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# YIELD AND QUALITY OF BAJRA NAPIER HYBRID AS INFLUENCED BY GROWING CONDITIONS AND MAGNESIUM SULPHATE LEVELS

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## SUMMARY

An experiment was conducted in Vellayani, Thiruvananthapuram during the period from May 2016 to April 2017 to assess the influence of six magnesium sulphate levels (0 ($M_1$), 40 ($M_2$), 60 ($M_3$), 80 ($M_4$), 100 ($M_5$) and 120 ($M_6$) kg $MgSO_4$ $ha^{-1}$) and two growing conditions (open ($S_1$) and coconut garden ($S_2$) ) on the yield and quality of Bajra Napier hybrid. The growth and yield of Bajra Napier hybrid was significantly higher in open condition compared to coconut garden. However, quality parameters *viz.* crude protein and crude fibre content were improved when Bajra Napier hybrid was grown under coconut garden. Higher yield of Bajra Napier hybrid was obtained in the open condition with a Mg dose of 80 kg $MgSO_4$ $ha^{-1}$ in addition to the POP recommendations of KAU (25 t $ha^{-1}$ FYM and 200:50:50 kg $ha^{-1}$ NPK). In coconut garden, the productivity can be enhanced by applying 100 kg $MgSO_4$ $ha^{-1}$ along with the POP recommendations of KAU. Magnesium fertilization improved the quality parameters in herbage. Highest crude protein content (9.33 %) was recorded in $M_5$ and it was on par with $M_4$ and $M_6$. Crude fibre content (35.46 %) was the lowest in $M_6$ and it was on par with $M_4$ and $M_5$.

**Key words:** BN hybrid, Magnesium sulphate, coconut garden, fodder yield, crude fibre, crude protein

Livestock sector is an important secondary source of income for millions of Indian rural households engaged in agriculture. In India, Kerala has the highest percentage of cross bred animals with higher genetic potential for milk production. But the average yield of cow $day^{-1}$ is only 7.508 kg milk and the total milk productions do not meet the requirement of the state. The major constraint for the low productivity of animals is inadequate availability and poor quality of fodder. As the per capita land availability is very less in Kerala, expansion of area for fodder cultivation is not possible. Coconut gardens offer good opportunity for fodder production in Kerala. Coconut occupies a major area in the state and the suitability of fodder crops as intercrops under coconut gardens is well established (Lakshmi,1998). Cultivation of high yielding varieties of fodder crops is also another solution to tackle the problem of fodder shortage. Perennial fodder grasses like Bajra Napier hybrid and guinea grass are widely accepted by the dairy farmers all over Kerala as these grasses are well adapted to tropical conditions with potential for higher yields per unit area and shade tolerance (Posler *et al.,* 1993). Suguna is a popular Bajra Napier hybrid variety with an yield potential of 280 - 300 t/ha. It has better quality with crude protein content of 9.4% and crude fibre content of 24.0%. The grass is nutritious, palatable and free from oxalates (Abraham and Thomas, 2015).

Eighty per cent of Kerala soils are deficient in Mg. The availability of Mg is very low in Kerala soils due to leaching under heavy rainfall. Application of $MgSO_4$ @ 80 kg/ha, can be done to solve the problem of Mg deficiency (KAU, 2011). Magnesium is an important component of the chlorophyll molecule and is associated with rapid growth, cell division, carbohydrate metabolism, synthesis of amino acids and cell proteins, uptake and migration of P in plants, providing resistance to unfavourable factors like drought etc.

Magnesium is essential for proper enzyme and nervous system function and for efficient carbohydrate metabolism in cattle. Young cattle can mobilize large amounts of magnesium from bone, but mature cattle are unable to do this. Grass tetany, a condition common among lactating beef cows grazing lush forages, is characterized by low magnesium levels (Bergmann, 1981).

Mg deficiency is increasingly becoming an important limiting factor in intensive crop production systems, especially in soils fertilized only with N, P, and K. In particular, Mg depletion in soils is a growing concern for high-productivity agriculture. Due to its potential for leaching in highly weathered, low activity soils and the interaction with Al, Mg deficiency is a critical concern in acid soils. At present the fertilizer recommendation of KAU for Bajra Napier hybrid include only NPK fertilizers @ 200:50:50 kg/ha. Hence it was felt appropriate to study the role of Mg in the nutrition schedule of Bajra Napier hybrid so as to seek the possibility of including the nutrient in the fertilizer schedule of Bajra Napier hybrid with the aim to increase its productivity and popularization.

In the light of the above facts, the present study was undertaken with the objective to assess the influence of Mg on yield of Bajra Napier hybrid under open and shaded situations.

## MATERIALS AND METHODS

The experiment was conducted at the College of Agriculture, Vellayani of Thiruvananthapuram district in Kerala during the period from May 2016 to April 2017. The mean maximum temperature ranged between 31.6° –34.3°C and mean minimum temperature ranged between 22.1°C- 26.0°C during the crop growing period. The relative humidity range between 80.3 per cent to 87.9 per cent. A total rainfall of 1256.8 mm was recorded during the crop period. The soil of the experimental site was sandy clay loam which belongs to the order oxisols, Vellayani series. The soil in the experimental site had pH 4.9, EC 0.049 dS/m, 0.98 % organic carbon, 362.4 kg/ha available nitrogen, 101.91 kg/ha available phosphorus, 412.35 kg/ha available potassium, 188.05 mg/kg available calcium and 12.46 mg/kg available magnesium. The Bajra Napier hybrid variety Suguna , released from Kerala Agricultural University was used for the study. Suguna is a Bajra Napier hybrid developed by crossing Composite 9 and FD 431. It has high tillering capacity (40 tillers/plant) with long broad leaves and pale green leaf sheath with purplish segmentation and serrated leaf margin, suitable for uplands in all seasons. The average inter nodal length is 6.5cm and leaf stem ratio is 0.82. It has better quality with crude protein content of 9.4% and crude fibre content of 24.0%. The average yield of the variety is 280-300 t/ha (KAU, 2011).

The experiment was laid out in 2 x 6 factorial RBD with three replications. The treatments included two factors *viz.* growing conditions and magnesium levels. The growing conditions were open ($S_1$) and coconut garden ($S_2$) and levels of magnesium sulphate were - 0 ($M_1$), 40 ($M_2$), 60 ($M_3$), 80 ($M_4$), 100 ($M_5$) and 120 ($M_6$) kg $MgSO_4$/ha. The gross plot size selected was 4 x 4 m and net plot size was 3 x 3 m. The stem cuttings with three nodes were used as planting material. The three budded cuttings were planted at a spacing of 60 x 60 cm in such a way that two nodes remain within the soil and one above the soil surface. FYM @ 25 t/ha was applied uniformly to all the plots at the time of final preparation of land. Chemical fertilizers like urea, rajphos and muriate of potash were applied to supply NPK @ 200: 50: 50 kg/ha. Entire dose of phosphorus and potassium were applied as basal. Nitrogen was applied in equal split doses after all the harvests. Magnesium sulphate was applied to all plots as per the treatments after one month of planting. The first harvest was taken 75 days after planting and subsequent harvests at an interval of 45 days. Total five harvests were taken in the study. The crop was harvested at regular cutting interval, fresh weight of the plants in the net plot was recorded and it was expressed in t/ha. Total green fodder yield for one year was also calculated and expressed in t/ha. The crop samples collected from each net plot for all the harvests were sun dried and then oven dried to a constant weight at 60°C for 48 h. The dry matter content was computed and dry fodder yield was worked out for each harvest in t $ha^{-1}$. Total dry fodder yield for one year was calculated and expressed in t $ha^{-1}$. Following Dry Matter estimation, the dried samples were processed and analyzed for total nitrogen (N) by the Kjeldahl method and crude protein content was estimated as % N × 6.25 (Simpson *et al.,* 1965).The crude fibre content was detrmined by AOAC method (AOAC, 1975). The magnesium content in plant samples were estimated using Atomic absorption spectrophotometry (Jackson, 1973). The uptake of magnesium was calculated as the product of the content of the nutrient in plants and the dry weight of plants and expressed as kg/ha. Data generated from the experiment were subjected to statistical analysis by applying ANOVA for factorial RBD and significance was tested by 'F' test (Snedecor and Cochran, 1967). CD was calculated in cases where treatment were found to be significant, using standard procedures. The data on green fodder yield, dry fodder yield, magnesium uptake and quality parameters viz., crude protein and crude fibre content was analysed statistically and the results are discussed here.

## RESULTS AND DISCUSSION

### Fodder yield

The results revealed that magnesium application and growing conditions had significant effect on the green fodder yield of Bajra Napier hybrid. The results of the study showed that green fodder yield was significantly higher in open condition than under coconut garden in all the five harvests. The data on the effects of growing conditions and magnesium application on the green fodder yield of Bajra Napier hybrid during five cuts are presented in Table 1 and 2. Total green fodder yield was superiorly higher in open condition (243.41 t/ha) than under coconut garden (135.92 t/ha). Kephart and Buxton (1996) reported that increasing shade levels significantly decreased the growth rates and herbage yield of forages. The green fodder production was 43.73 per cent , 52.69 per cent, 39.02 per cent, 41.99 per cent and 48.06 per cent higher in open condition compared to shade in first, second, third, fourth and fifth cut respectively. The increase in total green fodder yield was 44.16 per cent in open area compared to coconut garden. The increased number of tillers and higher leaf stem ratio in open condition might have resulted in the higher green fodder yield in open condition. Usually, yield of forage crops is linearly related to the amount of light available. Similar yield improvement in open condition were reported by Mullakoya (1982) in guinea grass cv. Mackuenii and Pillai (1986) in guinea grass and setaria grass.

TABLE 1
Effect of growing conditions and magnesium levels on green fodder yield of hybrid napier (t/ha)

| Treatments | I cut | II cut | III cut | IV cut | V cut | Total |
|---|---|---|---|---|---|---|
| **Growing conditions (S)** | | | | | | |
| S1 | 45.81 | 37.39 | 71.02 | 46.51 | 42.69 | 243.41 |
| S2 | 25.78 | 17.69 | 43.31 | 26.98 | 22.17 | 135.92 |
| SEm (±) | 0.09 | 0.10 | 0.12 | 0.09 | 0.13 | 0.26 |
| CD | 0.270 | 0.295 | 0.338 | 0.267 | 0.37 | 0.763 |
| **Magnesium sulphate levels (M)** | | | | | | |
| M1 | 32.54 | 23.15 | 54.01 | 34.31 | 28.99 | 172.99 |
| M2 | 33.55 | 24.96 | 55.25 | 36.80 | 32.61 | 183.17 |
| M3 | 35.35 | 28.65 | 56.21 | 38.10 | 32.90 | 191.20 |
| M4 | 37.42 | 30.41 | 60.26 | 38.36 | 32.82 | 199.26 |
| M5 | 37.40 | 29.52 | 58.95 | 37.79 | 34.93 | 198.59 |
| M6 | 38.49 | 28.54 | 58.31 | 35.14 | 32.33 | 192.80 |
| SEm (±) | 0.16 | 0.17 | 0.19 | 0.16 | 0.22 | 0.45 |
| CD | 0.468 | 0.511 | 0.586 | 0.462 | 0.640 | 1.321 |

$S_1$–Open, $S_2$–Coconut garden, $M_1$–0 kg/ha, $M_2$–40 kg/ha, $M_3$–60 kg/ha, $M_4$–80 kg/ha, $M_5$–100 kg/ha and $M_6$–120 kg/ha.

TABLE 2
Interaction effect of growing conditions and magnesium levels on green fodder yield of hybrid napier (t/ha)

| Treatments | I cut | II cut | III cut | IV cut | V cut | Total |
|---|---|---|---|---|---|---|
| **S x M** | | | | | | |
| S1M1 | 42.58 | 33.55 | 67.84 | 43.99 | 39.85 | 227.81 |
| S1M2 | 43.35 | 35.95 | 69.31 | 46.88 | 41.33 | 236.82 |
| S1M3 | 44.50 | 36.83 | 70.26 | 47.52 | 42.89 | 242.01 |
| S1M4 | 49.64 | 40.99 | 74.60 | 48.62 | 44.11 | 257.95 |
| S1M5 | 46.79 | 38.23 | 71.15 | 45.66 | 43.07 | 244.89 |
| S1M6 | 47.99 | 38.78 | 72.95 | 46.41 | 44.86 | 250.99 |
| S2M1 | 22.49 | 12.76 | 40.17 | 24.62 | 18.13 | 118.17 |
| S2M2 | 23.76 | 13.96 | 41.19 | 26.72 | 23.88 | 129.51 |
| S2M3 | 26.19 | 20.47 | 42.15 | 28.67 | 22.91 | 140.39 |
| S2M4 | 25.20 | 19.82 | 45.91 | 28.09 | 21.54 | 140.56 |
| S2M5 | 28.01 | 20.81 | 46.75 | 29.91 | 26.79 | 152.27 |
| S2M6 | 28.99 | 18.29 | 43.66 | 23.86 | 19.79 | 134.60 |
| SEm (±) | 0.22 | 0.25 | 0.28 | 0.22 | 0.31 | 0.63 |
| CD | 0.661 | 0.723 | 0.829 | 0.653 | 0.905 | 1.869 |

$S_1$–Open, $S_2$–Coconut garden, $M_1$–0 kg/ha, $M_2$–40 kg/ha, $M_3$–60 kg/ha, $M_4$–80 kg/ha, $M_5$–100 kg/ha and $M_6$–120 kg/ha.

Application of magnesium also showed significant influence on the green fodder yield of Bajra Napier hybrid in all cuts. Higher levels of magnesium sulphate *i.e.* application of 120 kg/ha and 100 kg/ha resulted in higher green fodder yield in first cut (38.49 t/ha) and fifth cut (34.93 t/ha), respectively. However in second, third and fourth cut, the medium dose of magnesium sulphate (80 kg/ha) recorded the higher green fodder yield of 30.41 t/ha,60.26 t/ha and 38.35 t/ha respectively and was on par with the application of 60 kg $MgSO_4$/ha in the fourth cut. Considering the total green fodder yield, application of 80 kg $MgSO_4$ / ha ($M_4$) recorded the highest total green fodder yield (199.26 t/ha) and was on par with the application of 100 kg $MgSO_4$/ha ($M_5$).

In the total green fodder yield, an yield increase of 13.18 per cent and 12.89 per cent was obtained with the application of 80 kg MgSO4 ha-1 and 100 kg $MgSO_4$/ha respectively over control treatment. In this study application of 80 kg $MgSO_4$/ ha and 100 kg $MgSO_4$/ha was found to produce significantly higher number of tillers. This yield increase might be due to increased magnesium level in the plant to a level sufficient for optimum growth and the effect of the fertilizer on the soil microorganisms. This increase in yield due to increase in levels of magnesium may also be due to the enhanced nutrient uptake and positive interaction of nutrients. Similar increase in green fodder yield due to magnesium application were reported by Aires *et al.*

(1996) in maize (*Zea mays*) - ryegrass (*Lolium multiflorum*) rotation and by Lakshmi *et al.* (2007) in guinea grass in coconut based fodder production system. S x M interaction was also found significant in all five cuts. Highest green fodder yield was recorded with the medium dose of magnesium sulphate (80 kg $ha^{-1}$) in open condition in all cuts except fifth cut. In fifth cut, highest dose of magnesium sulphate (120 kg $ha^{-1}$) resulted in higher green fodder yield in open condition and was on par with the medium dose of magnesium sulphate (80 kg $ha^{-1}$). In coconut garden 100 kg $MgSO_4$ $ha^{-1}$ recorded higher green fodder yield in all cuts except first cut. In first cut, 120 kg $MgSO_4$ $ha^{-1}$ resulted in higher green fodder yield.

Considering the total green fodder yield, in open condition the highest total green fodder yield of 257.95 t $ha^{-1}$ was recorded in $s_1m_4$ ( open condition + 80 kg $MgSO_4$ $ha^{-1}$) and it was significantly superior to all other treatments. But in coconut garden, application of 100 kg $MgSO_4$ $ha^{-1}$ ($s_2m_5$) recorded the highest total green fodder yield of 152.27 t $ha^{-1}$. In open condition, 80 kg $MgSO_4$ $ha^{-1}$ produced the highest number of tillers and under coconut garden 100 kg $MgSO_4$ $ha^{-1}$ recorded significantly highest tiller number which in turn might have contributed to the highest total green fodder yield. Since Bajra Napier hybrid is a crop suited to open condition, quite higher dose of magnesium may be required for the better growth and yield of the crop under coconut garden.

The growing conditions and magnesium application had significant effect on dry fodder yield of Bajra Napier hybrid (Table 3 and 4). Bajra Napier hybrid recorded significantly higher dry fodder yield in open area than in coconut garden in all the five harvests. An yield increase of 47.42 per cent in total dry fodder yield was obtained in open condition compared to coconut garden. At low light intensity, spongy tissues are developed in plants which might be responsible for lesser dry matter accumulation . Wong (1993) reported shade depressed total dry matter production in two tropical grasses *Paspalum malacophyllum* and *Paspalum wettsteinii*, the depression as expected being proportional to the quantum of reduction of photosynthetic active radiation. The results are in line with the findings of Mullakoya (1982) in guinea grass cv. Mackuenii; Pillai (1986) in guinea grass and setaria grass and Anita (2002) in guinea grass varieties.

Application of magnesium also showed significant effect on dry fodder yield of Bajra Napier hybrid. Higher levels of magnesium sulphate i.e. application of 120 kg ha-1 and 100 kg ha-1 resulted in higher dry fodder yield in first cut and fifth cut respectively. However in second, third and fourth cut, the magnesium level of 80 kg MgSO4 ha-1 recorded the higher dry fodder yield. This might be due to the highest green fodder yield obtained in the said treatments. Considering the total dry fodder yield, application of 80 kg MgSO4 ha-1 recorded the highest

TABLE 3
Effect of growing conditions and magnesium on dry fodder yield of hybrid napier (t/ha)

| Treatments | I cut | II cut | III cut | IV cut | V cut | Total |
|---|---|---|---|---|---|---|
| **Growing conditions (S)** | | | | | | |
| S1 | 13.02 | 10.63 | 20.18 | 13.21 | 12.13 | 69.17 |
| S2 | 6.89 | 4.74 | 11.59 | 7.21 | 5.93 | 36.37 |
| SEm (±) | 0.03 | 0.03 | 0.03 | 0.03 | 0.04 | 0.07 |
| CD | 0.076 | 0.085 | 0.094 | 0.074 | 0.102 | 0.215 |
| **Magnesium sulphate levels (M)** | | | | | | |
| M1 | 8.72 | 6.24 | 14.44 | 9.19 | 7.79 | 46.38 |
| M2 | 9.04 | 6.76 | 14.86 | 9.90 | 8.77 | 49.33 |
| M3 | 9.71 | 7.88 | 15.44 | 10.46 | 9.06 | 52.56 |
| M4 | 10.73 | 8.71 | 17.24 | 10.99 | 9.42 | 57.08 |
| M5 | 10.64 | 8.39 | 16.77 | 10.75 | 9.94 | 56.49 |
| M6 | 10.92 | 8.12 | 16.55 | 9.99 | 9.21 | 54.79 |
| SEm (±) | 0.04 | 0.05 | 0.06 | 0.04 | 0.06 | 0.13 |
| CD | 0.131 | 0.147 | 0.162 | 0.129 | 0.177 | 0.372 |

$S_1$–Open, $S_2$–Coconut garden, $M_1$–0 kg/ha, $M_2$–40 kg/ha, $M_3$–60 kg/ha, $M_4$–80 kg/ha, $M_5$–100 kg/ha and $M_6$–120 kg/ha.

TABLE 4
Interaction effect of growing conditions and magnesium on dry fodder yield of hybrid napier (t/ha )

| Treatments | I cut | II cut | III cut | IV cut | V cut | Total |
|---|---|---|---|---|---|---|
| **S x M** | | | | | | |
| S1M1 | 11.76 | 9.26 | 18.73 | 12.15 | 11.00 | 62.89 |
| S1M2 | 12.01 | 9.96 | 19.21 | 12.99 | 11.46 | 65.62 |
| S1M3 | 12.61 | 10.44 | 19.91 | 13.47 | 12.15 | 68.58 |
| S1M4 | 14.49 | 11.96 | 21.77 | 14.19 | 12.87 | 75.29 |
| S1M5 | 13.35 | 10.91 | 20.31 | 13.03 | 12.29 | 69.89 |
| S1M6 | 13.91 | 11.24 | 21.14 | 13.45 | 13.00 | 72.74 |
| S2M1 | 5.69 | 3.22 | 10.15 | 6.22 | 4.58 | 29.87 |
| S2M2 | 6.06 | 3.56 | 10.51 | 6.82 | 6.09 | 33.04 |
| S2M3 | 6.81 | 5.33 | 10.97 | 7.46 | 5.96 | 36.53 |
| S2M4 | 6.97 | 5.45 | 12.71 | 7.78 | 5.96 | 38.87 |
| S2M5 | 7.92 | 5.89 | 13.23 | 8.46 | 7.58 | 43.07 |
| S2M6 | 7.93 | 5.01 | 11.95 | 6.53 | 5.41 | 36.84 |
| SEm (±) | 0.06 | 0.07 | 0.08 | 0.06 | 0.09 | 0.18 |
| CD | 0.185 | 0.208 | 0.230 | 0.182 | 0.251 | 0.526 |

$S_1$–Open, $S_2$–Coconut garden, $M_1$–0 kg/ha, $M_2$–40 kg/ha, $M_3$–60 kg/ha, $M_4$–80 kg/ha, $M_5$–100 kg/ha and $M_6$–120 kg/ha.

dry fodder yield year -1. In the total dry fodder yield, an yield increase of 18.74 per cent was obtained with the application of 80 kg MgSO4 ha-1 over control. As magnesium is associated with carbohydrate metabolism in plants, application of higher level increased the green fodder yield which in turn lead to higher dry fodder yield. Similar results were reported by Aires et al. (1996) in maize (Zea mays) - ryegrass (Lolium multiflorum) rotation and by Lakshmi et al. (2007) in guinea grass in coconut based fodder production system.

In all cuts, the S x M interaction effect on dry fodder yield of Bajra Napier hybrid was also found significant. The highest dry fodder yield was recorded with the magnesium sulphate level of 80 kg $ha^{-1}$ in open condition in all cuts except fifth cut. In fifth cut, the highest dose of magnesium sulphate (120 kg $ha^{-1}$) resulted in higher dry fodder yield in open condition and was on par with $M_4$ (80 kg $MgSO_4$ $ha^{-1}$). In coconut garden, application of 100 kg $MgSO_4$ $ha^{-1}$ obtained higher dry fodder yield in all cuts except first cut. In first cut, application of 120 kg $MgSO_4$ $ha^{-1}$ resulted in higher dry fodder yield in coconut garden and was on par with the application of 100 kg $MgSO_4$ $ha^{-1}$. This increased dry fodder yield could be due to the increased green fodder yield in these treatments. Among the interactions, total dry fodder yield was the highest at 80 kg $MgSO_4$ $ha^{-1}$ in open condition and with the higher dose of magnesium (100 kg $MgSO_4$ $ha^{-1}$) in coconut garden.

## Quality parameters

Growing conditions and magnesium application significantly influenced the quality parameters *viz.* crude protein content and crude fibre content (Table 5). The quality attributes of fodder grown in coconut garden were more than that under open; high crude protein content (9.82 %) and lower crude fibre content (36.83%) was observed in coconut garden. Kephart and Buxton (1993) reported that crude protein is more associated with shading than other quality characteristics of fodder and nitrogen accumulation was recorded in all plant components of green plants due to shading.

The crude protein content of Bajra Napier hybrid increased with increase in level of magnesium. The treatment $M_5$ (100 kg $MgSO_4$ $ha^{-1}$) recorded the highest crude protein content (9.33 %) and it was on par with $M_6$ (120 kg $MgSO_4$ $ha^{-1}$) and M4 (80 kg $MgSO_4$ $ha^{-1}$). Magnesium fertilization facilitates an increase in protein content in plants; higher protein content is an important factor in production of forage grain crops and grasses (Mayland and Wilkinson, 1989).

TABLE 5

Effect of growing conditions and magnesium on crude protein content and crude fibre content of hybrid napier (%)

| Treatments | Crude protein content | Crude fibre content |
|---|---|---|
| **Growing conditions (S)** | | |
| $S_1$ | 8.30 | 38.86 |
| $S_2$ | 9.82 | 36.83 |
| SEm (±) | 0.05 | 0.27 |
| CD | 0.139 | 0.799 |
| **Magnesium sulphate levels (M)** | | |
| $M_1$ | 8.77 | 41.45 |
| $M_2$ | 8.87 | 40.06 |
| $M_3$ | 8.99 | 37.64 |
| $M_4$ | 9.11 | 36.44 |
| $M_5$ | 9.33 | 36.04 |
| $M_6$ | 9.29 | 35.46 |
| SEm (±) | 0.08 | 0.47 |
| CD | 0.240 | 1.384 |

$S_1$–Open, $S_2$–Coconut garden, $M_1$–0 kg/ha, $M_2$–40 kg/ha, $M_3$–60 kg/ha, $M_4$–80 kg/ha, $M_5$–100 kg/ha and $M_6$–120 kg/ha.

The crude fibre content of Bajra Napier hybrid reduced with increase in level of magnesium and the lowest crude fibre content (35.46%) was obtained in $M_6$ (120 kg $MgSO_4$ $ha^{-1}$) which was on par with $M_5$ (100 kg $MgSO_4$ $ha^{-1}$) and $M_4$ (80 kg $MgSO_4$ $ha^{-1}$). Fajemilehin *et al.* (2008) observed that crude fibre content was significantly reduced due to magnesium application in guinea grass (*Panicum maximum*) and also reported that magnesium fertilization reduces the rapidity of lignification in forage crops.

## CONCLUSION

From the results of the study, it can be concluded that higher yield of Bajra Napier hybrid in open condition could be obtained with a Mg dose of 80 kg $MgSO_4$ $ha^{-1}$ in addition to the POP recommendations of KAU (25 t $ha^{-1}$ FYM and 200:50:50 kg $ha^{-1}$ NPK). In coconut garden, the productivity can be enhanced by applying 100 kg $MgSO_4$ $ha^{-1}$ along with the POP recommendations of KAU. Quality parameters and chlorophyll content were improved in levels of magnesium above 60 kg $MgSO_4$ $ha^{-1}$. Highest crude protein content (9.33 %) was recorded in $M_5$ and it was on par with $M_4$ and $M_6$. Crude fibre content (35.46 %) was the lowest in $M_6$ and it was on par with $M_4$ and $M_5$.

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