



# Comparative studies of *Jowar* and soybean straw feeding in Sahiwal cows

Nilesh S. Mawal, S.D. Chavan and M.S. Mahalle

**ABSTRACT :** The study entitled “Comparative studies of *Jowar* and soybean straw feeding in Sahiwal cows” was conducted for period of 95 day. Six sahiwal cows were divided into three groups on the nearness of age and weight. Three feeding treatment were studied namely T<sub>1</sub> (Jowar straw adlib + 5 kg Green Hy. napier + 1kg concentrate), T<sub>2</sub> (50% Jowar straw adlib + 50% Soybean straw adlib + 5 kg Green Hy.Napier +0.750 kg concentrate), T<sub>3</sub> (Soybean straw adlib + 5 kg Green Hy.Napier + 0.500 kg concentrate) was fulfil requirement of sahiwal cow in all treatments. Experimental feeding lasted 95 days including 7 days gap for reducing residual effect before starting second and third period. An attempt was made to study the effect of Feeding of jowar straw in combination with soybean straw on feed intake, dry matter intake of Sahiwal. The DMI intake and body weight gain during the experiment period were found significantly superior in T<sub>2</sub> treatment over T<sub>1</sub> and T<sub>3</sub>.

**KEY WORDS :** *Jowar* straw, Soybean straw, Concentrate, Sahiwal cows

**HOW TO CITE THIS PAPER :** Mawal, Nilesh S., Chavan, S.D. and Mahalle, M.S. (2019). Comparative studies of *Jowar* and soybean straw feeding in Sahiwal cows. *Res. J. Animal Hus. & Dairy Sci.*, 10(2) : 38-42 : DOI: 10.15740/HAS/RJAHDS/10.2/38-42. Copyright@ 2019: Hind Agri-Horticultural Society.

## INTRODUCTION

Sahiwal is one of the indigenous breeds out of 27 indigenous breeds of cattle in India. Sahiwal breed, originated form montegomeri district of Punjab provinces from Pakistan and seen at its best in Punjab, Haryana, Delhi, Uttar Pradesh, Madhya Pradesh and Bihar states. Colour of this cow is reddish and skin is loose that's called as “Lola” and also called as “Montegomeri”. It yields average 2000-2200 kg milk in one lactation. It yields

maximum milk among all the indigenous breeds with highest Milk fat *i.e.* 4-6 per cent. Soybean is known as the “Golden Bean” of the though soybean is a legume crop, yet it is widely used as oilseed. Due to very poor cook ability and digestibility on account of inherent presence of trypsin inhibitor, it cannot be utilized as a pulse. It is now the second largest oilseed in India after groundnut. It rows in varied agro-climatic conditions. It has emerged as one of the important commercial crop in many countries. Due to its popularity, the international trade of Soybean is spread several countries such as Japan, China, Indonesia, Philippines, and European countries are importing Soybean to supplement their domestic requirement for human consumption and cattle feed. 20<sup>th</sup> Century. Grows in the worldwide globally. philippines, Soybean has great potential as an exceptionally nutritive and very rich protein food. It can supply the much needed protein to human diets, because it contains

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above 40 per cent protein of superior quality and all the essential amino acids particularly glycine, tryptophan and lysine, similar to cow's milk and animal proteins. Soybean also contains about 20 per cent oil with an important fatty acid, lecithin and Vitamin A and D. The 4 per cent mineral salts of Soybeans are fairly rich in phosphorus and calcium. Jowar is an important crop providing food, feed and fodder in the arid and semi-arid tropics of the world. It is a staple food for the rural poor in the country and African countries. It is primarily used as livestock feed and as industrial use in USA and other developed countries. *Jowar* is often referred to as "coarse grain". Though it is a traditional subsistence crop but now changes its role to commercial/semi-commercial crop. The demand for *Jowar* for feed purpose is the main driving force in rising the global production and international trade. It has also been used in the production of alcohol. The whole plant is used for forage, hay or silage. The sweet stalked sorghum is emerging as a potential raw material to the industries producing ethanol, jaggery and paper making. It is grown as *Kharif*, *Rabi* and also as summer sorghum.

#### MATERIAL AND METHODS

The present investigation entitled comparative studies of jowar and soybean straw feeding in sahiwal cows was conducted at Livestock instructional Farm, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, for a period for 95 days. The material used and method employed for this investigation is presented in the following pages under appropriate head. The Livestock instructional Farm is located at Akola, which is one of the districts of Vidarbha region in Maharashtra state. The environmental condition is one of the most dominant factors. It is therefore, necessary to describe the topographical and climatological situation of the place. Akola is located on the latitude of 22.42° and longitude of 77.02° East with a height of 307.4 meter above mean sea level. Six sahiwal cows were divided into three groups on the nearness of age and weight. Three feeding treatment were studied namely T<sub>1</sub> (Jowar straw adlib + 5 kg Green Hy. napier + 1kg concentrate), T<sub>2</sub> (50% Jowar straw adlib + 50% Soybean straw adlib + 5 kg Green Hy.napier +0.750 kg concentrate), T<sub>3</sub> (Soybean straw adlib + 5 kg Green Hy. napier + 0.500 kg (concentrate) was fulfil requirement of sahiwal cow in all treatments. Experimental feeding lasted 95 days including 7 days gap for reducing residual effect before starting second and third period. The

samples of feed ingredients collected were analysed for proximate principles and chemical composition.

#### Health and sanitation:

The cow's pens where the cows were housed during the period of experiment were cleaned daily. The byres and surrounding area were disinfected with phenyl. The help of veterinarian was taken whenever necessary. The cows were kept in open paddock from 8.00 a.m. to 9.30 a.m. daily.

#### RESULTS AND DISCUSSION

Chemical composition is one of the most important indexes of nutritive value of feed. Hence the chemical compositions of different feeds used in the present study the Sahiwal cow offered Jowar straw, soybean straw, green hybrid Napier and sugras concentrate mixture. It is therefore seems necessary to know the nutritional status of these feed stuffs in order to assess whether they are capable to meet nutritional requirement of animal. Soybean straw was used. When the top portion of the plant was harvested and grains were obtained by putting this material in the thresher. The byproduct is called soybean *Bhusa* or kutar. Another way is to cut the complete plant at ground level and grains were obtained by threshing in the yard with the use of tractor or bullock, the byproduct is called soybean straw. The nutrients content in soybean roughages were influenced by the method of harvesting leading to final byproduct as soybean kutar or soybean straw. With this view the feed stuffs were analyzed for proximate principles and the data were established in Table 1.

From the Table 1 it was observed that *Jowar* straw, soybean straw, hybrid Napier and concentrate were containing 90.23, 87.62, 29.75 and 91.12 DM, respectively. The jowar straw was containing 3.74, 2.84, 51.52, 32.48 and 9.42 per cent CP, EE, NFE, CF and ash while soybean straw was containing 6.13, 2.51, 37.29, 44.21, 9.86 per cent, CP, EE, NFE, CF and ash, respectively. The contents of nutrients in hybrid nippier containing 5.77, 2.50, 49.22, 26.28 and 16.23 per cent CP, FE, NFE, CF and Ash. The contents of nutrient in concentrate were 17.34, 5.27, 61.74, 11.84 and 3.81 per cent CP, EE, NFE, CF and ash. Chemical composition of jowar straw is nearer with that of reported by Ibrahim *et al.* (1998). They also observed that the content of CP, CF, EE and NFE in *Jowar* straw as 4.04, 37.34, 2.40 and 4.55 per cent, respectively, slightly

**Table 1 : Chemical composition of feed stuffs (on % DM)**

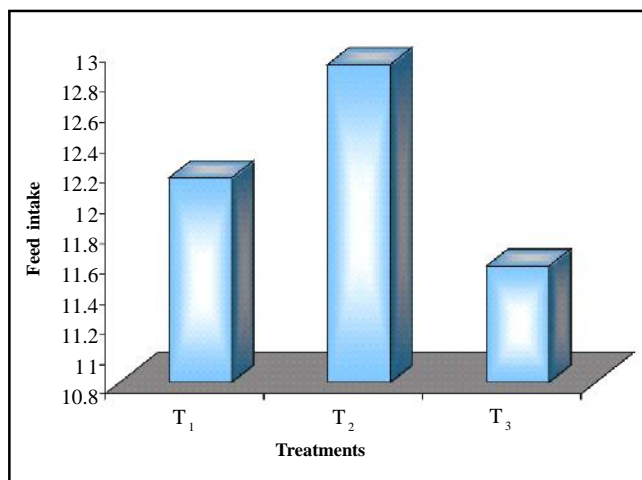
Particulars	Jowar straw	Soybean straw	Hybrid Napier (Green fodder )	Concentrate (Sugras dry ration)
DM	90.23	87.62	29.75	91.12
CP	3.74	6.13	5.77	17.34
EE	2.84	2.51	2.50	5.27
NFE	51.52	37.29	49.22	61.74
CF	32.48	44.21	26.28	11.84
Total ash	9.42	9.86	16.23	3.81

lower values of CP and CF, but the values of EE and NFE are in line with present value. The difference in value of CP and CF is due to change in variety, soil climatic condition and harvesting time of jowar. Similar observations were also noted by Kamble (2006) and Bansod (2008). Green Hybrid Napier contained 29.75% DM Along with 5.77, 2.50, 49.22, 26.28 and 16.23 per cent CP, FE, NFE, CF and total Ash on dry matter basis, respectively. The present CP values are nearer with the composition reported by by Talpada *et al.* (1978) as 5.89%, Parnekar *et al.* (1985) as 4.30%, Bansod (2008) as 5.77% and Kumaresan and Parthasarathy (2008) 7.8% are substantially higher than the present value. Moreover the past workers like Puri and Gupta (2001) and Gupta and Murdia (2006) also suggested feeding of higher CP level concentrates (19.5 to 19.8 %) while rearing animals on ammonia treated paddy and wheat straw. Kamble (2006) and Adangale *et al.* (2009) reported the CP content of Sugras between 17.34 to 19.17 % which is comparable with present results.

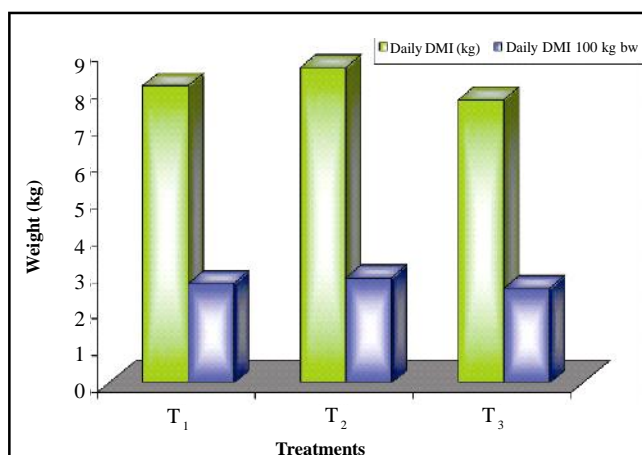
**Daily feed intake:**

The feed intakes of different feed stuff by the cow under different groups are shown in Table 2. The soybean straw, jowar straw and concentrate and hybrid Napier were provided to cows in different groups to meet out the DCP and TDN requirement.

It was observed from Table 2 and Graph that on an average the cows consumed 12.148, 12.897, 11.564 kg of feed per day under T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> treatment, respectively. The differences in respect of feed intake among the treatments indicating that all the cows



**Fig. 1 : Average feed intake under different treatments**



**Fig. 2 : Average dry matter and DM/100 kg body weight under different treatments**

**Table 2 : Average intake of different feed stuffs under different groups (kg/day/cows)**

Treatments	Jowar straw	Soybean straw	Concentrate	Hy. Napier (Green fodder)	Total
T <sub>1</sub>	6.648	-	1.000	5.000	12.148
T <sub>2</sub>	3.657	3.490	0.750	5.000	12.897
T <sub>3</sub>	-	6.064	0.500	5.000	11.564

**Table 3 : Average intake of DM over the experimental period under different treatments (kg/day/cow)**

Treatments	Average body weight (kg)	Daily dry matter intake (kg)	Daily dry matter intake 100 kg body weight
T <sub>1</sub>	299.789	8.086	2.697
T <sub>2</sub>	300.181	8.584	2.859
T <sub>3</sub>	300.008	7.701	2.566
'F' test	-	Sig	Sig
S.E. $\pm$	-	0.133	0.035
C.D. (P=0.05)	-	0.425	0.113

consumed adequate quantity of feed and the incorporation of soybean straw in the ration of the cow did not influence on the feed intake. However, the incorporation of soybean straw in the ration increased the feed intake in T<sub>2</sub> and T<sub>3</sub> treatments comparing to T<sub>1</sub> groups. It was further noted that the T<sub>2</sub> groups preferred more consumption of jowar straw as against soybean straw inspite of equal opportunity for soybean straw. This could be due to more coarseness of soybean straw and thereby reducing the palatability on one hand and the availability of jowar straw on the other hand in T<sub>2</sub> treatment. It is already pointed out by the past workers that the soybean straw possessed lower palatability (89%) compared to traditional straw which was the reason to reduce the feed intake in animal (Talokar, 1993). Pires *et al.* (1983) also indicated that on account of higher content of cellulose in soybean compared to jowar straw reflected on the intake of this straw. These observations do not agree with present trend on feed intake from soybean base diet. The present intake values are nearer to the values reported by past research workers like Kamble (2006) reported that he crossbred cows in T<sub>1</sub> group consumed 6.580 kg jowar straw while, cow in T<sub>2</sub> groups consumed 3.270 kg jowar and 3.270 kg soybean straw and 6.410 kg soybean straw in T<sub>3</sub> group.

#### Daily DM intake:

Daily DM intake was calculated from intake of different feeds and data is tabulated in Table 3.

It was noted that the daily DM intake was differing significantly between the treatments. The cow from T<sub>2</sub> groups consumed more DM than that of T<sub>1</sub> and T<sub>3</sub> cow. The average daily intake was 8.086, 8.584 and 7.701 kg/day/cow in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> groups, respectively. This trend thus indicates that there was increase in the daily DM intake when soybean straw was incorporated as roughage in the rations of cow. However, the past research workers reported more DM intake on soybean straw based (Pachauri and Negi, 1976; Barbosa *et al.*, 1980 and

Talokar, 1993). This trend does confirm the present result. Whereas, Homani and Srivastava (1989) reported reduction in DM intake of animal on soybean based diet. This observation does not agree with the present trend. Thus the inclusion of soybean straw in the ration of cow was beneficial to raise the intake and could form as alternative to jowar straw. The present intake values are nearer to the values reported by past research workers like Kamble (2006) observed daily dry matter intake of 2.699, 2.684 and 2.687 kg DM/100 kg body weight were observed in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. On the other hand Bansod (2008) reported average daily intake of DM was 7.492, 8.390 and 8.28 kg/day/cow in T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> group, respectively. This intake value appears to be lower than T<sub>1</sub> and higher than T<sub>3</sub> of present values.

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**Received:** 28.09.2019; **Revised:** 05.11.2019; **Accepted:** 21.11.2019