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## Assessment of different levels of silage feeding on biochemical parameters in osmanabadi kids

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### Abstract

Total 18 apparently healthy Osmanabadi kids of either sex were randomly selected for the present research work. The kids of uniform body size and weight of age between 4 to 7 months were chosen for the project. They were divided into 3 groups viz (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) with each group involving six kids. (T<sub>0</sub>) was the control group while (T<sub>1</sub>) and (T<sub>2</sub>) were the treatment groups with different levels of silage feeding i.e. 15 & 25 % respectively. Total 5 ml of blood samples from these goats for estimation of biochemical parameters were collected in clot activator vacutainer plastic tubes. Serum was separated with the help of centrifuge machine and transferred to eppendorf tube. Analysis of serum samples for biochemical analysis like serum ALT, AST, Total protein, Albumin, Globulin and blood sugar were carried out on AGD2020 clinical chemistry analyzer. The mean  $\pm$  S.E. concentration of serum ALT (IU/L) were found to be 21.83 $\pm$ 0.567, 21.82 $\pm$ 0.691 and 22.159 $\pm$ 0.614 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) respectively. The average serum AST/SGOT (IU/L) values in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25%. The mean  $\pm$  S.E. concentration of serum total protein (gm/dl) is observed to be 6.99 $\pm$ 0.13, 7.10 $\pm$ 0.12 and 7.09 $\pm$ 0.13 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals respectively. The mean  $\pm$  S.E. concentration of serum Albumin (gm/dl) is found to be 4.043 $\pm$ 0.104, 4.103 $\pm$ 0.104 and 4.107 $\pm$ 0.122 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals, respectively. The mean  $\pm$  SE concentration of serum Globulin (gm/dl) seen to be 2.948 $\pm$ 0.049, 3.001 $\pm$ 0.059 and 2.992 $\pm$ 0.036 in T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> group of animals respectively. The mean concentration of serum Glucose (mg/dl) are found to be 52.879 $\pm$ 1.694, 53.979 $\pm$ 1.491 and 51.783 $\pm$ 2.102 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals respectively. No significant effects of different levels of silage was seen on serum concentration of AST (IU/L) between the groups of animals and slight increasing trend of serum AST (IU/L) and blood sugar was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids.

**Keywords:** Blood biochemical parameters, levels of feedings, osmanabadi kids, silage

### Introduction

India's livestock sector is one of the largest in the world with around 535.8 million livestock population. In the world, India ranks first in milk production, cattle population, buffalo population and second in goat population. The population of goats in the world is about 1 billion and India ranks 2<sup>nd</sup> with 148.9 million goat population (NDDDB, 2019) [6]. In regard to Maharashtra there are 10.60 million goats. Goat farming sector contributes 8.4% to India's livestock GDP i.e. Rs. 38590 crores through meat (Rs.22625 crores), milk (Rs.564crores), skin (Rs.1491 crores), manure (Rs.1535 crores). Goat (*Capra hircus*) is also known as poor man's cow and was first domesticated ruminant as early as 9000 to 7000 B.C. It is an important livestock species of India which plays a main role in the livelihood of farmers and landless labourers. In many rural areas several families depend on goat rearing for their livelihood. Goats play an important role in the national economy as they can be used for various purposes like milk, meat, hide and fibres production that too at a low cost of rearing. Goat meat has superior nutritional value and less fat content as compared to sheep meat, hence, it is preferred in most parts of the country.

Osmanabadi breed of goat is a native of Marathwada region of Maharashtra state, despite of this it is raised, easily adapted and breeding is done throughout India (Motghare *et al*, 2004) [5]. The name 'Osmanabadi' is derived from their distribution area in Osmanabad district of Maharashtra state. These goats are reared mainly in three southern states of India namely Maharashtra, Andhra Pradesh and Karnataka. Goat kids play a crucial role in the success of goat farming. Earlier the male kids attain the marketable body weight, lesser is the cost of

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rearing. Similarly, female goats that reach maturity early and reproduce are more profitable. Hence they require proper health care and management. Even though India leads in livestock populations, the productivity and performance of our indigenous livestock is very poor due to traditional husbandry practices, poor management and sanitation, lack of veterinary facilities, intermixing of breeds and inadequate feed and fodder resources.

Feeding has the most marked effect on production costs (from 50 to 85% of the total cost for production under European conditions (Ouin, 1995) [8], and accordingly on farmer incomes. Furthermore, the management of feeding in goat flocks depends on vegetal mass production and rangeland, pasture and crop by-product management. The conservation of greens in the form of silage will be useful for long term and cost effective as well. In the process of silage making, ensiling helps in breaking the lingo-cellulose bonds and thus making more nutrients available for absorption for ruminants. The surplus green fodder can be conserved, with minimising wastage. Apart from this, feeding silage is an effective tool for the control of parasitic diseases, as the parasites present in different stages in green fodder are destroyed during ensiling. The silage preserves 85 per cent or more of the feed value of

the crop. It also facilitates harvesting at optimum maturity. Nowadays silage bags of different capacity have been developed and shown to be a workable system for small holding farmers, thus making it cost effective to make silage. In this regard, studies on effect of different levels of silage feeding on growth performance of Osmanabadi kids will be more fruitful to signify utilities of silage in goats feeding. In this context, we plan to study on effect of different levels of silage feeding on biochemical parameters in Osmanabadi Kids.

### Materials and Methods

The present research was carried on 18 apparently healthy Osmanabadi kids of either sex. The kids of uniform body size and weight of 4 to 7 months age were selected. They were randomly divided into 3 groups viz (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) with each group involving six kids. (T<sub>0</sub>) was the control group while (T<sub>1</sub>) and (T<sub>2</sub>) were the treatment groups with 15 and 25% of silage feeding. All the experimental kids were dewormed before the beginning of experiment and were given two weeks adaptation period to acclimatize to new feeding routine to avoid errors due to stress during the actual work. Following is details of experimental animals.

**Table 1:** Grouping of experimental animals

Sr. No.	Group	No. of Animals	Average body weight	Level of Silage Feeding
1.	T <sub>0</sub> (control group)	06	13.50±1.30	0%
2.	T <sub>1</sub>	06	13.48±1.23	15 %
3.	T <sub>2</sub>	06	13.51±1.198	25 %

The experimental animals were housed scientifically in a well- organized and comfortable semi-intensive sheds.

### Feeding of experimental animals

The feeding of experimental kids was done on DM basis i.e. 3 % of body weight. In T<sub>1</sub> group the 15 % level of maize silage was fed to Osmanabadi kids. Similarly, the Maize Silage for group- T<sub>2</sub> at 25% level was measured and fed to all the experimental kids of T<sub>2</sub> group. Green roughages like green maize fodder along with grasses and tree leaves were offered apart from silage. Quantity of feed was increased gradually as the weight of kids increased. Observations of all the groups T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were undertaken for 90 days in this project. Proximate analysis of concentrate, Maize silage and green Maize fodder was carried out by standard procedures. As mentioned in the table below values of the Dry matter, Crude protein, Crude Fibre, Total Ash, Ether Extract and Nitrogen free extract of Maize silage were 26.5%, 7.35%, 22.8%, 5.63%, 2.96%, 61.26%.

**Table 2:** Proximate Composition (%) of Maize Silage, green maize fodder and concentrate

Sr. No.	Nutrient Parameter	Maize silage	Green Maize fodder	Concentrate
1	DM (%)	26.5%	16.48%	93.82%
2	CP (%)	7.35%	9.34%	17.78%
3	CF (%)	22.8%	11.02%	6.9%
4	TA (%)	5.63%	4.26%	7.54%
5	EE (%)	2.96%	2.72%	5.14%
6	N.F.E. (%)	61.26%	73.68%	52.68%

### Bio-chemical parameters

Total 5 ml of blood samples from these goats for estimation of biochemical parameters were collected in clot activator vacutainer plastic tubes. Serum was separated with the help of centrifuge machine and transferred to Eppendorf tube.

Analysis of serum samples for biochemical analysis like serum ALT, AST, Total protein, Albumin, Globulin and blood sugar were carried out on AGD2020 clinical chemistry analyzer.

### Results and Discussion

#### Serum alanine aminotransferase (ALT)/SGPT

The average serum ALT (IU/L) values in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels were depicted in table 3. The mean ± SE concentration of serum ALT (IU/L) were found to be 21.83±0.567, 21.82±0.691 and 22.159±0.614 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) respectively. It was also depicted in table No. 3. In the present study, no significant effects of different levels of Maize silage was seen on serum concentration of ALT (IU/L) between the groups of animals but marginal increasing trend of serum ALT (IU/L) was found in (T<sub>1</sub>) group as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both haematopoietic and immune response. Similar results have been reported in goats (Ahmad, *et al*, 2013) [1] and in rat tail ram breeds. Oelker *et al* (2009) [7] reported that silage being preserved forage that was made from a crop in a container called silo under the anaerobic environment. These silage feedings may be major source of nutrient and nutrition for Osmanabadi kids in the present study. Present research findings are in close agreements with Soul *et al* (2019) [9] who reported serum concentration of ALT (IU/L) 19.92, 15.78 and 20.78 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) in goats fed the concentrate pellets, Lablab purpureus and Vigna unguiculata supplementing Chloris gayana.

### Serum Aspartate aminotransferase (AST/ SGOT)

The average serum AST/SGOT (IU/L) values in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels of (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) are depicted in table 3. The mean  $\pm$  S.E. concentration of serum AST (IU/L) is found to be 74.58 $\pm$ 1.69, 74.22 $\pm$ 1.69 and 74.63 $\pm$ 1.61 in T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> group of animals, respectively. In the present study, no significant effects of different levels of silage was seen on serum concentration of AST (IU/L) between the groups of animals but marginal increasing trend of serum AST (IU/L) was found in T<sub>1</sub> as compared to T<sub>0</sub> and T<sub>2</sub> group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both haematopoietic and immune response. Similar results have been reported in goats (Ahmad *et al*, 2013) [1] and in rat tail ram breeds. Among other factors like stress, reproductive status, age, sex, genetics, management and housing, the feeding of different levels of Maize silage have profound effects on the haematological and biochemical profiles of small ruminants (Mohammed *et al*, 2016) [4].

### Total protein (g/dL)

The average serum total protein (gm/dl) values in Osmanabadi kids in different levels of Maize silage feeding viz. 0%, 15% and 25% levels in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) are depicted in table

3. The mean  $\pm$  S.E. concentration of serum total protein (gm/dl) is observed to be 6.99 $\pm$ 0.13, 7.10 $\pm$ 0.12 and 7.09 $\pm$ 0.13 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals respectively.

**Table 3:** Mean  $\pm$  SE serum biochemical parameters values during experiment in Osmanabadi Kids.

Biochemical Parameters	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	CD
ALT (IU/L)	21.83 $\pm$ 0.567	21.82 $\pm$ 0.691	22.159 $\pm$ 0.614	NS
AST (IU/L)	74.587 $\pm$ 1.698	74.225 $\pm$ 1.698	74.633 $\pm$ 1.612	NS
Protein (gm/dl)	6.991 $\pm$ 0.13	7.105 $\pm$ 0.13	7.099 $\pm$ 0.13	NS
Albumin	4.043 $\pm$ 0.104	4.103 $\pm$ 0.104	4.107 $\pm$ 0.122	NS
Globulin	2.948 $\pm$ 0.049	3.001 $\pm$ 0.059	2.992 $\pm$ 0.036	NS
A:G Ratio	1.373 $\pm$ 0.033	1.369 $\pm$ 0.039	1.373 $\pm$ 0.040	NS
Blood Glucose	52.879 $\pm$ 1.694	53.979 $\pm$ 1.491	51.783 $\pm$ 2.102	1.644

Treatment found to be non-significant at 1% level

In the present study, no significant effects of different levels of silage is seen on serum concentration of total protein (gm/dl) between the groups of animals but marginal increasing trend of serum total protein (gm/dl) is found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both haematopoietic and immune response. Similar results have been reported in goats (Ahmad, *et al*, 2013) [1] and in rat tail ram breeds. Among other factors like stress, reproductive status, age, sex, genetics, management and housing, the feeding of different levels of silage have profound effects on the biochemical profiles of small ruminants (Mohammed *et al*, 2016) [4]. Results of present study for serum concentration of total proteins was steadily increasing with increase in percentage of silage as reported by Mohammed *et al* (2020) [3].

### Albumin (gm/dL)

The average serum albumin (gm/dl) values in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group are depicted in table 3.

The mean  $\pm$  S.E. concentration of serum Albumin (gm/dl) is found to be 4.043 $\pm$ 0.104, 4.103 $\pm$ 0.104 and 4.107 $\pm$ 0.122 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals, respectively. In the present study, no significant effects of different levels of Maize silage is seen on serum concentration of Albumin (gm/dl) between the groups of animals but marginal increasing trend of it was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both liver sufficiency and immune response. Among other factors like stress, reproductive status, age, sex, genetics, management and housing, the feeding of different levels of silage have profound effects on the biochemical profiles of small ruminants (Mohammed *et al*, 2016) [4]. Results of present study for serum concentration of Albumin was steadily increasing with increase in percentage of silage as reported by Mohammed *et al* (2020) [3]. Globulin (gm/dL).

The average serum globulin (gm/dl) values in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) are depicted in table 3. The mean  $\pm$  S.E. concentration of serum Globulin (gm/dl) seen to be 2.948 $\pm$ 0.049, 3.001 $\pm$ 0.059 and 2.992 $\pm$ 0.036 in T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> group of animals respectively. In the present study, no significant effects of different levels of silage is seen on serum concentration of Globulin (gm/dl) between the groups of animals but marginal increasing trend of it was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both liver sufficiency and immune response. Results of present study for serum concentration of Globulin was steadily increasing with increase in percentage of silage as reported by Mohammed *et al* (2020) [3].

### Albumin: Globulin (ratio)

The average serum Albumin: Globulin ratio in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels are depicted in table 3. The mean  $\pm$  SE concentration of serum Albumin: Globulin ratio is recorded as 1.373 $\pm$ 0.033, 1.369 $\pm$ 0.039 and 1.373 $\pm$ 0.040 in T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> group of animals, respectively. In the present study, no significant effects of different levels of silage is seen on serum concentration of Albumin: Globulin ratio between the groups of animals but marginal increasing trend of it was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some effects on both liver sufficiency and immune response. Results of present study for serum concentration Albumin: Globulin ratio was steadily increasing with increase in percentage of silage as reported by Mohammed *et al*, (2020) [3].

### Glucose (mg/dl)

The average serum Glucose (mg/dl) in Osmanabadi kids in different levels of silage feeding viz. 0%, 15% and 25% levels are depicted in table 3. The mean concentration of serum Glucose (mg/dl) are found to be 52.879 $\pm$ 1.694, 53.979 $\pm$ 1.491 and 51.783 $\pm$ 2.102 in (T<sub>0</sub>), (T<sub>1</sub>) and (T<sub>2</sub>) group of animals respectively. In the present study, significant effects of different levels of Maize silage is seen on serum concentration of glucose (mg/dl) between the groups of animals with marginal increasing trend of it was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids suggesting that different levels of silage feedings had some beneficial effects on both energy metabolism and maintaining blood glucose homeostasis. Results of present study for serum

concentration of Glucose (mg/dl) was steadily increasing with increase in percentage of silage as reported by Mohammed *et al* (2020)<sup>[3]</sup>.

### Conclusion

No significant effects of different levels of Maize silage was seen on serum concentration of ALT (IU/L) between the groups of animals but marginal increasing trend of serum ALT (IU/L) was seen in (T<sub>1</sub>) group as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids. No significant effects of different levels of silage was seen on serum concentration of AST (IU/L) between the groups of animals and slight increasing trend of serum AST (IU/L) was found in (T<sub>1</sub>) as compared to (T<sub>0</sub>) and (T<sub>2</sub>) group of Osmanabadi kids. Therefore, from overview of results, it can be concluded that feeding of Maize silage at different levels in all the groups had no significant effect was observed on GPT, SGOT, total proteins, albumin, globulin, A:G ratio values in all the treatment groups.

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