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RESEARCH ARTICLE.....

Effect of formaldehyde treated concentrate, urea and soybean meal on compound growth rate of milk yield and correlation studies in lactating cows

N.S. CHORE, S.D. CHAVAN, **R. R. SHELKE AND** P. A. KAHATE

ABSTRACT..... Present investigation entitled "effect of formaldehyde treated concentrate, urea and soybean meal on compound growth rate of milk yield and correlation studies in lactating cows" was undertaken at Department of Animal Husbandry and Dairy Science, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. Feeding of 1.5 per cent formaldehyde treated 70:30 sugras : SBM concentrate mixture with 2 per cent added urea diet to lactating cows (T_3) was evaluated in relation to sugras untreated ration (T_1). It was observed that intakes in cows were non-significantly influenced by the parameters except water intake as out of the five animals only 2 animals showed significant impact due to DMI and TDNI and none of the animals due to DCPI. The values were 0.30, 0.74, 0.30 and 0.28 per cent per week for DMI, DCPI, TDNI and TWI, respectively. This reflected in an increase of 1.14 per cent in milk yield/ week in cows. It was noticed that DCPI had a greater influence on milk yield of cows in all the groups except T_5 group as the correlation values were positive and significant, being r = 0.770, 0.764 and 0.921 of high magnitude in T_1, T_2 and T_3 groups, respectively and 0.588 of medium order in T_4 group while it was positive but non-significant (r= 0.431) in T_5 group. The correlation values observed for maximum and minimum ambient temperature were positive non-significant, being r = 0.186 and 0.137, 0.243 and 0.074, 0.324 and 0.081, 0.230 and 0.067 and 0.250 and 0.094 in T_1, T_2, T_3, T_4 and T_5 treatments, respectively. In contrast correlation co-efficient values between RHI and daily milk yield were negative non-significant in T_1, T_2 and T_4 treatments, being r = -0.481, -0.546 and -0.424, respectively while the association was negative significant in T_3 (r = - 0.642) and in T_5 (r = - 0.778).

KEY WORDS..... Formaldehyde, Sugras, Urea, Soybean meal, DMI, DCP, Milk yield, Compound growth rate, Correlation studies

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INTRODUCTION.....

Maharashtra posses 16.73 and 5.56 million cattle and buffalo population, of which 2.50 and 0.48 million cattle and buffalo are locate in Amaravati division of

Vidarbha region. Moreover, Gaolao and Nagpuri breed of cattle and buffalo are habitat in Vidarbha region (Anonymous, 2012). The focus on the development of dairying by the animal husbandry department Government of Maharashtra through the implementation of different schemes like distribution of milch animal on subsidy to farmers, AI facilities and milk procurement network will provide a base for enhancement of milk production in the state in general and particular in the region. Livestock contributed 27 per cent of agriculture are allied GDP and therefore, Government of India has targeted 4 per cent growth in agriculture (Chakravarthy, 2010). This means a growth of 7.5 would be needed in livestock sector (Rekhate *et al.,* 2010). Hence, to cope up with the situation, it is necessary to maintained the present growth in milk production on one hand and to accelerate the milk production by 39 per cent over the present level within a span of 8 to 10 years *i.e.* a production target of 150 million tonnes by 2020, to fulfil the demand of milk for human population on the other hand. Basically the nutrients consumed by the animals through feeds must satisfy (a) the need of rumen microbes to convert dietary proteins in to ammonia to utilize it in microbial protein synthesis (b) the need of organs and tissues for productive milk synthesis function. Thus, to achieve these needs the roughage diet is supplemented with limited quantity of cereal grains, costly cakes and byproduct of pulses without considering the requirement of animal, resulting either low nutritional status or mal nutrition. This feeding approach has direct influence on production potential of animals. However, under present scenario it appears that feeding of full quota of concentrate is not possible as a result of unbridgeable gap between availability and requirement of concentrates. A gap of 35 to 44 per cent between availability and requirements of concentrate is estimated during 2010 which would have increase in coming years. In view of this the strategic approach for increasing protein supply to the productive functions from the available concentrate feeding seems to be the need of the day.

However, limited studies with regards to the effect of feeding formaldehyde treated soybean meal to lactating cows and buffaloes have been conducted so far as apparent from documented literature. Where a positive significant effect on increase in milk yield of cows, goats and sheeps was noticed due to feeding of formaldehyde treated SBM (Compeneere *et al.,* 2010 and Doskey *et al.,*2011). Thus, an attempt has been made in the present study to enhance the rumen by pass protein value of soybean meal (SBM) by treating with 1.5 per cent formaldehyde/ 100 g CP and its feeding effect on lactating cows with main objective to find out the effect of various factors, nutritive value on compound growth rate and correlation studies in respect to milk yield of cows.

RESEARCH METHODS.....

Research methodology deals with the description of research methods and techniques used as empirical measures for testing hypothesis developed earlier. The present investigation entitled "Effect of formaldehyde treated concentrate, urea and soybean meal on compound growth rate of milk yield and correlation studies in lactating cows" was carried out at Livestock Instructional Farm, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola for a experimental period of 90 days with 10 days prior pre experimental period. Twenty five early to mid-lactation stage lactating cows were selected from the herd on the basis of nearness in stage of lactation, milk production and body weight. The selected cows were divided in the five groups on the basis of nearness in different productive characters.

The maintenance and milk production requirements of the cows were worked out on the basis of the thumb rules suggested by Prasad and Neeraj (2008) and Banerjee (2008). The cows in all the treatments (T_1 to T_5) were given 5 kg green Hy. Napier and one kg sugras milk ration grade 1 (17.60% CP) to fulfill the maintenance requirements. Treatments were planned like T_1 – Wheat straw + sugras concentrate (17.60 % CP) 40 per cent of milk yield (production ration), T_2 – Wheat straw + untreated 70:30 sugras:SBM mixture (27.47 %CP) 30 per cent of milk yield (75% of production ration) + 2 per cent urea of the production quantity, T_3 – Wheat straw + 70:30 sugras : SBM mixture (27.47 %CP) treated with HCHO at 1.5 g/100CP 30 per cent of milk yield (75% of production ration) + 2 per cent urea of the production quantity, T_4 - Wheat straw + untreated 70:30 sugras:SBM mixture (27.47 %CP) 20 per cent milk yield (50% of production ration)+ 3 per cent urea of the production quantity and T_5 – Wheat straw + 70:30 sugras: SBM mixture (27.47 %CP) treated with HCHO at 1.5 g/100CP 20 per cent milk yield (50% of production ration) + 3 per cent urea of the production quantity.

The meteorological data for environment prevailing

during trial period was recorded at Meteorological observatory located in the Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The digestibility trial was conducted at the end of seventeenth week's trial. The digestibility trial was conducted for a period of 14 days, out of which first seven days were preliminary period and rest of seven days as collection period.

The cows were offered measured quantity of feed and leftover was measured. During collection period the dung voided in 24 hrs by individual cow was collected manually and measured to know the weight of dung voided. Individual sample of dung was collected and kept for DM estimation every day. All the seven days dried samples of individual cow were mixed together to form composite sample for analysis of proximate principles.

Water intake of individual animal was recorded once in week. The animals were offered clean and fresh water of known quantity twice a day in morning and evening and the water consumption was recorded by measuring the remaining water in the bucket. The weekly water consumption was consolidated on fortnightly basis during compilation of data. Milk yield was recorded separately for morning and evening milking of individual cow for whole experimental period.

The data were arranged in Factorial Randomized Block Design (FRBD) and analyzed by standard statistical method as per Amble (1975). For other related statistical analysis the procedures given by Snedecor and Cochran (1967) was used as follows,

The growth performance of milk over the weeks was studied by computing compound growth rates fitting exponential trend :

$$Y = a.\ b^{x}$$

where, compound growth rate,

$$\text{C.G.R.} = [\text{Antilog (Log b) -1}] \times 100$$

The significance of growth rate was tested on the basis of significance of b.

Correlation analysis :

The simple correlation co-efficient 'r' between the selected characters were worked out using following formula :

$$r = \frac{\sum XY - \frac{(\sum X)(\sum Y)}{n}}{\sqrt{\sum X^2 - \frac{(\sum X)^2}{n}}\sqrt{\sum Y^2 - \frac{(\sum Y)^2}{n}}}$$

The significance of 'r' was tested with table values of 'r' at 1 per cent and 5 per cent level of significance.

Regression analysis :

Multiple linear regression equation was fitted between,

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4$$

where,

Y= Milk yield ,

X_1= DCP, X_2= TDN

X_3= Maximum temperature,

X_4= Relative humidity (RH1)

The significance of bi's was tested by 't' test.

RESEARCH FINDINGS AND ANALYSIS.....

The results obtained from the present investigation as well as relevant discussion have been summarized under the following heads :

Compound growth rate of milk yield :

In order to study on compound growth rate of milk yield, the performance of cows over 90 days trial in terms of DM, DCP, TDN and water intake in relation to milk yield were subjected to growth analysis. The results of compound growth rate as influenced by the intake of DM, DCP, TDN and Water along with overall growth in total milk production/week are shown in Table 1.

A perusal of Table 1 indicates that all the attributes of feeding significantly influenced on milk yield in all the treatments. However the contribution of different factors exhibited differences between the feeding treatments. On an average an increase of 0.58 per cent in DMI/ week was registered in cows, whereas 2.17, 0.58 and 0.24 per cent increase was contributed by the intake of DCP, TDN and water, respectively in T_1 control treatment. This resulted in an increase of 1.57 per cent milk yield/week in cows. This trend thus, did indicate that the contribution of DCPI was more in milk yield of animals followed by TDNI and least effect of water intake.

On the other hand, the compound growth rate study based on DCP, TDN and water intakes exhibited relatively higher impact on feeding HCHO treated 70:30 sugras:SBM concentrate with 2 per cent urea supplement (T_3) diet to cows. Highest contribution was recorded by DCPI to the tune of 2.12 per cent per week followed by TDNI and DMI to the level of 0.62 per cent per week

and water intake was influenced by minimum level of 0.38 per cent per week. Moreover, the different parameters had significant positive impact on growth in milk yield over the experimental period in T_3 group as there was increase of 2.91 per cent milk yield/week in cows. In contrast, the contribution of DMI, DCPI, TDNI and TWI on feeding untreated 70:30 sugras:SBM concentrate with 2 per cent added urea (T_2) diet to cows were 0.76, 1.21, 0.73 and 0.24 per cent per week, respectively, where the impact of DCPI on growth in milk yield was on lower side in T_2 in reference to T_3 treatment, resulting lower increase in milk yield/week *viz.*, 1.09 per cent in T_2 treatment.

Moreover, it was observed that DMI and DCPI did not contribute to significant level in T_5 treatment where the cows were offered HCHO treated 70:30 sugras:SBM concentrate with 3 per cent urea supplement ration, the values being 0.55 and 0.33 per cent per week, respectively. While the contribution of TDNI was recorded to the tune of 0.55 per cent per week but consistency was not noticed as the value was significant only in case of two animals out of five animals. Whereas water intake influenced significantly by 0.26 per cent per week. As a result the overall impact on milk yield

Table 1 : Compound growth rate of milk yield in cows (%)

Treatments	Animal No.	DMI	DCP	TDN	Water intake	Total milk production
T_1	1	0.498**	2.032**	0.498**	0.383**	0.602 NS
	2	0.489**	2.190**	0.489**	0.373**	1.847**
	3	0.555**	2.008**	0.555**	0.002 NS	1.290**
	4	0.701**	2.291**	0.702**	0.275*	2.053**
	5	0.670**	2.320**	0.670**	0.177*	2.046**
	Overall	0.583	2.168	0.583	0.242	1.568
T_2	6	0.544*	1.422**	0.544*	0.271**	2.150**
	7	0.868NS	0.746**	0.868**	0.087 NS	0.221 NS
	8	0.730**	0.746**	0.730**	0.304**	0.397 NS
	9	0.764**	1.393**	0.764**	0.257**	0.863 NS
	10	0.890**	1.739**	0.764**	0.269**	1.855**
	Overall	0.759	1.209	0.734	0.238	1.097
T_3	11	0.761**	2.090**	0.761**	0.194*	3.717**
	12	0.416**	2.944**	0.416**	0.197**	2.941**
	13	0.399**	1.690**	0.399**	0.892*	2.387**
	14	0.722**	1.675**	0.722**	0.345**	2.244**
	15	0.805**	2.203**	0.805**	0.263**	3.256**
	Overall	0.621	2.121	0.621	0.378	2.909
T_4	16	0.075 NS	0.572 NS	0.075 NS	0.277 NS	1.141
	17	0.145 NS	0.954 NS	0.145 NS	0.194**	1.101
	18	0.078 NS	0.715 NS	0.078 NS	0.225**	1.192
	19	0.485**	0.528 NS	0.485**	0.458**	1.075
	20	0.722*	0.928 NS	0.722*	0.236**	1.204
	Overall	0.301	0.739	0.301	0.278	1.142
T_5	21	0.834 NS	0.638 NS	0.834*	0.258**	1.192
	22	0.353 NS	0.674 NS	0.353 NS	0.267**	1.239
	23	-0.060 NS	0.159 NS	-0.060 NS	0.242**	1.085
	24	0.619 NS	0.122 NS	0.619 NS	0.374**	0.889
	25	0.993*	0.047 NS	0.993*	0.142**	0.889
	Overall	0.548	0.328	0.548	0.257	1.059

*and ** indicate significance of values at P=0.05 and 0.01, respectively NS= Non-significant

increase was to the tune of 1.06 per cent per week in cows. As regards to impact of DMI, DCPI, TDNI and TWI on feeding untreated 70:30 sugras:SBM concentrate with 3 per cent added urea diet to cows (T_4), it was observed that intakes in cows were non-significantly influenced by the parameters except water intake as out of the five animals only 2 animals showed significant impact due to DMI and TDNI and none of the animals due to DCPI. The values were 0.30, 0.74, 0.30 and 0.28 per cent per week for DMI, DCPI, TDNI and TWI, respectively. This reflected in an increase of 1.14 per cent in milk yield/week in cows.

It is evident from Table 1 that milk production growth rate differed between the treatments. The highest growth rate in milk production to the tune of 2.91 per cent per week was recorded in T_3 treatment where HCHO treated 70:30 sugras:SBM concentrate with 2 per cent added urea diet feeding to cows against a growth rate of 1.06 per cent per week in milk yield on feeding HCHO treated 70:30 sugras:SBM concentrate with 3 per cent added urea diet to cows (T_5), indicating the consistency in milk production growth was more in T_3 as compared to T_5 treatment. This trend might have emerged out on account of more compound growth rate of DCPI in T_3 as compared to T_5 treatment, thereby availability of more proteins for milk synthesis in cows. Thus the results pointed out that one can obtained higher milk production with consistency over the time by feeding HCHO treated 70:30 sugras:SBM concentrate (27.47% CP) with 2 per cent added urea (T_3) ration to cows at the rate of 30 per cent of milk yield instead of thumb rule of 40 per cent of milk yield for cows producing 6 to 7 kg milk yield/day with 4.3 to 4.5 per cent fat. This feeding approach appears to be practical under the present situation in respect of shortage of concentrates for feeding animals.

Correlations studies :

The intake of different nutrients is known to influence the milk production in cows. Beside this the environment under which the cows are reared is also a another factor to affect the milk yields in cows. Considering these aspects the contribution of DMI, DCPI, TDNI, TWI as well as climatic factors prevailing during the trial period in accounting variation in milk yield, the correlation analysis was carried out according to treatments and results are presented in Table 2.

The dry matter intake established a positive significant medium degree association with daily milk yield in T_1, T_2 and T_3 treatments, the values being r = 0.664, 0.676 and 0.611, respectively. Therefore with the increase in DMI there was increase in daily milk yield of cows. Moreover, the contribution of DMI in variation of milk yield worked out to 44.08, 45.69 and 37.33 per cent under T_1, T_2, and T_3 treatments, respectively. In contrast DMI did not exhibit significant association with daily milk yield in T_4 (r = 0.247) and T_5 (r= 0.267) groups. However, the correlation co-efficient values in these treatments were positive, indicating there was a role of DMI in influencing the milk yield.

With regards, to the contribution of DCPI in the milk yield of cows it was noticed that DCPI had a greater influence on milk yield of cows in all the groups except T_5 group as the correlation values were positive and significant, being r = 0.770, 0.764 and 0.921 of high magnitude in T_1, T_2 and T_3 groups, respectively and 0.588 of medium order in T_4 group while it was positive but non-significant (r= 0.431) in T_5 group. This trend did indicate that there was increase in milk yield with the increase of DCP intake in cows. The DCPI did contribute in the variation of milk yield of cows to the extent of 59 per cent in T_1 and T_2 groups while it was 85 per cent in

Table 2 : Correlation co-efficient of various attributes with daily milk yield in cows

Variables	T_1	T_2	T_3	T_4	T_5
DMI	0.664*	0.676*	0.611*	0.297 NS	0.267 NS
DCPI	0.770**	0.764**	0.921**	0.585*	0.431 NS
TDNI	0.664*	0.510 NS	0.611*	0.247*	0.425 NS
TWI	0.613*	0.510 NS	0.801**	0.547 NS	0.692*
Temp max	0.186 NS	0.243 NS	0.324 NS	0.230 NS	0.250 NS
Temp min	0.137 NS	0.074 NS	0.081 NS	0.067 NS	0.094 NS
RH I	-0.481 NS	-0.546 NS	- 0.642*	-0.642 NS	- 0.778**
RH II	-0.139 NS	-0.363	- 0.305 NS	-0.189 NS	- 0.404 NS

* and ** indicate significance of values at P=0.05 and 0.01, respectively NS= Non-significant

T_3 group. This clearly showed that DCPI in cows was more important for harvesting optimum milk from cows. The trend on DCPI with daily milk yield appeared supportive to earlier results where it was emphasized that higher DCPI on feeding HCHO treated 70:30 sugras: SBM concentrate with 2 per cent added urea diet (T_3) was the cause to raise milk yield in cows as compared to other groups.

The TDNI exhibited positive significant moderate degree association with that of daily milk yield in T_1 and T_3 treatments, the values being r = 0.664 and 0.611, respectively, while TDNI could not established significant relationship with milk yield in T_2, T_4 and T_5 treatments. The corresponding values were r = 0.510, 0.297 and 0.425, respectively. This trend thus indicated that energy supply interms of TDNI intake in T_1 and T_3 cows was beneficial to increase the daily milk yield in cows. Moreover, the positive non significant relationship between TDNI and daily milk yield in other groups do indicate the role of TDN intake in influencing milk yield in cows.

The water intake had shown strong positive significant association with daily milk yield on feeding HCHO treated 70:30 sugras:SBM concentrate with 2 per cent urea supplement diet to cows in T_3 (r = 0.801). On the other hand, medium degree significant association between water intake and milk yield was noticed in T_1 control group (r =0.613) and in T_5 feeding of HCHO treated 70:30 sugras:SBM concentrate with 3 per cent urea (r = 0.692). This means with increase of water intake there was increase in milk yield of cows on feeding formaldehyde treated diet to cows. In contrast water intake did not influence significantly daily milk yield in feeding 70:30 sugras:SBM untreated diet with urea supplement to cows. The values of correlation co-efficients were r = 0.510 in T_2 and 0.547 in T_4 treatments.

With regards to relationship of climatic factors like maximum ambient temperature, minimum ambient temperature, relative humidity RHI and RHII with daily milk yield, it was noticed that ambient temperatures did not establish significant correlation with that of milk yield in all the groups. However, the correlation values observed for maximum and minimum ambient temperature were positive non significant, being r = 0.186 and 0.137, 0.243 and 0.074, 0.324 and 0.081, 0.230 and 0.067 and 0.250 and 0.094 in T_1, T_2, T_3, T_4 and T_5 treatments, respectively. In contrast correlation co-efficient values between RHI and daily milk yield were negative non-significant in T_1, T_2 and T_4 treatments, being r = -0.481, -0.546 and -0.424, respectively while the association was negative significant in T_3 (r = - 0.642) and in T_5 (r = - 0.778). On the other hand, the association between RHII and milk yield were negative non significant in all the treatment groups, indicating day humidity levels did not influence the milk production in cows. This means the environment prevailing during December to February a trial period was not the factor to influence milk yield of cows under all treatments. This trend appears obvious as climate in winter months is pleasant *i.e.* cold dry and not detrimental to affect the physiological reaction like body temperature, respiration rate and pulse rate in animals.

This contention gets support of the observation of Gulati *et al*. (2002); Garg *et al*. (2004); Sampath *et al.* (2004) and Compeneere *et al*. (2010) where they suggested that inclusion of higher level of bypass proteins in the ration of lactating animal improved the milk production performance under the Indian conditions of feeding and management. Therefore, the results and to be looked upon from the angle that provision of bypass proteins in ration of lactating cows was in general advantageous to carry out improvement in milk production of cows.

The results are in agreement with those reported by many past workers where Socha (1991) and Atwal *et al*. (1995) noticed significantly more yield in cows by feeding specifically extruded soybean, heat treated soybean and HCHO treated SBM over that of offering untreated diet while Chatterjee and Walli (2003); Garg *et al.* (2003a, b and c); Yadav and Chaudhary (2004); Sahoo and Walli (2005); Bugalia *et al.* (2008a); Doskey *et al*. (2011) and Vahora *et al*. (2012) reported significant increase in milk yield by feeding HCHO treated mustard cake to buffaloes, sunflower meal to buffaloes, gaur meal to cows, rape seed meal to cows, GNC to cows, mustard cake to goat, til cake to cows, barly grains to does, canola meal to eves and protein meal to buffaloes, respectively over that of feeding respective untreated meals and cakes to animals. The higher milk production in cows on feeding HCHO treated concentrates with 2 per cent added urea diet could be on account of intake of more nutrients particularly CP and energy over that of other groups. This contention get support of observations of Yeasmin *et al.* (2004) and Bugalia *et al.* (2008b),

indicating increase intake of CP on HCHO treated concentrate feeding, thereby availability of protein for digestion in intestine. Beside this, methionine and lysine amino acids were identified as limiting acids for lactating cows when soybean product were fed to them. The ratio should be 1:3 for optimum milk production which could be achieved by treating soya proteins with formaldehyde (Anonymous, 2001). Moreover, majority of the past workder Garg *et al*. (2003b); Bugalia *et al*. (2008b); Yadav and Chaudhary (2010) and Vahora *et al*. (2012) attributed higher milk yield in animals on feeding HCHO treated concentrates to higher protein availability for digestion in intestine, thereby increasing supply of milk precursor for milk production as well as supply of required amino acid to host animal at cellular level.

Thus, it appears from correlation studies that DMI, DCPI, TDNI and TWI together seems to be important rather than emphasizing the influence of individual parameter in isolation on daily milk yield of cows. Considering this view all these attributes had shown strong to moderate positive significant association with daily milk yield on feeding 1.5 per cent formaldehyde treated 70:30 sugras:SBM concentrates with 2 per cent urea supplement ration T_3 to cows. While these parameters except water intake did not established significant association with daily milk yield on feeding of 1.5 per cent HCHO treated 70:30 sugras : SBM concentrates with 3 per cent urea supplement diet T_5 to cows.

Conclusion :

It is concluded that intakes in cows were non-significantly influenced by the parameters except water intake as out of the five animals only 2 animals showed significant impact due to DMI and TDNI and none of the animals due to DCPI. The values were 0.30, 0.74, 0.30 and 0.28 per cent per week for DMI, DCPI, TDNI and TWI, respectively. This reflected in an increase of 1.14 per cent in milk yield/week in cows.

It was noticed that DCPI had a greater influence on milk yield of cows in all the groups except T_5 group as the correlation values were positive and significant, being r = 0.770, 0.764 and 0.921 of high magnitude in T_1, T_2 and T_3 groups, respectively and 0.588 of medium order in T_4 group while it was positive but non-significant (r= 0.431) in T_5 group. The correlation values observed for maximum and minimum ambient temperature were positive non-significant, being r = 0.186 and 0.137, 0.243 and 0.074, 0.324 and 0.081, 0.230 and 0.067 and 0.250 and 0.094 in T_1, T_2, T_3, T_4 and T_5 treatments, respectively. In contrast correlation co-efficient values between RHI and daily milk yield were negative non-significant in T_1, T_2 and T_4 treatments, being r = -0.481, -0.546 and -0.424, respectively while the association was negative significant in T_3 (r = - 0.642) and in T_5 (r = - 0.778). Thus, it appears from correlation studies that DMI, DCPI, TDNI and TWI together seems to be important rather than emphasizing the influence of individual parameter in isolation on daily milk yield of cows. Considering this view all these attributes had shown strong to moderate positive significant association with daily milk yield on feeding 1.5 per cent formaldehyde treated 70:30 sugras:SBM concentrates with 2 per cent urea supplement ration T_3 to cows.

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