



Feeding of *Jowar* straw in combination with soybean straw on the growth performance of Sahiwal Heifers

Minakshi S. Mahalle, S.D. Chavan and N.S. Mawal

ABSTRACT : Experiment was designed to improve the utilization of soybean straw by simple physical mixing of conventional feed *Jowar* straw with soybean straw. The six Sahiwal heifers were selected on the basis of nearness to age and body weight and these were exposed to three different treatments in each 2 heifers. Three feeding treatment were studied namely T₁ - *Jowar* straw (Ad.lib) +3kg green fodder+1kg concentrate, T₂ - 50% *Jowar* straw +50% soybean straws + 3kg green fodder +0.750kg concentrate, T₃ -soybean straw (Ad lib) +3kg green fodder +0.500kg concentrate (Dry green and concentrate feeding will be provided on the basis of DCP and TDN required as per feeding standard). Total experiment period was of 95 days in switch over design with a period of 27 days per 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 heifers. The DMI intake and body weight gain during the experiment period were found significantly superior in T₂ treatment over T₁ and T₃.

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

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INTRODUCTION

Jowar is the main cereal crop in Maharashtra occupying 4.176 M ha area out of which *Rabi jowar* occupied maximum area of 3.112 M ha during the year 2009-10. The gradual growth in use of technology in agriculture has resulted in increased crop productivity. *Jowar* (sorghum) is one of the most important cereal crops in the world and is one of the four major food grains

of our country. It is a staple food for millions of poor rural people in Asian and African countries. Besides being a major source of staple food for human beings, it also serves as an important source of fodder, animal feed and industrial raw material. During the year 2005, *Jowar* was cultivated over an area of 43707.4 thousand hectares in the world producing about 59197.52 thousand tonnes of grains.

Soybean has maximum nutritive value. It contains 20.21 per cent oil, 41.21 per cent protein and carbohydrates with vitamins A, B, C, D, E, K and all other essential amino acids. Soybean (*Glycine max*) crop is rich in carbohydrate, fat, protein minerals and vitamin and therefore, can serve as gift to undernourished human population as well as livestock. It is leguminous plant and every part of this crop is useful to animals. Most of the crop residues are fibrous, of low energy and have very

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little protein and minerals. Soybean byproducts constitute of soybean pods and crushed potential roughage (Gupta *et al.*, 1973 and Pachauri and Negi, 1976). However, due to the coarseness of straw, greater portion is refused by the animal. Some efforts were made in past to develop the means for its utilization by the livestock (Gupta *et al.*, 1973 and Felix *et al.*, 1990). Some chemical treatment have been tried in past to improve the palatability and digestibility of soybean straw (Felix *et al.*, 1990). Farmers of Maharashtra are not utilizing soybean straw efficiently as a feed. Hence, the feeding of soybean straw with jowar has been proposed with an objective to feed intake and dry matter intake of sahiwal heifers.

Heifer production is the most expensive part of the dairy farm operation. Poor growth rate resulting in delayed sexual maturity, thereby requires more input for a longer period, hence it delays the economical returns in the form of delayed introduction of replacement heifers. Excessive fattening of dairy heifers by providing either extra protein or energy may damages their mammary development and impair reproduction, thereby decreasing their lifetime milk producing ability (NRC, 1989; Troy, 2005). Therefore, balanced feeding with improved management and minimum disease prevalence can be helpful in reducing the cost of production and age at first calving (Heinrichs *et al.*, 2005) of heifers of local breeds. Reduction in feed and nutrient intake of the animals reduced the rate of passage of feed, which resulting in greater retention time and ultimately increased ruminal degradation and nutrient utilization (Tamminga *et al.*, 1979).

MATERIAL AND METHODS

The study was conducted in Department of Animal Husbandry and Dairy Science Post Graduate Institute Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during the year 2014-2015. The livestock instruction farm is located on Mumbai-Kolkata national highway No. 6 at East of Akola city. Akola is situated at central-East side of Maharashtra state. The six sahiwal heifers were

selected on the basis of nearness to age and body weight and these were exposed to three different treatments in each 2 heifers. The heifers subjected to different groups were fed for twice in day for periods of 27 days (total 95 days trial). Namely T₁ - Jowar straw (Ad.lib) +3kg green fodder+1kg concentrate, T₂ - 50% Jowar straw +50% soybean straws + 3kg green fodder +0.750kg concentrate, T₃ -soybean straw (Ad lib) +3kg green fodder +0.500kg concentrate. The experimental animal was fed with concentrated mixture of respective treatment in period I, II and III per head per days in the morning. The Data were statistically analysed by Switch over design.

Health and sanitation:

The heifer pens where the heifers 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 heifers were kept in open paddock from 8.00 a.m. to 9.30 a.m. daily.

RESULTS AND DISCUSSION

It is observed from that Table 1, soybean straw, Jowar straw, berseem and concentrate were containing 91.21, 91.08, 20.8 and 89.2 DM, respectively. The soybean was containing 7.11, 1.53, 38.31, 41.22, 11.83 per cent, CP, EE, NFE, CF and ash while jowar straw was containing 3.65, 2.90, 52.45, 32.42 and 8.58 per cent CP, EE, NFE, CF and ash, respectively. The contents of nutrient in concentrate were 19.65, 6.55, 60.12, 6.10 and 7.58 per cent CP, EE, NFE, CF and ash. The contents of nutrients in berseem containing 14.6, 1.3, 51.8, 19.6, and 12.7 per cent CP, EE, NFE, CF and Ash. The most significant finding was that soybean straw thrice rich as that of jowar in respect of CP content. Similarly, CF was higher in soybean straw than that of jowar straw, whereas NFE, EE were higher in jowar straw, over soybean straw.

Chemical composition of jowar straw is nearer with that of reported by Bansod (2008) observed that the

Table 1 : Chemical composition of experimental feeds fed to sahiwal heifers (on % DM)

Particulars	Jowar straw	Soybean straw	Berseem	Concentrate
DM	91.21	91.08	20.8	89.2
CP	3.65	7.11	14.6	19.65
EE	2.90	1.53	1.3	6.55
NFE	52.45	38.31	51.8	60.12
CF	32.42	41.22	19.6	6.10
Total ash	8.58	11.83	12.7	7.58

Table 2 : Daily dry matter intake and average intake of different feed stuffs under different groups (kg/day/heifers)

Treatments	Average body weight (kg)	Daily feed intake (kg)	Daily dry matter intake (kg)	Daily dry matter intake/100kg body weight
T ₁	214.08	8.47	5.363	2.513
T ₂	214.51	8.57	5.388	2.518
T ₃	214.23	8.45	5.355	2.507
F Test				
S.E. ±			0.009	0.011
C.D. (P=0.05)			0.0027	0.038

content of CP, CF, EE and NFE in jowar straw as 3.70, 32.45, 2.89, and 52.46, per cent, respectively, slightly lower values of CP and CF, but the values of EE and NFE are in line with present value. Similar observations were also noted by Kamble (2006). The present chemical composition values are nearer to the values reported by past research workers Mandal and Banerjee (2009) observed that the content of CP, CF, EE, NFE and TA in berseem as 14.5, 19.7, 1.2, 51.9 and 12.7 per cent, respectively. Yadav and Chaudhary (2010) observed that the content of CP, CF, EE, NFE and TA in berseem as 15.12, 24.96, 2.20, 44.54 and 13.18 per cent, respectively. The present values are appearing between the same values.

Feed intake and dry matter intake:

The mean daily dry feed intake Sahiwal heifers in three different treatments is presented in Table 2. The values of feed intake of the of the treatment T₁, T₂ and T₃ were 8.47, 8.57, 8.45 kg, respectively.

Feed intake:

The value of daily feed intake kg body weight of the treatment group T₁, T₂ and T₃ were, 8.47, 8.57, and 8.45 kg, respectively. The daily feed intake through roughages and concentrate was affected significantly given in Table 2. The feed intake was noticed more in T₂ followed by T₁ and T₃. It indicates that the influence of incorporation of soybean and jowar straw combination with concentrate mixture improves the feed intake of the experimental heifers. The lowest feed intake kg/day observed under T₃ treatment due to standard feeding.

Dry matter intake:

Data regarding average total dry matter intake per animal per day per 100 kg body weight under different treatments are presented in Table 2. The average dry

matter intake under treatment T₁, T₂ and T₃ were 5.363, 5.388 and 5.355, respectively. The dry matter intake on 100 kg body weight basis by heifers under treatment T₂ was slightly higher over treatment T₁ and T₃. It shows that combination of jowar straw improved DM intake and also the heifers liked the soybean straw as dry roughage. The present intake values are nearer to the values reported by past research workers like Das *et al.* (2012) reported that the average daily dry matter intake was higher in T₂ and the values being 5.89, 6.34 and 5.93 kg in T₁, T₂ and T₃, respectively. However, the past research workers reported Homani and Srivastava (1989) reported reduction in DM intake of animal on soybean based diet.

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