

Effect of different levels of nitrogen and spacings on crude protein (per cent) of amaranthus cv. CO.3

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ABSTRACT

Crude protein content is influenced by many factors among which cultivars, fertilizer application and date of planting are important. This experiment was undertaken to compare the effect of different nitrogen levels and different spacings on the crude protein content (per cent) in the greens of amaranthus var. CO.3 seeds were sown with different spacings viz., Broadcast (S_1), 15×15 cm (S_2), 20×20 cm (S_3), 30×30 cm (S_4) having different nitrogen levels viz., Control (N_1), 25 kg N ha^{-1} (N_2), 50 kg N ha^{-1} (N_3), 75 kg N ha^{-1} (N_4), 100 kg N ha^{-1} (N_5). The study revealed that a treatment combination of $100 \text{ kg nitrogen ha}^{-1}$ with a spacing of 30×30 cm resulted in the highest crude protein (per cent) in amaranthus CO.3. Similar trend had been noticed in qualitative characters viz., phosphorus, potassium and calcium.

Key words: Amaranthus CO.3, Crude protein, Nitrogen, Spacing.

Leafy vegetables in general and amaranthus in particular are very rich in minerals, vitamin A and C. Dieticians recommend daily consumption of at least 116 grams of leafy vegetables in a balanced diet. If the nutritive value of amaranthus is viewed in terms of protein, vitamin A and C and iron (four important components limiting in Indian diet) in comparison to other leafy vegetables or commonly used vegetables, one would realize how valuable amaranthus are! Unscrupulous application of nitrogenous fertilizers to amaranthus with the intention to increase green matter production may also invite the risk of accumulating certain anti-nutrient factors in the greens beyond safety levels. Thus, protein content with reference to N application at different stages of clipping become important and relevant. The present study was carried out in amaranthus CO.3 to study the effect of spacing and nitrogen levels on protein content in the greens.

MATERIALS AND METHODS

Quality seeds of amaranthus CO.3 variety were procured from Vegetable Research Station, Palur (TNAU). The seeds were sown at different spacing (Minor plot) i.e., Broadcast (S_1), 15×15 cm (S_2), 20×20 cm (S_3), 30×30 cm (S_4) with different nitrogen levels viz., Control (N_1), 25 kg N ha^{-1} (N_2), 50 kg N ha^{-1} (N_3), 75 kg N ha^{-1} (N_4), 100 kg N ha^{-1} (N_5). The protein content was recorded after 20 DAS for 1st, 3rd, 5th and 7th clipping. The clippings were done at 10 days interval uniformly. Qualitative characters such as phosphorus, potassium,

calcium and protein was recorded for 1st, 3rd, 5th and 7th clipping stages. The crude protein content was arrived by multiplying the nitrogen per cent by 6.25.

RESULTS AND DISCUSSION

The crude protein percentage at different clipping stages was significantly influenced by N levels. Application of N at 100 kg ha^{-1} (N_5) recorded the highest crude protein content (16.31 %) and control (N_1) recorded the lowest (10.09 %) in different clipping stages. Similarly, crude protein content was significantly influenced by different spacings with highest crude protein (17.32 %) being recorded in 30×30 cm (S_4) spacing as compared to the lowest (10.99 %). The interaction effects between spacing and N levels were significant and S_4N_5 was found to be the best treatment combination.

The crude protein content showed an increasing trend with increment of nitrogen levels. The crude protein content however showed a decreasing trend as clipping stages advanced. The high protein content in line with higher N levels could be attributed to enhanced absorption from soil of added N and its direct participation in the protein synthesis.

The decreasing trend in protein content with advancement of clipping stages could be further attributed to gradual depletion of soil N through the 'greens' (biomass) that were clipped periodically, which might have resulted in lower protein synthesis. The findings of Subbiah and Ramanathan (1982), Singh *et al.* (1986) and Zainal Abidin and Yusdar Hilman (1986) corroborated the results of the present study.

The minerals, comprising of total phosphorus, total potassium and total calcium contents in the greens were