Effect of untreated and urea treated soybean straw on feeding value in lactating cows

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ABSTRACT...... Present investigation was conducted to utilize urea treated non-conventional SBS as protein source roughage in the ration of lactating cows to find out its feeding value in respect to intake and digestibility of nutrients, milk yield and quality of milk, blood metabolic profile, feed conversion efficiency and economics. The results do suggest that 2 per cent urea treated SBS can find a place in the ration of lactating cows without any adverse effect on performance of cows. The results also points out that cow having up to 300kg body weight and producing 5 kg milk/day can be reared and can maintain a growth rate of 0.65 per cent in milk yield per week on urea treated SBS with one kg concentrates and little support of greens.

KEY WORDS...... Conventional Jowar straw, Untreated soybean straw, 2 per cent urea treated soybean straw, DCP, TDN, DMI, Water intake, Feed conversion efficiency, Milk yield, $ per cent FCM, Blood metabolic profile


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INTRODUCTION........................................

The lower productivity in milking animals may occur as a result of complex climate, economic problem and under nutrition. In which nutrition status and feeding management had significant impact on milk production (Garg et al., 2007). Feeding component alone contributes 60 to 70 per cent of total expenditure and thereby direct influence on economics of dairy farming. Under present rural scenario, the size of land holding is decreasing sharply, the grazing and forest land providing fodder to animals are also declining at the rate of 1.5 million ha /year due to one or other reasons. Moreover, these resources have shown deterioration over the years. As a result, the fodder made available from the present resources neither supports to neither fulfill the appetite of animal nor meet out nutritional requirements. During couple of years, a significant change in cropping pattern has been noticed where the farmers have concentrated on the cultivation of crops like soybean having low cost of production and remunerative selling price in the market. As a result, this situation reflected on the acreage of traditional crop like sorghum, bajra and maize as well as to some extent on cultivation of pulses and wheat crops, creating the shortage of established conventional straws to animal feeding. Cultivation of soybean crop on 30.69 lakh ha of land in Maharasthra during 2012-13 is an indication of crop popularity amongst the farmers. It is, therefore, expected that large quantity of non-conventional leguminous SBS is generated in the state (Mule et al., 2008; Adangale et al., 2009 and Chopade et al., 2010). During 2012-13 approximately 68 lakh MT of SBS would be made available by cultivating soybean crop in Maharashtra, considering the optimum yield of 2.2 tons straw/ha as suggested by Gupta et al. (1978). Of which 27 lakh MT would be produced in Amravati division of Vidarbha region (Anonymous, 2012). This situation calls upon the need to utilize SBS in ruminants ration so as to relieve the...
demand pressure of conventional straws. Therefore present investigation was conducted at Livestock Instructional Farm, Dr. Panjabrao Deshmukh Krishi Vidya Peeth, Akola, for a period of 120 days (starting from 05th February 2012 to 03rd June, 2012) to utilize urea treated non-conventional SBS as protein source roughage in the ration of lactating cows to find out its feeding value in respect to intake and digestibility of nutrients, milk yield and quality of milk, blood metabolic profile, feed conversion efficiency and economics.

Feeding value of SBS:

It is reported that SBS is a rich protein source leguminous by product, containing 3 to 4 times more CP than that of conventional cereal straws; Moreover, CP content of green soybean is similar to that of berseem like legumes (Gupta et al., 1978 and Bacchu Singh et al., 2005). In the present study SBS was containing 6.80 per cent CP against a content of 2.36 per cent CP in Jowar straw. Hence, replacement of conventional straws with non-conventional SBS can improve the nutritional status of the ration. However, high lignin content (16.18%) of SBS makes the straw most lignified coarse and fibrous in nature. The SBS used in present study was possessing 16.32 per cent lignin while 4.36 per cent lignin was found in Jowar straw. As a result, high lignin content reflects adversely on palatability, feed intake and nutrients digestibility. Lower palatability and ignorance about protein value of SBS, farmers are reluctant to include SBS in the diet of animals. In reference to this the past workers have suggested the different means like feeding SBS in combination with cereal straw, formulation of complete feed and sprinkling of water before use for its utilization by small and large ruminants (Mule et al., 2008, Adangale et al., 2009 and Chopade et al., 2010). Beside this chemical treatment of SBS was suggested improving degradability of cell wall by Gupta et al. (1978), While Gawai (1995) and Janorkar (1995) improved palatability, feed intake and nutrient utilization of SBS with 2 per cent sodium sulphate or sodium chloride treatments. However, efforts are not directed towards the improvement in nutritive value of SBS. In this context, effectiveness of urea ammoniation to SBS in terms of delignifying ability, nutritive value improvement and economics of feeding was evaluated on the basis of milk production of cows along with quality in the present study.

On this background, the results of present study demonstrated that 2 per cent urea ammoniation to SBS proved advantageous to raise DCP content of straw by 4 folds over Jowar straw and by about ½ folds over that of untreated SBS. Break down of cell wall structures was also achieved in urea treated diet as evident from the decrease in the content of CF and lignin as compared to untreated SBS. As a result, rearing of lactating cows producing up to 5 kg of milk/day on 2 per cent urea treated SBS diet needed a support of only 1 kg of concentrates to meet out maintenance and production requirement against requirement of 1.66 kg concentrates on untreated SBS and 2.66 kg concentrates on Jowar straw based rations. There was also improvement in the palatability of SBS by urea treatment due to change of coarse texture to soft pliable as observed from the intake pattern of straw and DM in cows where the cows consumed urea treated SBS more by about 42 per cent resulting an increase intake of DMI by 15 per cent in comparison to feeding of untreated SBS to cows.

The overall nutrients utilization was better on feeding urea treated SBS to cows on the basis of different nutrient digestibility co-efficient and thereby improvement in the nutritive value of the ration. In turn the cows received more DCP by 27.07 per cent and TDN by 19.40 per cent and thereby supply of more ME by 28.39 per cent on feeding urea treated SBS ration as compared to feeding of untreated SBS diet to cows. Obviously this situation had reflected on the performance of cows. The cows from urea treated SBS fed group produced not only more milk by 26 per cent /day/cow over that of feeding untreated SBS diet but milk was containing more fat and proteins, which seems to be an indication of improvement in milk quality. Moreover, the compound growth rate in milk yield was at 0.518 per cent/day/cow against a rate of 0.358 per cent in untreated SBS diet group. The higher fat content of milk resulted in more 4 per cent FCM production which in turn would fetch more prices at procurement level. Lactating cows reared on enriched SBS ration produced 26 and 24 per cent more milk and 4 per cent FCM in comparison to feeding of untreated SBS ration. Feeding of urea treated diet to cows is beneficial to improve fat, protein, SNF and TS content of milk. Approximately 61 per cent of the enriched SBS consumption is converted to milk production by the cows.

With regards to health status of cows on feeding urea treated SBS ration it was noticed that haemoglobin, Serum glucose, Serum proteins and total lipids levels were improved significantly over that of feeding untreated SBS diet. Moreover all the metabolic profile values were within the normal prescribed range indicating no adverse effect on health of the cows.

Beside this 2 per cent urea treated SBS feeding to cows withstands on different economical norms. The treated straw had a potential to reduce daily cost of feeding by 49 and 28 per cent over that of feeding conventional and untreated SBS diet, as a result of mainly saving in concentrate requirements. Feeding of concentrates could be saved by 66 per cent in comparison to conventional Jowar straw feeding to cows producing up to 5 kg milk.

Therefore, the farmers be motivated and promoted towards utilization of non-conventional leguminous SBS in animal ration. This would help to provide better nutrition to livestock as presently more than 90 per cent of livestock fulfilled their appetite by grazing on field boundaries and waste
lands. Moreover the urea needed for enrichment is available at the door of farmers.

Conclusion:
From present investigation it is concluded that inclusion of 2 per cent urea ammoniated SBS in the ration of lactating cows had no adverse effect on performance of cows similarly does not have any toxic effect as evident from blood urea levels of the cows.

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