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Productive performance of suitable concentrate feed by partial replacing of maize by Jawar and rough rice in cross breed cattle

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Abstract
The effect of feeding maize-based concentrates on milk yield in cows with cost-benefit analysis was done at smallholder farmers in Dumka districts. The 24 cross bred cattle subjected to this study were randomly divided into four groups (6 in each group) and supplied to concentrate mixtures containing Maize, wheat bran, Mustard oil cake (MOC) and Mineral mixture (MM) at different ratio after 15 days post partum. The composition of concentrate feed of Group I i.e Farmer Practice was Maize-25%, wheat bran-50% & MOC-25%; Group II- Maize-50%, Wheat bran-25%, MOC-22%, MM 2% & salt-1%; Group III-Maize-30%, Jawar-20%, Wheat bran-25%, MOC-22%, MM 2% & salt-1% and group IV- Maize-30%, Broken rice-20%, Wheat bran-25%, MOC-22%, MM 2% & salt-1%. Cows were given @1 kg maize-based concentrates/100 kg body weight twice daily for a further 90 days and total milk yield (kg), Fat (%) and SNF (%) were recorded at every 15 days intervals. There was Nonsignificant ($P<0.05$) change in milk yield before and after supplementation of ration in group I and group IV, while a significant increase after 45 days was observed in group II and group III comparing to the base value. However, the Fat (%) and SNF (%) were significantly ($P<0.05$) increased throughout the period in the entire group except I. Although, the energy value of all the three ingredient i.e Maize, Jawar and Rice are nearly same, though the concentrate mixture II was far superior (in both quality and quantity) than rest other three concentrate mixture.

Keywords: Concentrate feed, maize, rough rice, cross breed cattle

Introduction
Dairying is an integral part of rural livelihoods especially for the landless and smallholder dairy farmers, and acts as an important economic activity in Dumka as it provides supplementary income, employment and balanced nutrition for round the year. However, most of the cattle in villages are nondescript indigenous Zebu-type animals and the Productivity of such indigenous animals is low, which is an important constraint limiting the development of the dairy industry. The production level of these animals is far behind the stakeholders' expectations to make the industry competitive. The reason is poor genetic characteristics and of course poor nutrition might be a second cause.

The classical approach in increase dairy production is through genetic means by crossing with improved breeds. Unless feeding management is improved, these animals may be limited to fully express their potential genetic superiority. It is fundamental approach to provide good quality diets to dairy cattle in sufficient amounts to maximize production. But, in our country there is heavy shortage of feed both in quantity and quality. The traditional feeding system for cross breed dairy cattle is straw, natural grasses supplemented with a little or no concentrates

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with some amount of based on the use of rice wheat bran and mustard oil cakes (MOC).However, there is an acute shortage of feed supply during the dry season, and the available feed during this period is of very poor quality. Poor nutrition results in low production and reproductive performance, slow growth rate, loss of body condition and increased susceptibility to diseases and parasites. Thus, effective utilization of the available feed resources (agricultural and agro-industrial byproducts) with appropriate supplementation of quality grains for energyfulfill and mineral mixture appear to be the necessary steps to alleviate the nutritional problems of dairy animals. In view of this situation, this research has carried out to find out the alternate concentrate ration with partial replacement of energy giving carbohydrate source of maize by locally available Jawar and broken Rice.

Material and methods

The performance of different Maize based concentrate feed with wheat bran & mustard cake were evaluated, and compared with partial replacement of maize by Jawar & broken rice in crossbreed cattle in rural/ tribal areas of Dumka.

Twentysixcross breed cattle subjected to this present studywere randomly divided in to four groups Viz. Gr I, Gr. II, Gr. III and Gr IV, each of having 6 cattle and having a range of 6 to 8 liter milk production /cow/day. All these cattle are between 4- 6 years old age and started feeding just after 15 days of parturition. The paddy straw was common to all animals, but the change was only in the different computed concentrate ration. The animals were feed the respective ration @ 1kg/100 kg body weight twice daily up to 90 days. The quantity (milk yield in kg) and quality (fat% & SNF %) at '0' day were considered as base value.All the cattle included in this study were reared at 12 marginal farmers, having 2 cattle to each farmer. The cattle were kept in possible isomanagemental condition in the farm house of respective farmers and kept on following concentrate mixture Group I (FP) - Paddy straw + Conc. Mix. 1(Maize-25%, wheat bran-50% & MOC-25%)

Group II - Paddy straw + Conc. mix. 2(Maize-50%, Wheat bran-25%, MOC-22%, MM 2% & salt-1%)
Group III - Paddy straw+Concentrate mix. 3(Maize-30%, Jawar 20% Wheat bran-25%, MOC-22%, MM 2% & salt-1%)
Group IV - Paddy straw+ Concentrate mix. 4(Maize-30%, Broken Rice 20% Wheat bran-25%, MOC-22%, MM 2% & salt-1%)

Observation to be recorded: The parameter to be recorded during the trial were the change in milk production (in kg), fat (%) and SNF (%) on '0' day,15 day, 30 day, 45 day, 60 day, 75 day and 90 day. All the subjected animals were started feeding after 15 days of parturition i.e 0 day and considered as base value.

Result and Discussion

The animals of Group-Iand IVobserved that there was Non-significant ($P<0.05$) increase in milk production throughout the period of observation. Although, a considerable amount of milk production was increased in group IV than Group- I, yet it was non-significant ($P<0.05$) than their base value. Contrary to this, there was significant ($P<0.05$) increase in milk production was observed in group II & III after 30 days and onwards. In group II, the milk production at 45 days and onward was significant increased ($P<0.05$) than production at '0', 15 day and 30 day (Table-1). Contrary to present finding, Scheibler, R.B. et al. (2015) [3] reported that Milk yield, milk composition, feed efficiency and energy balance were not influenced ($P>0.05$) by the replacement of corn by brown rice. Similar results were also reported by Nörnberg (2003) [2]. and López et al. (2007) [1]. using the same control diets, based on corn and soybean meal, with Jersey cows. These similar production levels may be indicative that the homeostasis of animals was preserved and some little differences between corn and rice were not sufficient to induce any effects.The increase in milk production in group II might be due to higher nutritive value of maize. The maize contains about 4%oil, 8-12 % CP and 85-90% TDN whereas, unprocessed rough rice contains about 8-10 % CP, 9% CF and 78-82% TDN.

Table 1 Mean ± S.E of milk production (Kg) at different interval of time

Group/days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
Group-I (FP)	7.26±0.33	7.15±0.37	7.43±0.34	7.50±0.31	7.58±0.33	7.68±0.31	7.63±0.34
Group-II	7.05±0.29 [a]	7.41±0.38 [ab]	7.90±0.27 [bc]	8.26±0.19 [c]	8.45±0.20 [c]	8.58±0.23 [c]	8.33±0.27 [c]
Group-III	7.58±0.35 [a]	7.85±0.35 [a]	8.31±0.36 [b]	8.67±0.37 [b]	8.66±0.40 [b]	8.75±0.37 [b]	8.73±0.42 [b]
Group- IV	7.86±0.31	8.25±0.36	8.76±0.42	9.0±0.41	9.01±0.38	8.9±0.37	8.88±0.39

Means bearing the same superscript in a row did not vary significantly

A non-significant ($P<0.05$) change in Fat (%) and SNF (%) were observed in group I throughout the period of observation but, a significant ($P<0.05$) increase in Fat (%) and SNF (%) was observed in group II, III and IV throughout the period of observation from their base value (Table 2 and 3). The increase in Fat (%) and SNF (%) may be due to rational content, physical status of the cow and also their digestibility Sutton (1985) [5]. reported that the lower ruminal degradability of corn compared with that of barley would result in the production of milk with a higher fat percentage. However, Singh et al. (2016) [6]. also reported feeding of

mineral mixture @ 50 gm/day/animal produces no significant difference in milk yield during first 3 months of trial but a significant difference ($p<0.05$) was observed during 3 to 6 months of trial period. Tiwari et al. (2013) [7]. also reported an increase in milk production and total lactation length were increase in cattle after specific mineral mixture supplementation. The present study demonstrated that feeding a balanced ration helped in improving daily income of smallholder milk producers by improving milk production as well as alsoin Fat and SNF content of milk.

Table 2 Mean ± S.E of Fat% at different interval of time

Group/days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
Group-I (FP)	3.85±0.12	3.80±0.13	3.86±0.14	3.91±0.17	3.83±0.11	3.85±0.15	3.88±0.18
Group-II	4.33±0.06[a]	4.4±0.05[ab]	4.66±0.08[c]	4.61±0.10[bc]	4.61±0.07[bc]	4.6±0.08[bc]	4.61±0.06[bc]
Group-III	3.51±0.09 [a]	3.8±0.08 [ab]	3.9±0.12 [b]	4.0±0.1 [b]	4.01±0.09 [b]	3.95±0.16[b]	3.91±0.17[b]
Group- IV	3.53±0.16 [a]	3.71±0.17[ab]	3.8±0.18[ab]	3.95±0.16[ab]	4.03±0.14[ab]	4.06±0.12 [b]	4.05±0.14 [b]

Means bearing the same superscript in a row did not vary significantly

Table: 3 Mean ± S.E of SNF % at different interval of time

Gr/ days	0 day	15 day	30 day	45 day	60 day	75 day	90 day
Gr-I (FP)	8.25±0.16	8.31±0.15	8.51±0.23	8.28±0.15	8.3±0.15	8.26±0.12	8.21±0.10
Gr-II	8.15±0.13[a]	8.35±0.17[ab]	8.66±0.22[abc]	8.83±0.20[bc]	8.88±0.22[bc]	8.95±0.19[bc]	9.03±0.17[c]
Gr-III	8.0±0.16[a]	8.21±0.18[ab]	8.4±0.22[ab]	8.56±0.17[ab]	8.55±0.16[ab]	8.68±0.19[b]	8.75±0.17[b]
Gr- IV	8.13±0.13[a]	8.2±0.11[ab]	8.45±0.14[abc]	8.61±0.18[bc]	8.58±0.15[abc]	8.81±0.16[c]	8.85±0.13[c]

Means bearing the same superscript in a row did not vary significantly

Conclusion

Although, the energy value of all the three ingredient i.e Maize, Jawar and Rice are nearly same, though the concentrate mixture II was far superior (in both quality and quantity) than rest other three concentrate mixture.

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