

Effect of organic and inorganic nitrogen and biofertilizer on nutrient content and uptake by amaranthus (*Amaranthus hypochondriacus* L.)

J.K. PARMAR AND J.J. PATEL

Accepted : May, 2009

See end of the article for authors' affiliations

Correspondence to :

J.K. PARMAR

Department of
Agricultural Chemistry
and Soil Science, College
of Agriculture Junagadh
Agricultural University,
JUNAGADH (GUJARAT)
INDIA

ABSTRACT

A field experiment study was conducted on loamy sand soil of the S.D. Agricultural University, Sardar Krushinagar indicated that fertilizing the crop with 75 % RDN (urea) + 25% (gliricidia) with Azotobacter gave highest crude protein. The N, P, K S, Fe and Zn content were higher in treatment where 50 or 25 % recommended dose of nitrogen was applied through organic sources (FYM, gliricidia compost). The maximum removal of N, P and Fe by both grain and stover and K by grain were noted by application of 75 % RDN (urea) + 25% gliricidia compost with Azotobacter. While, highest uptake of K by stover, S by grain and stover were noted 50-50 % RDN applied through urea and gliricidia compost and 75 % RDN through urea + 25 % RDN through FYM + Azotobacter (T_8), treatments, respectively. While, the maximum uptake of Zn by both grain and stover were recorded by 75 % RDN through urea + 25 % RDN through gliricidia compost (T_6).

Key words : Nitrogen management, amaranthus, Azotobacter, Gliricidia compost, FYM, Organic fertilizer, Inorganic fertilizer, Nutrient content and uptake

Amaranth (*Amaranthus hypochondriacus* L.) constitutes an important part of the diet in several parts of India. It supplies a substantial portion of the protein, minerals and vitamins in the diet. The grain protein is usual because its amino acid complement is very similar to optimum balance required in the human diet. Its grain has relatively high value of protein, fat, carbohydrates and mineral content as compared to other cereals crops. Therefore, the nutritional qualities of amaranth fulfils the balance diet of low income people. Its grains also contain about 16% crude protein with high content of lysine (Joseph, 1979). In present day of cultivation, increasing the use of inorganic fertilizer increased the nutrient imbalance in soil; these imbalanced affected the nutritional value of crop. The use of organic fertilizer is known to provide the micronutrient and other important element, which are essential for plant growth and development and to increase the nutritional value of crop. In line of these matter, the effect of organic and inorganic and biofertilizer on nutrient content and uptake by amaranthus (*Amaranthus hypochondriacus* L.) was carried out.

MATERIALS AND METHODS

The field experiment was conducted at the Regional Research Station, Gujarat Agricultural University, Sardar Krushinagar. The soil of the experimental field had a pH of 7.8 and EC of 0.08 dSm⁻¹. The soil had organic carbon content of 0.17 per-cent, available N 218 Kg ha⁻¹, Olsen' P of 26.31 Kg ha⁻¹, NH₄Oac K of 248 Kg ha⁻¹, heat soluble P of 8.9 ppm and DTPA Fe and Zn of 3.61 ppm and 0.43

ppm. The experiment was conducted in a Randomized Block Design with ten different integrated nitrogen management treatments viz., No fertilizers or control (T_1), 100 % RDN through urea (T_2), 50 % RDN through urea + 50 % RDN through FYM (T_3), 75 % RDN through urea + 25 % RDN through FYM (T_4), 50 % RDN through urea + 50 % RDN through gliricidia compost (T_5), 75 % RDN through urea + 25 % RDN through gliricidia compost (T_6), T_3 + Azotobacter (T_7), 75 % RDN through urea + 25 % RDN through FYM + Azotobacter (T_8), T_5 + Azotobacter (T_9), T_6 + Azotobacter (T_{10}). The crop was fertilized with 60 kg N and 40 kg N P₂O₅ ha⁻¹. Nitrogen was applied through inorganic and organic sources of nitrogen as per treatments. Organic source of nitrogen was applied 7 days before sowing as per treatment. Whatever phosphorus and potassium have been added through inorganic source of nitrogen treatments that much of phosphorous and potassium were nullified through SSP and MOP. Before application, gliricidia compost was made. Pits were dug and lined with polyethylene sheet. Required quantity of gliricidia leaves were put in five layers and left for decomposition for a period of 15 days. The seeds of amaranthus (G.A.1) were first inoculated with Azotobacter (ABA-1) culture and then the treated seeds were utilized for sowing as per treatments. Five plants were randomly collected and prepared to assess the protein content and concentration and uptake of N, P, K, S, Fe and Zn by the amaranthus crop. Plant samples were digested in di-acid mixture. The extract prepared after digestion was used for estimation of nutrients content as