

## Effect of Feeding Hydroponics Fodder Is an Alternative Solution for Concentrate Feed in Bovine Nutrition

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### Abstract

An experiment was conducted to find out the effect of feeding hydroponics maize fodder by replacing maize of concentrate mixture partially on digestibility of nutrients and milk production in lactating cows. Lactating cows (6) (Avg.BW 437 Kg, avg.milk yield 8.57kg) were divided into 2 equal groups i.e Maize Grain Group (MGG) and Hydroponics Maize Fodder Group (HMFG) based on their body weight and milk yield. Two types of concentrate mixture (CM maize100 or CM maize50) were prepared. CM maize 100 contained maize grain 35, rice polish 35, soyabean meal 27, mineral mixture 2 and common salt 1 parts by weight. In CM maize 50, 50% of the maize of CM maize 100 was replaced partially and it contained maize grain 17.5, rice polish 54, soybean meal 25.5, mineral mixture 2 and common salt 1 parts by weight. Randomly animals of MGG and HMFG were offered 6Kg CM maize100 and CM maize 50, respectively along with 10Kg fresh conventional green fodder (Napier bajra hybrid, CO-3) and ad.lib. jowar straw. Besides animals of the HMFG were offered five kg fresh HMF, sprouted from approximately one kg maize. Which has been with drawn from 6kg concentrate mixture. The experiment was conducted for a period of 45 days. The fresh yield of the HMF from one kg maize seed was 5-6 with 12.39% DM content. Feeding of HMF by replacing the maize grain of the concentrate mixture had not altered the DM intake (11.20 vs 11.52 kg/day) and the roughage :concentrate ratio (51:49 vs 52:48) of the animals. There was non significant increase in the digestibility of nutrients, nutritive value, milk yield (7.97 vs 8.59kg/day), 4.0% FCM (8.25 vs 9.31 kg/day), and fat (4.20 vs 4.50) in HMFG than the MGG. The feed conversion ratio (FCR) in terms of DM (1.51 vs 1.40), CP (0.19 vs 0.18) and TDN (1.03 vs 0.96) was better in the HMFG than the MGG. It can be concluded that hydroponics maize fodder can be fed to the lactating cows by replacing maize of the concentrate mixture partially with improvement in the performance of the animals. Hydroponic maize fodder of 7days growth was fed to 6 dairy cows divided into two equal groups (BW 442 Kg avg. milk yield 6.0kg). Animals were offered 5kg concentrate mixture and ad.lib jowar straw along with either 15kg fresh hydroponics maize fodder (T-HF) or conventional napier bajra hybrid (NBH) green fodder (T-CF) for 68 days. The hydroponic maize fodder (HMF) had higher CP (13.30 vs 11.14%), EE (3.27 vs 2.20%), NFE (75.32 vs 53.54%) and lower CF (6.37 vs 22.25%), TA (1.75 vs 9.84%) and AIA (0.57 vs 1.03%) than NBH, HMF intake was low (0.59kg DM/d) NBH (1.19kg DM/d) by the cows. The DMI (2.05 and 2.17%) was similar in the both the groups. Digestibility of CP (72.46 vs 68.86%) and CF (59.21 vs 53.25%) was higher ( $P<0.05$ ) for cows fed HMF. The DCP content (9.65 vs 8.61%) of the ration increased significantly ( $P<0.05$ ) due to feeding of HMF; the increase ( $P>0.05$ ) in the CP (13.29 vs 12.48%) and TDN (68.52 vs 64%) content was non-significant. There was 13.7% increase in the milk yield of T-HF than the T-CF group. There was higher net profit of Rs.12.67 per cow /day on feeding HMF. It can be concluded that feeding of HMF to lactating cows

increased the digestibility of nutrients and milk production leading to increase in net profit. 24 cross bred male calves assigned randomly to one of the two treatment (diets), that were either control (Grain barley) or hydroponic barley green fodder(BGF) that was included to provide 22.8 percent of the total diet on dry matter basis. Seed grade barley was grown in a hydroponics chamber system where the growth period was adjusted for 6days.Body weight gain was not significantly different between the treatments. But the animals that had received the control diet had higher ( $P<0.05$ ) dry matter intake than those fed BGF diet. There was a tendency ( $P=0.199$ ) toward differences in feed efficiency due to dietary treatments. from economical point of view, feed cost increased up to 24 percent when the calves were offered BGF, because of the costly production of hydroponics green forage. Although the mass production of fresh fodder was about 4.5 times per kg of barley grain, this was due to water absorption during germination and growth period. Nevertheless, the dry matter obtained was less than the initial barley grain and further dry matter losses were found in the green fodder. These findings suggest that green fodder had no advantage over barley grain in feedlot calves, while it increased the cost of feed.

## Review

NAIK *et al.* (2016) Reported that hydroponics maize fodder can be fed to the lactating cows by replacing maize of the concentrate mixture partially with improvement in the performance of the animals.

NAIK *et al.* (2014) Reported that feeding of HMF to lactating cows increased the digestibility of nutrients and milk production leading to increase in net profit.

H Fazaeli *et al.* (2011) reported that Substitution of Barley grain with BGF, up to 22.8 percent of the total DMI, showed a similar result in feeding of the finishing calves and there was no difference in the performance of the animals fed with either diet. The feed cost increased when the animals were fed the green fodder diet. Therefore, economically speaking this system of BGF production is not recommended in feedlot calves.

## Results And Discussion

Feeding of HMF by replacing the maize grain of the concentrate mixture had not altered the DM intake (11.20 vs 11.52 kg/day) and the roughage: concentrate ratio (51:49 vs 52:48) of the animals. There was non-significant increase in the digestibility of nutrients, nutritive value, milk yield (7.97 vs 8.59kg/day), 4.0% FCM (8.25 vs 9.31 kg/day), and fat (4.20 vs 4.50) in HMFG than the MGG. The feed conversion ratio (FCR) in terms of DM (1.51 vs 1.40), CP (0.19 vs 0.18) and TDN (1.03 vs 0.96) was better in the HMFG than the MGG. The hydroponic maize fodder (HMF) had higher CP (13.30 vs 11.14%), EE (3.27 vs 2.20%), NFE (75.32 vs 53.54%) and lower CF (6.37 vs 22.25%), TA (1.75 vs 9.84%) and AIA (0.57 vs 1.03%) than NBH, HMF intake was low (0.59kg DM/d) NBH (1.19kg DM/d) by the cows. The DMI (2.05 and 2.17%) was similar in the both the groups. Digestibility of CP (72.46 vs 68.86%) and CF (59.21 vs 53.25%) was higher ( $P<0.05$ ) for cows fed HMF. The DCP content (9.65 vs 8.61%) of the ration increased significantly ( $P<0.05$ ) due to feeding of HMF; the increase ( $P>0.05$ ) in the CP (13.29 vs 12.48%) and TDN (68.52 vs 64%)



content was non-significant. There was 13.7% increase in the milk yield of T-HF than the T-CF group. 24 cross bred male calves assigned randomly to one of the two treatments (diets), that were either control (Grain barley) or hydroponic barley green fodder (BGF) that was included to provide 22.8 percent of the total diet on dry matter basis. Seed grade barley was grown in a hydroponics chamber system where the growth period was adjusted for 6days. Body weight gain was not significantly different between the treatments. But the animals that had received the control diet had higher ( $P<0.05$ ) dry matter intake than those fed BGF diet. There was a tendency ( $P=0.199$ ) toward differences in feed efficiency due to dietary treatments. From economical point of view, feed cost increased up to 24 percent when the calves were offered BGF, because of the costly production of hydroponics green forage. Although the mass production of fresh fodder was about 4.5 times per kg of barley grain, this was due to water absorption during germination and growth period. Nevertheless, the dry matter obtained was less than the initial barley grain and further dry matter losses were found in the green fodder.

## Conclusion

It can be concluded that hydroponics maize fodder can be fed to the lactating cows by replacing maize of the concentrate mixture partially with improvement in the performance of the animals. It can be concluded that feeding of HMF to lactating cows increased the digestibility of nutrients and milk production leading to increase in net profit.

Substitution of Barley grain with BGF, up to 22.8 percent of the total DMI, showed a similar result in feeding of the finishing calves and there was no difference in the performance of the animals fed with either diet. The feed cost increased when the animals were fed the green fodder diet. Therefore, economically speaking this system of BGF production is not recommended in feedlot calves.

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