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Assessing nutritive value and economics of baby corn fodder (*Zea mays*) production compared to QPM and hybrid maize during winter season

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Introduction

Maize (*Zea mays* L) is one of the most versatile emerging crops having wider adaptability under varied agro-climatic conditions both as grain and fodder. In India, maize is the third most important food crops after rice and wheat. According to an estimate it is cultivated in 8.7 m ha (2010-11) mainly during *Kharif* season which covers 80% area. In recent past, some new varieties of maize like quality protein maize (QPM) and baby corn have been introduced in the region considering its better economic returns (baby corn as food-feed crop) and nutritional quality over normal maize. In the last one and a half decade baby corn has emerged worldwide as one of the high value crops due to its high nutritive value and demand for use as vegetable since farmers cannot spare land for fodder production alone due to low land holding (0.34 ha) per capita. Baby corn, a food-feed crop can be a suitable alternative for the farmers to use as cash crop and fodder as indicated by economics of production (Natraj *et al.*, 2011) and feeding value of baby corn fodder (Srichana *et al.*, 2014). Therefore, the present study was undertaken to assess the nutritive value of baby corn fodder and economics of its production compared to QPM and hybrid maize fodder to enable the farmers to have a better economic choice.

Materials and Methods

Three maize varieties (normal hybrid maize, QPM *var.* PEMM-5 and baby corn *var.* VL-1) were sown in November 2014 in the experimental fields of ICAR Research Complex for Eastern Region, Patna farm during *Rabi* season having tropical agro-climate, clay-loam type soil and pH neutral to alkaline. Land was prepared by adding FYM @5t/ha and DAP @60 kg/ha. Total nine plots of 100m² area each were prepared. Three maize varieties were sown in triplicate replications in prepared plot and maintained plant geometry of 30 x 30 cm from plant-to-plant and row-to-row and followed standard agronomical practices. Fodder was harvested at the age of 100 days of crop and yields were recorded. The baby corn green cobs were harvested at 90 days and yield was also recorded.

To evaluate the nutritive value of different varieties of maize fodder, 9 cattle heifers of 13-15 months age and 223 ±13.08 kg of body weight were selected and divided into 3 groups. Heifers of group 1 were fed hybrid maize fodder and groups 2 and 3 were fed QPM and baby corn fodder, respectively as sole feed. After a preliminary feeding of 14 days, a digestion trial of 4 days duration was conducted. Fodder, residue and faeces samples were processed for further estimation of dry matter (DM) and proximate principles as per standard procedure (AOAC, 2005). All data were subjected to statistical analysis following the methods of Snedecor and Cochran (1994).

Results and Discussion

Normal maize hybrid variety attained significantly ($P<0.01$) maximum plant height (170 cm) than QPM (158 cm) and baby corn (152 cm) at 100 days which exhibited higher fodder yields (58.67 t/ ha) than QPM (24.67 t/ha) and baby corn (19.17 t/ha) fodder. Maximum DM content (19.46%) was obtained at 100 days of harvesting in baby corn fodder and minimum (12.94%) in hybrid variety. CP content of QPM fodder was observed higher (10.56%) than baby corn (9.65%) and hybrid maize (8.65%) fodder on DM basis.

DMI (kg/100kg B. Wt.) was found significantly ($P<0.05$) higher in heifers fed QPM fodder than other two fodders but no significant difference was observed in heifers fed hybrid and baby corn fodder (Table 1). In all the three groups, DMI (kg/100kg B. Wt.) varied from 2.13 to 2.59 which was lower than the values (3.49 to 3.83 kg/100kg B. Wt.) reported by Naik *et al.*, (2012) in dairy cows fed fodder along with concentrate feed. Digestibility of DM did not differ significantly among the groups, however, CP and CF digestibility were significantly ($P<0.05$) higher in heifers fed QPM fodder than baby corn and hybrid maize fodder. Similarly, DCP value of QPM fodder was significantly ($P<0.05$) higher than baby corn and hybrid maize fodder, but DE value did not differ significantly. The initial and final body weights data clearly revealed that all maize variety of forage can works as maintenance ration only when fed as sole feed.

The stage of green cob of baby corn was perfect for human consumption when harvested at 100 days of sowing during winter season and yielded 5.90 ± 0.21 t/ha which gave an additional income. The input cost of baby corn production was slightly higher (11%) than QPM and hybrid maize fodder. However, cost benefit ratio of baby corn production (1: 2.63) was much higher than the QPM (1: 0.92) and hybrid maize fodder (1: 2.19) because of income from green cob and fodder.

Table 1: Nutritive value of different maize fodder in heifer calves

| Nutritive value: | Treatment Means \pm SE | | |
|--------------------------|-------------------------------|-------------------------------|-------------------------------|
| | Maize hybrid | QPM (var. PEMM-5) | Baby corn (var. VL-1) |
| Initial body weight (kg) | 214 \pm 7.31 | 235 \pm 14.57 | 220 \pm 40.88 |
| Final body weight (kg) | 214 \pm 7.42 | 236 \pm 14.57 | 220 \pm 40.88 |
| DMI (kg/100kg B.Wt.)* | 2.13 ^a \pm 0.05 | 2.59 ^b \pm 0.06 | 2.23 ^a \pm 0.14 |
| DMD (%) | 66.60 \pm 2.13 | 69.19 \pm 1.31 | 62.07 \pm 2.80 |
| CFD (%)* | 65.53 ^a \pm 2.95 | 75.35 ^b \pm 0.61 | 63.98 ^a \pm 1.73 |
| CPD (%)* | 46.07 ^a \pm 1.27 | 52.38 ^b \pm 1.99 | 44.18 ^a \pm 2.08 |
| DCP (%)** | 3.99 ^a \pm 0.16 | 5.53 ^b \pm 0.21 | 4.26 ^a \pm 0.20 |
| DE (Kcal/kg DM) | 2414 \pm 99 | 2712 \pm 52 | 2375 \pm 97 |

Value having different superscripts in a row differ significantly (P<0.05)* / (P<0.01)**

Conclusion

Baby corn fodder, after harvesting of green cobs, has similar chemical composition and nutritive value as hybrid maize fodder with higher economic return as dual purpose crop. So, the small and marginal farmers in eastern region who cannot spare land for fodder production for shake of food/ cash crop have option to opt for baby corn as both cash and fodder crop.

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