

## REPLACEMENT OF MAIZE WITH SOYBEAN HULLS IN CONCENTRATE MIXTURE ON NUTRIENT DIGESTIBILITY AND HAEMATO-BIOCHEMICAL PARAMETERS OF GROWING GOATS

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### SUMMARY

The present study was undertaken on eighteen growing goats for a period of thirteen weeks. The selected goats were allotted randomly to three groups with six animals each. The concentrate mixture was formulated and offered to control group ( $T_0$ ), while  $T_1$  group received a concentrate mixture with 25% replacement of maize by soybean hulls and  $T_2$  group received a concentrate mixture with 50% replacement of maize by soybean hulls. The blood samples were collected on monthly basis and observations were recorded accordingly. During the last week of experiment, a digestibility trial of seven days duration was conducted. The average digestibility coefficients (%) of various nutrients and haemato-biochemical parameters were not found to differ among groups. Thus, it is concluded that soybean hulls can safely replace maize up to 50% in concentrate mixture without any adverse effect on health and performance of growing goats.

**Keywords:** Blood parameters, Digestibility, Goats, Maize, Soybean hulls

The domestic goats (*Capra hircus*) are primary source of livelihood for people with many benefits. The world would need 73% more meat in 2050, while for developing countries, this increase will be 109 per cent (DADF, 2016). In India, there is shortage of 25, 159 and 117 million tonnes of concentrates, green forages and crop residues, leading to their respective shortage of 32, 20 and 25 per cent of requirement (DADF, 2016). Therefore, there is need to look for different agro-industrial by-products like soybean hulls (by-product of extraction of oil from soybean seeds) as alternate feed source.

The soybean hull is light, flaky, bulky and has low lignin content, its crude fibre is rapidly fermented in rumen, and it has good amount of TDN and Net energy content (Blasi *et al.*, 2002), TDN of 77% and net energy for lactation of 1.77 Mcal/kg (Boyle, 1999).

The present study was conducted on eighteen (18) growing goats (4-6 months of age). The animals were selected on the basis of age, sex, and weight of individual animal. The selected experimental goats were randomly divided into three experimental groups ( $T_0$ ,  $T_1$ , and  $T_2$ ). The concentrate mixture was formulated and offered to control ( $T_0$ ), while  $T_1$  group received a concentrate mixture with 25% replacement of maize by soybean hulls and  $T_2$  group received a concentrate mixture with 50% replacement of maize by soybean hulls. The allowance of concentrate mixture to be offered was adjusted at fortnightly interval according to change in body weight of goats. The concentrate mixture was offered daily in morning hours. One third DM requirement was fulfilled by concentrate

mixture, while remaining two third DM requirements was fulfilled by roughages i.e. dry roughage (Gram straw) and green roughages (Para-grass). The leftover of feedstuffs, if any, was recorded at 24 hourly intervals.

During the experimental period, the blood samples were collected on 0<sup>th</sup> day, 1<sup>st</sup> month, 2<sup>nd</sup> month and 3<sup>rd</sup> month. The observations pertaining to haemato-biochemical parameters were recorded. During the last week of experiment, a digestibility trial of seven days duration was conducted by adopting total collection method to study the digestibility of various nutrients. All the experimental goats were housed individually during digestion trial period. The feed samples viz, concentrate mixture; dry fodder, green fodder fed and faecal samples were analyzed for proximate principles as per AOAC (1995). The obtained data was analyzed by using Complete Randomised Design (CRD) as per Snedecor and Cochran (1995).

The details of concentrate mixture, digestibility coefficient of nutrients and haematobiochemical parameters are presented in Table 1, 2, and 3, respectively. The average digestibility coefficients of nutrients found statistically non-significant except digestibility coefficient of nitrogen free extract among treatment groups. Our results are in accordance with Maximilliiane *et al.* (2012) and Lopez *et al.* (2014).

The average value of haemoglobin (g/dl), the average packed cell volume concentration (%), the average serum total protein value, the average serum total albumin value and average serum globulin values did not differ significantly among the different treatment groups.

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**Table 1**  
**Composition of concentrate mixture**

Ingredients	T <sub>0</sub> (control)	T <sub>1</sub>	T <sub>2</sub>
Maize	40	30	20
Soybean hulls	—	10	20
Groundnut cake	11	11	11
Cottonseed cake	20	20	20
Tur chunni	17	17	17
Wheat bran	11	11	11
Mineral mixture	0.5	0.5	0.5
Salt	0.5	0.5	0.5
Total	100	100	100

**Table 2**

**Digestibility coefficients of nutrients and Feed intake**

Parameters	Treatment Groups		
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
Dry matter (%)	72.39±0.04	71.93±0.03	72.03±10.2
Organic matter (%)	77.93±0.03	77.57±0.26,	76.82±0.03
Crude protein (%)	70.05±0.02	69.84±0.38	69.81±9.97
Ether extract (%)	65.78±0.53	65.09±0.45	65.25±9.32
Crude fibre (%)	63.20±0.09	62.34±0.42	62.69±0.04
Nitrogen free extract (%)	83.66±0.02 <sup>b</sup>	83.35±0.19 <sup>b</sup>	84.75±0.02 <sup>a</sup>
<b>Feed intake (gm/day)</b>			
Concentrate mixture	256.75±5.07 <sup>NS</sup>	257.59±4.82 <sup>NS</sup>	256.28±4.79 <sup>NS</sup>
Roughages (Green+Dry)	568.68±35.59 <sup>NS</sup>	572.81±38.04 <sup>NS</sup>	568.57±37.86 <sup>NS</sup>
Total dry matter intake (TDMI)	825.44±40.37 <sup>NS</sup>	830.41±42.50 <sup>NS</sup>	824.86±42.29 <sup>NS</sup>

a, b- means with different superscript in a row differ significantly at P<0.05; NS: Non-significant

All the blood biochemical parameters were well within normal range. Our findings are in accordance with Bhattacharyya (2015), Rainchwar (2012) and Jadhav *et al.* (2016).

**CONCLUSION**

The result of present study indicated that, soybean hulls can be used as replacement for maize in concentrate mixture up to 50%, since it is cheaper than maize and has no adverse effect on nutrient digestibility and haemato-biochemical parameters of growing goats.

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**Table 3**

**Haemato-biochemical parameters of experimental goats**

Days	Treatment		
	T <sub>0</sub>	T <sub>1</sub>	T <sub>2</sub>
<b>Haemoglobin concentrations (g/dl)</b>			
0	9.28±0.45	9.52±0.39	9.63±0.39
30	9.38±1.38	9.11±0.31	9.56±0.40
60	9.69±0.47	9.30±0.32	9.41±0.33
90	9.36±0.29	9.00±0.15	9.22±0.31
<b>Packed Cell Volume (%)</b>			
0	26.98±1.06	27.18±1.12	27.76±1.10
30	24.06±2.83	26.78±0.95	28.11±1.21
60	25.08±2.94	26.81±0.97	27.20±0.96
90	24.31±2.79	24.41±0.55	26.76±0.86
<b>Serum Total Protein (g/dl)</b>			
0	6.66±0.14	6.76±0.19	6.95±0.17
30	6.95±0.17	6.78±0.16	6.91±0.18
60	6.73±0.18	7.00±0.13	7.05±0.10
90	6.81±0.17	7.03±0.12	7.21±0.08
<b>Serum Albumin (g/dl)</b>			
0	2.11±0.10	2.35±0.34	2.15±0.07
30	2.20±0.05	2.13±0.07	2.15±0.05
60	2.15±0.07	2.15±0.07	2.15±0.07
90	2.15±0.07	2.13±0.08	2.16±0.07
<b>Serum globulin (g/dl)</b>			
0	4.55±0.21	4.41±0.24	4.80±0.22
30	4.75±0.06	4.65±0.20	4.76±0.17
60	4.58±0.19	4.85±0.14	4.90±0.14
90	4.66±0.15	4.90±0.15	5.20±0.13

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