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INFLUENCE OF NOVA AMI-CA FOLIAR FERTILIZATION ON YIELD, YIELD COMPONENTS AND QUALITY CHARACTERISTICS OF PEANUT (*Arachis hypogaea* L.)

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ABSTRACT
In order to investigate the effect of Nova ami-ca on yield, yield components of peanut (*Arachis hypogaea* L.) in 2018 an experiment was conducted in Randomized Block Design (RBD) with treatments T_1: Control (No application of any fertilizer), T_2: Recommended dose of fertilizers (RDF) with 2 splits at 45 and 75 DAS, T_3: T_2+ 5g/l Calcium nitrate at 45, 75 DAS, T_4: T_2 + 2.5ml/l of Nova ami-Ca at 45 and 75 DAS,T_5: 5g/l Calcium nitrate at 45, 75DAS,T_6: 2.5ml/l of Nova ami-Ca at 45 and 75 DAS. Results showed that application of T_4 had significant effect on plant height, number of branches per plant, number of filled pods, no of unfilled pods,100 kernel weight, oil content and pod yield but application of T_3 resulted highest protein content. According to the results of the present study calcium is an important factor for increasing of yield and yield components of peanut.

KEY WORDS: Peanut, Calcium, Nova ami-ca, Yield; Yield components.

INTRODUCTION

Ground nut is an important oil, protein, food and feed legume crop grown in over 100 countries. It covered 26.7 million hectares area worldwide with a total production of 37.1 million MT. Though, the groundnut cultivation has been extended in almost all soils throughout the world, its nutrient requirement is high and like other crops it also requires all the macro- and micro-nutrients for its growth and development (Dwivedi 1988, Singh *et al.*, 1990, Adams and Hartzog 1991, Adams *et al.*, 1993 and Singh 1999). Calcium is an essential plant nutrient that plays a significant role in peanut seed development. According to the Department of Agriculture (DOA) 2006 the application of Calcium is important for proper kernel development in groundnut. It is a constituent of cell walls and involved in production of new growing points and root tips. It provides elasticity and expansion of cell walls, which keeps growing points away from becoming rigid and brittle. It acts as a base for neutralizing organic acids generated during the growing process and aids in carbohydrate translocation and nitrogen absorption. Indeed, calcium might be considered as bricks in plant assembly. Application of amino chelate fertilizers by farmers has increased during recent years (Souri and Yarahmadi, 2016). Aminochelate fertilizers are the latest novelties regarding plant nutrition in agriculture (Souri, 2015). They are among the new and modern formulae of fertilizers which are synthesized based on various amino acids. Application of aminochelates instead of simple routine fertilizers generally results in higher nutrient uptake efficiency (Souri and Yarahmadi, 2016; Ghasemi., 2014; Garcia *et al.*, 2011). In many cases, only the use of chelated forms of micronutrients could meet the plant's requirements for nutrients to provide healthy growth and high yield achievements (Ghasemi *et al.*, 2013 and Souri, 2015).

MATERIALS & METHODS

This study was conducted in the *kharif*, 2018 at the Nova Agritech Ltd. Experimental farm, Kamareddy, Telangana, India. To investigate the performance of Nova amino chelated–calcium on yield components and quality parameters of Ground nut. The experiment was laid out in Randomized block design (RBD) with three replications. The groundnut cultivar kadiri-9 with duration 110-120 days was used for this study. The field was prepared by ploughing and leveling, divided into small plots of $25m^2$ (5m × 5m) by raising bunds and the seeds of Ground nut were sown at 30×10 cm spacing in the furrows and covered with soil. The crop was grown under recommended package of practices and proper care was taken to protect it from weeds, insects, pests and diseases during entire cropping season. Data was recorded on established plants at 60 days after planting and at harvest stage. Plant height, no of branches per plant, no. of filled pods, no. of unfilled pods, 100 kernel weight, oil content by according to Tiwari *et al.* (1974), protein content according to by Lowry *et al.*, (1951) and pod yields were investigated.

Treatments

T_1: Control (No application of any fertilizer).
T_2: Recommended dose of fertilizers (RDF) with 2 splits at 45 and 75 DAS.
T_3: T_2+ 5g/l Calcium nitrate at 45, 75DAS.
T_4: T_2 + 2.5ml/l of Nova ami-Ca at 45 and 75 DAS.
T_5: 5g/l Calcium nitrate at 45, 75DAS.
T_6: 2.5ml/l of Nova ami-Ca at 45 and 75 DAS.

RESULTS & DISCUSSIONS

Plant height

Data on plant height of ground nut at 60 DAS and at harvest presented in table 1. The results of this study shows that significantly maximum plant height with 28.9 and 35.76 cm at 60 DAS and at harvest respectively recorded in response to T_4 (T_2 + 2.5ml/l of Nova ami-Ca at 45 and 75 DAS), while minimum plant height 22.4 and 28.43 cm at 60DAS and at harvest respectively recorded in T_1(Control). Calcium is a important plant nutrient that affects cell wall and membrane formation and plays a key role in plant growth, biomass production (Madani *et al.*, 2015). Calcium application increased plant height by activating enzymes for cell mitosis, division and elongation and height (Jones, 1999).

TABLE 1: Effect of calcium source Nova ami-ca on plant height and No. of branches

Treatments	Plant height (cm)		No. of branches/plant	
	60 DAS	At harvest	60 DAS	At harvest
T_1	22.4	28.43	5.51	5.81
T_2	24.8	31.90	6.05	6.57
T_3	26.5	32.46	6.09	6.95
T_4	28.9	35.76	6.35	7.41
T_5	23.9	28.94	5.57	6.45
T_6	24.4	30.10	5.78	6.54
SEm	0.8795	1.4572	0.1393	0.1157
CD 5%	2.7714	4.5916	0.4390	0.3647
CV%	6.0561	8.0702	4.0949	3.0261

Number of branches per plant^{-1}

The obtained results shows that significant differences were observed with more number of branches in T_4 at 60 DAS and at harvest and lower number of branches noticed T_1 at 60DAS and at harvest. The increase in number of branches per plant might be due to the role of Ca in cell division, mitosis and carbohydrate metabolism (Davis *et al.*, 2003) application of calcium increased number of branches (Kamara *et al.*, 2011)

TABLE 2: Effect of Nova ami-ca on yield and yield components of peanut

Treatments	No. of filled pods	No. of un filled pods	100 kernel weight	Oil content %	Protein content %	Pod yield/ha
T_1	2.6	1.44	23.83	44.56	14.76	1114
T_2	13.88	1.52	30.89	48.18	25.50	1691
T_3	16.50	1.61	32.56	47.37	29.30	1934
T_4	19.18	1.03	34.44	49.45	29.20	2024
T_5	11.44	1.35	28.65	45.01	25.26	1665
T_6	13.55	1.11	29.22	46.86	27.37	1695
SEm	0.5611	0.0743	0.5114	0.5745	0.4072	11.41
CD 5%	1.7679	0.2341	1.6114	1.8102	1.2830	35.96
CV%	7.5619	9.5615	2.9588	2.1212	2.8073	1.1714

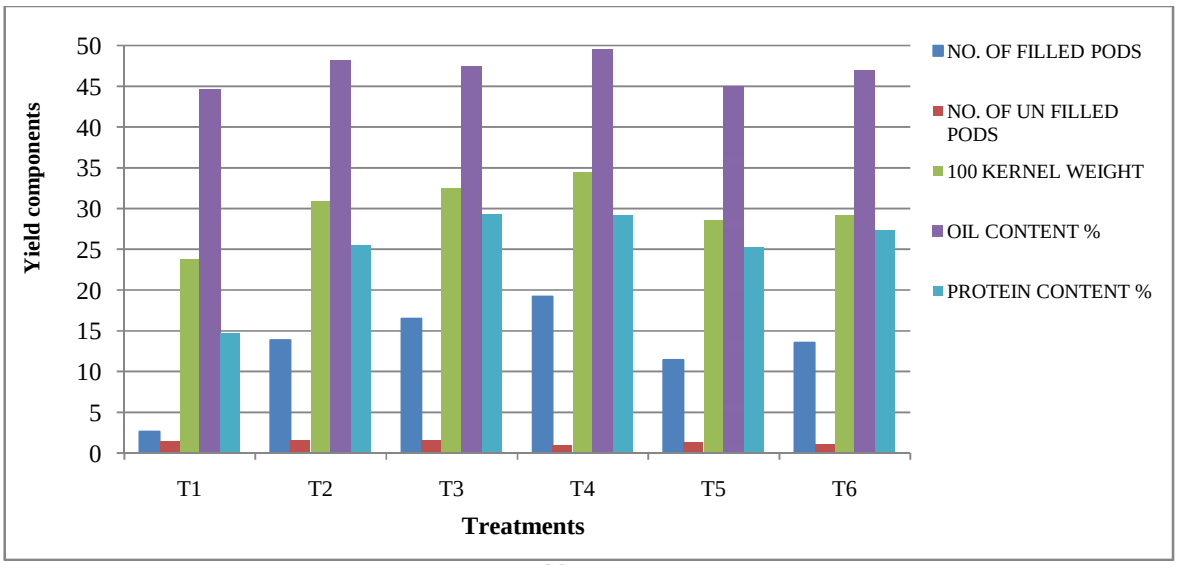

FIGURE 1: Yield Components in Peanut

Number of filled pods plant^{-1}

Number of filled pods per plant (table 2) differed significantly among all treatments. Maximum number of filled pods noticed in T_4 followed by T_3 and minimum number of filled pods observed in T_1 calcium application increased the number of two seeded pods and increased pod set Son *et al.* (1974). Calcium application had a positive effect on the number of filled pods per plant (Kamara *et al.*, 2011).

Number of unfilled pods plant^{-1}

Significantly higher number of unfilled pods observed in T_1 in comparison to other treatments and lower number of unfilled pods noticed in T_4. Application of ca significantly decreased the number of unfilled pods in ground nut (Kogram *et al.*, 1999)

100 kernel weight

Application of Recommended dose of fertilizers (RDF) with 2 splits at 45 and 75 DAS + 2.5ml/l of Nova ami-Ca at 45 and 75 DAS was showed significant differences among all treatments with highest weight observed in T_4 and lowest was recorded in T_1. The weight of 100 kernel had a significant effect to apply calcium (Gashti, 2012). Application of calcium fertilizer had a positive effect on the 100 seed weight (Kamara *et al.*, 2011)

Oil content (%)

Oil content highest was recorded in T_4 which differed significantly with all the treatments except T_2 which shows parity with T_4. Application of calcium results significant effect on oil content of ground nut (Gashti, 2012). Results showed that increased calcium fertilization increased the vigour, germination and oil content of the seeds (Kamara *et al.*, 2017)

Protein content (%)

This study confirms that lowest protein content recorded in T_1 which differed significantly with all other treatments. Highest protein content was noticed in T_3 followed by T_4. Badiger *et al.* (1982) concluded that crude protein per cent and oil yield were improved by the application of calcium.

Pod yield (kg ha^{-1})

This study reveals that T_4 significantly differed with all other treatments and lowest pod yields observed in T_1. Calcium fertilization is important for seed yields of ground nut (Kamara *et al.*, 2011).

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Abbreviation: DAS- Days After Sowing; RDF - Recommended Dose of Fertilizers; Nova Ami -Ca - Nova Amino Chelated Calcium; g-grams.