tissues, therefore cellular respiration will not be affected [19]. The RBC counts reported in this study were within the range of 9.2–13.5 g/l [18], 9.9–18.7 g/l [20], and 10.25–12.85 $\times 10^{12}/l$  [21]. The WBC counts which reduced across the dietary treatments was within the range of 6.8–20.1 $\times 10^9/l$  [9] and the range of 7.5–27.9 mm<sup>3</sup> [22]. In current study, white blood cell (WBC) was significantly higher in the control group than in animals fed the blue and white variety leaves meal, but all the other haematological indices were higher with supplemental diets. The WBC obtained in present study animals fed supplemental leaves meals were within normal range of 4.0–12.0 $\times 10^3$  mm<sup>-1</sup> for goats [23].

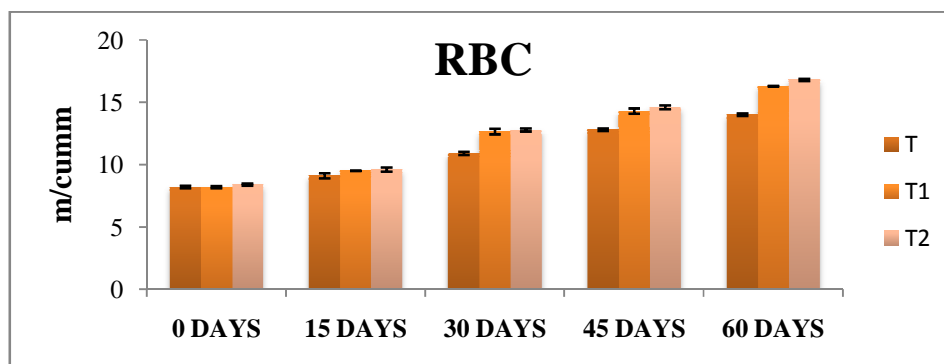


Fig 5: Representation of red blood cell (RBC) in control and treated goats

The supplementation of higher level of dietary energy (11.98 MJ ME/kg DM) may be suggested for optimizing growth and reproductive performance of female goats under grazing condition. [24] On the other hand in current study observed that supplemented meal increase the food intake capacity of goats. The animals fed diets A (Akee apple leaf meal), B (*Etanda africana* leaf meal), C (*Gliricida sepium* leaf meal) and D (Baobab leaf meal) maintained normal haematological indices and keeping healthy condition [25]. In present work instead of different plants author used leaves of blue and white variety of *C. ternatea*. Current study reveals the PVC, Hb and RBC higher in treated group (T1&T2) except WBC than the control group (T). The red Sokoto goats fed tannin rich *Pterocarpus erinaceus* (PE) forage diets showed that all blood parameters were within the normal range for healthy goats and there were no signs of tannin toxicity [26]. In present study were also not noticed any sign of the toxicity in treated group (T1&T2).

The effects of feeding different levels of dried cassava leaves at 0%, 20%, 40% and 60%, respectively, using guinea grass as basal feed, on the haematological and serum biochemical parameters of West African Dwarf (WAD) goats showed noticed, there was a slight increase in the values of PCV and Hb in the diets ( $P>0.05$ ) [27]. The study revealed that inclusion of dried cassava leaves in the diets of West African Dwarf goats had no deleterious effects on the haematological and serum biochemical parameters of WAD goats and could therefore be included in ruminant diets up to 60%. In present work both varieties of *C. ternatea* also provides supplemented source for goat nutrition.

## CONCLUSION

The result of this study has revealed that the leaves based diet of *Clitoria ternatea* Linn produced significant effect on the blood parameters of the Indian goat. Hence, feeding leaf meal based diets (Blue and white variety of *C. ternatea*) to goat kids should be encouraged among farmers in order to improve ruminant performance. It is considered that the extract was beneficial because it increased haemoglobin level which may boost oxygen delivery to the tissues.

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