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## Effect of feeding milk substitute on growth performance of kids

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### Abstract

A study on "Substitute milk for early weaned Konkan kanyal kids" was carried out by using soy milk, coconut milk and goat milk. The attempts have been made to study effect of different levels of soy milk and coconut milk (25, 50, 75 and 100 %) on kid's growth. Goat milk with 50 per cent soy milk and goat milk with 25 per cent coconut milk was found superior over rest of the treatments.

**Keywords:** soy milk, coconut milk, goat milk, weight gain

### Introduction

Goat milk has benefits that it doesn't cause inflammation. That's a big reason why it is easier for people with bowel inflammation to drink goat milk, instead of cow milk. It is easier to digest and assimilate in the human body. The size of the fat globules in goat's milk is much smaller than those found in cow milk (Anonymous, 2017) <sup>[1]</sup>.

Kids are non-ruminants at birth. For the first 7 to 14 days of life, kids fore stomach (with the exception of the abomasum) is poorly developed and it must rely on milk or milk replacers for nutrients (Sarker *et al.*, 2015) <sup>[2]</sup>.

Soya bean grain contains proteins with sulfhydryl groups which play a very important role as antioxidants. Beside their role in trapping of free radicals and prevention of stress they could reduce trypsin inhibitors, such as Kunitz-trypsin inhibitor and phenolics, as main contributors of antioxidative activity in soya bean grain (Dragicevic *et al.* 2010) <sup>[3]</sup>.

Soymilk is a creamy, milk-like product made by soaking and grinding soybeans in water. Soybean or soymilk has always been a rich source of protein which is inexpensive and abundantly available (Raja *et al.*, 2014) <sup>[4]</sup>.

Coconut milk is the aqueous emulsion of coconut kernel, which is prepared by hand or machine pressing fresh grated coconut kernel. Coconut milk has many culinary applications. Coconut milk is consumed directly or with cooked food. (Nadeeshani *et al.*, 2015) <sup>[5]</sup>.

### Material and Methods

The present investigation was carried out to determine the substitute milk for early weaned Konkan Kanyal kids. The trial was conducted at Instructional farm of the Department of Animal Husbandry and Dairy Science, College of Agriculture, Dapoli.

36 newly born kids were divided into nine groups with four kids each during the trial period (90 days). The kids were reared under weaning system of management. The colostrum and normal milk were fed to each kid up to five days after birth according to their nutritional requirement. The colostrum and normal milk were fed to control group (T<sub>0</sub>) animals according to their nutritional requirement. While for kids in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> treatments 25, 50, 75 and 100 per cent replacement of normal milk by soymilk was done for 90 days and kids in T<sub>5</sub>, T<sub>6</sub>, T<sub>7</sub> and T<sub>8</sub> were fed 25, 50, 75 and 100 per cent replacement coconut milk for 90 days. Thus the feeding trial was conducted for 90 days with the following treatments.

T<sub>0</sub>- Control (100 % whole goat milk)

T<sub>1</sub>-75% whole goat milk +25% Soy milk

T<sub>2</sub>- 50% whole goat milk +50% Soy milk

T<sub>3</sub>- 25% whole goat milk +75% Soy milk

T<sub>4</sub>- Soy milk (100 %)

T<sub>5</sub>-75% whole goat milk +25% Coconut milk

T<sub>6</sub>- 50% whole goat milk +50% Coconut milk

T<sub>7</sub>- 25% whole goat milk +75% Coconut milk

T<sub>8</sub>- Coconut milk (100 %)

Some preliminary trials were conducted to determine the range of Soy milk and Coconut milk for feeding to kids. The trials with four levels of Soy milk and Coconut milk (25, 50, 75 and 100 %) were selected on the basis of preliminary trials for further studies.

## Results and Discussion

### Growth performance

**Table 1:** Average Feed intake of experimental kids for thirteen weeks (kg/day).

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Feed intake (kg)	0.516 <sup>a</sup>	0.516 <sup>a</sup>	0.546 <sup>a</sup>	0.446 <sup>b</sup>	0.392 <sup>b</sup>	0.529 <sup>a</sup>	0.484 <sup>a</sup>	0.473 <sup>a</sup>	0.371 <sup>b</sup>
SE ±	0.029								
CD (P<0.05)	0.084								

\*Means with different superscripts differed significantly

The statistical analysis revealed that differences in total feed consumption due to different treatments were significant.

Findings of feed intake during present study were in accordance with Luo *et al.* (2000) <sup>[6]</sup> fed to Spanish (S), Boer×Angora (BA) and Boer×Spanish (BS) goat kids with milk replacer. Kids received goat milk fortified with milk replacer for approximately 1 week followed by 600 ml of milk replacer twice daily until weaning at 8 week. Thus, they reported that BA kids consumed more milk replacer from

### 1. Feed intake

The average daily feed consumption of experimental kids in different treatments is given in Table 1. It was evident from the table that average feed consumption vary significantly from control group because of additional levels of different milk substitute. The average feed consumption of soy milk was highest in treatment (T<sub>2</sub>) with 50 per cent goat milk and 50 per cent soy milk (0.546 kg/kid/day) and lowest in treatment (T<sub>8</sub>) with 100 per cent coconut milk (0.371 kg/kid/day).

birth to 3 week of age.

In present study, higher feed intake was observed in treatment T<sub>2</sub>, this might be due to higher protein and total solids in treatment T<sub>2</sub> in combination of goat milk and soy milk for fulfilling the growth requirement of kids.

### 2. Water intake

The data pertaining to the average daily water intake of kids reared under different treatments are presented in Table 2.

**Table 2:** Average daily water intake of experimental kids for thirteen weeks (ml/day).

Treatments	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>	T <sub>5</sub>	T <sub>6</sub>	T <sub>7</sub>	T <sub>8</sub>
Water intake (ml)	51.751	45.823	51.725	52.723	52.374	52.177	51.882	50.902	50.335
SE ±	2.025								
CD (P<0.05)	NS								

\*Means with different superscripts differed significantly

The average water intake was highest in treatment (T<sub>3</sub>) with 25 per cent goat milk and 75 per cent soy milk (52.723 ml/kid/day), whereas, lowest water intake was observed in treatment T<sub>1</sub> i.e. 75 per cent goat milk and 25 per cent soy milk (45.823 ml/kid/day). The changes in water intake were statistically non-significant due to various treatments. Average daily water intake of kids did not showed any definite trend. However, no reliable citations were available to support the results of water intake of kids up to three months of age to compare with observed values.

### 3. Average body weight gain

The data pertaining to the average daily body weight gain of experimental kids reared under different treatments are presented in Table 3.

The average daily weight gain in treatment (T<sub>2</sub>) with 50 per cent goat milk and 50 per cent soy milk (73.249 g) and (T<sub>5</sub>)

with 75 per cent goat milk and 25 per cent coconut milk (73.107 g) group were significantly highest over other treatments and at par with each other. This might be due to treatments T<sub>2</sub> and T<sub>5</sub> contain appreciable amount of protein sufficient for body growth and development. While, T<sub>0</sub> (72.303 g), T<sub>1</sub> (72.178 g), T<sub>3</sub> (71.500 g), T<sub>6</sub> (71.964 g) and T<sub>7</sub> (71.786 g) were at par with each other. Also, T<sub>4</sub> (61.357 g) and T<sub>8</sub> (60.893g) with lowest weekly body weight gain (g/day/kid) were at par with each other.

The total live weight gain and average daily weight gain increased in treatments T<sub>2</sub> (50 per cent goat milk and 50 per cent soy milk) and T<sub>5</sub> (75 per cent goat milk and 25 per cent coconut milk). These results agree with the study of Luo *et al.* (2000) <sup>[6]</sup> who reported daily weight gain of Spanish (S), Boer×Angora (BA) and Boer×Spanish (BS) kids fed with goat milk fortified with milk replacer were 60, 71 and 77 g/day from 3-8 week, respectively.

**Table 3:** Total live weight gain (kg) and average daily body weight gain (g) of experimental kids.

Treatments	Initial weight (kg)	Final weight (kg)	Total live weight gain (kg)	Average daily body weight gain (g)
T <sub>0</sub>	1.930 <sup>a</sup>	8.563 <sup>a</sup>	6.633 <sup>a</sup>	72.303 <sup>b</sup>
T <sub>1</sub>	1.928 <sup>a</sup>	8.428 <sup>b</sup>	6.500 <sup>b</sup>	72.178 <sup>b</sup>
T <sub>2</sub>	1.940 <sup>a</sup>	8.685 <sup>a</sup>	6.745 <sup>a</sup>	73.249 <sup>a</sup>
T <sub>3</sub>	1.928 <sup>a</sup>	8.330 <sup>b</sup>	6.402 <sup>b</sup>	71.500 <sup>b</sup>
T <sub>4</sub>	1.902 <sup>a</sup>	7.531 <sup>c</sup>	5.629 <sup>c</sup>	61.357 <sup>c</sup>
T <sub>5</sub>	1.944 <sup>a</sup>	8.653 <sup>a</sup>	6.710 <sup>a</sup>	73.107 <sup>a</sup>
T <sub>6</sub>	1.907 <sup>a</sup>	8.412 <sup>b</sup>	6.505 <sup>b</sup>	71.964 <sup>b</sup>
T <sub>7</sub>	1.850 <sup>b</sup>	8.364 <sup>b</sup>	6.514 <sup>a</sup>	71.786 <sup>b</sup>
T <sub>8</sub>	1.916 <sup>a</sup>	7.446 <sup>c</sup>	5.529 <sup>c</sup>	60.893 <sup>c</sup>
SE ±	0.018	0.077	0.081	0.294
CD (P<0.05)	0.053	0.225	0.235	0.857

\*Means with different superscripts differed significantly

However, Galina *et al.* (1995) <sup>[7]</sup> reported higher daily weight gain of kids fed with goat milk, cow milk, cow milk replacer and partial substitution of the replacer mixture which were 167, 170, 153 and 168 g of 3 months, respectively.

Pandiyan *et al.* (2012) <sup>[8]</sup> reported higher total body weight gain than Mecheri lambs fed with T<sub>1</sub> (ewe's milk), T<sub>2</sub> (50 per cent of soya milk and 50 per cent of ewe's milk) and T<sub>3</sub> (75 per cent soya milk and 25 per cent ewe's milk) which were 8.57±0.17, 9.99±0.12 and 10.33±0.16 kg of 90 days, respectively.

In present study, higher feed intake was observed in treatment T<sub>2</sub>, also, higher protein availability was observed in treatment T<sub>2</sub> in combination of goat milk and soy milk for fulfilling the growth requirement which is resulted in higher gain in body weight.

Higher weight gain was observed in T<sub>2</sub> (50 per cent soy milk and 50 per cent goat milk) which might be due to higher protein and total solids from the diet.

### Conclusion

The present study showed that the higher weight gain was observed in 50 per cent soy milk and 50 per cent goat milk followed by 25 per cent coconut milk and 75 per cent goat milk. It can be concluded that the combination of goat milk and soy milk as substitute milk (50 per cent soy milk and 50 per cent goat milk) could be successfully used for economical raising of kids.

Therefore, from the present investigation the results revealed that replacement of goat milk with 50 per cent soy milk and 50 per cent goat milk or 25 per cent coconut milk and 75 per cent goat milk provides essential nutrients for growth and useful to improve growth performance and physiological performance of kids. Thus neonatal kids can be weaned by replacing goat milk with 50 per cent soy milk or 25 per cent coconut milk without any detrimental effect on their growth performance.

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