



Research Article

INFLUENCE OF FERROS SULPHATE AND ZINC SULPHATE ON POD YIELD OF GROUNDNUT

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Received: April 02, 2018; Revised: April 11, 2018; Accepted: April 12, 2018; Published: April 15, 2018

Abstract- The field experiment carried out during kharif season of 2016 at Agricultural Research Station, S.D. Agricultural University, Aseda, Gujarat to study the Influence of ferros sulphate and zinc sulphate on pod yield of groundnut. Effect of ferros sulphate and zinc sulphate, were tested by soil application and foliar spray for identifying its effect on groundnut pod yield. pod yield was significantly higher under the treatment T₉-ZnSO₄ @ 8 kg/ha + Foliar Spray of FeSO₄ @ 1 % and at par with T₇, T₁ and T₃. Haulm yield also found significantly higher under the treatment T₉- ZnSO₄ @ 8 kg/ha + Foliar Spray of FeSO₄ @1 % which was at par with the treatment T₃ and T₁.

Keywords- Ferros sulphate, Zinc sulphate, Groundnut, Pod yield.

Citation: Rabari K. V., et al., (2018) Influence of Ferros Sulphate and Zinc Sulphate on Pod Yield of Groundnut. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 7, pp.-5725-5726.

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Academic Editor / Reviewer: Abdelsalam Mohammed Ibrahim, Singh Priyanka

Introduction

Groundnut (*Arachis hypogaea* L) is important oilseed crop. It is best cultivated in well drained sandy or sandy loam soils with pH ranging from 5.5 to 6.5. Its high content of oil and protein makes it an important commodity for both human use and livestock feed. Zinc plays significant role in various enzymatic and physiological activities of the plant. Zinc catalyses the process of oxidation in plant cells and is vital for transformation of carbohydrates, regulates the consumption of sugar, increases source of energy for the production of chlorophyll, aids in the formation of auxins which produce more plant cells and more dry matter, that in turn will be stored in seed as a sink and promotes absorption of water. In plants, the deficiency of zinc arises mainly due to alkaline soil pH, calcareousness, low organic matter, exposed sub soil, Zn free fertilizers and flooding induced electrochemical changes. Fe plays an important role in a series of metabolic activities involving respiratory enzymes and various photosynthetic reactions. Iron also plays an important role in legumes for nodulation and nitrogen fixation. Fe application also found to improve the protein content in groundnut kernels. Application of micronutrients successfully prevented occurrence of chlorosis and increased chlorophyll content, pod yield and micronutrient uptake [1]. Groundnut is one of the most important and economical oilseeds in Gujarat in 20 lakh ha area. Now a day's yellowing of groundnut is common occurrence resulted in poor yield. It is might be due to deficiency of the iron and zinc in the soil. as per the survey report of micronutrient 55 % soil of the north Gujarat are found deficient in iron and 20 % deficient in zinc in the soil, which support the occurrence of chlorosis in the plant in order to correct deficiency of iron and zinc, field experiment was conducted with the objective to find out effectiveness of soil as well as foliar feeding of iron and Zn to groundnut crop for better growth and higher yield under North Gujarat conditions.

Material and Methods

The present experiment was conducted at Agricultural Research Station, Sardarkrushinagar Dantiwada Agricultural University, Aseda, Gujarat during kharif

season of 2016. The soil of experimental site was loamy sand in texture with 7.64 pH, low in organic carbon (0.41 %), medium in available P₂O₅ (32.68 kg ha⁻¹) and higher in available K₂O (336 kg ha⁻¹). Groundnut variety Gujarat Groundnut -20 was sown at second fort night of June with line sowing method in randomized block design with nine treatments and three replications. The experiment consist of nine treatments viz., T₁: Water spray, T₂: FeSO₄ @ 15 kg/ha, T₃:ZnSO₄ @ 8 kg/ha, T₄:Foliar Spray of FeSO₄ @1 %, T₅:Foliar Spray of ZnSO₄ @ 0.5 %, T₆:Foliar Spray of FeSO₄ @1 % + Foliar Spray of ZnSO₄ @ 0.5 %, T₇:FeSO₄ @ 15 kg/ha + ZnSO₄ @ 8 kg/ha, T₈:FeSO₄ @ 15 kg/ha + Foliar Spray of ZnSO₄ @ 0.5 %, T₉ – ZnSO₄ @ 8 kg/ha + Foliar Spray of FeSO₄ @1 %. Pre emergence herbicide (Pendimethalin @ 1 kg a.i / ha) was applied at next day after sowing (DAS) with knapsack sprayer fitted with flat-fan nozzle using 500 liter water/ha. The half dose of N and full dose of P were applied through urea and di ammonium phosphate as basal at the time of sowing and remaining N was top dressed at 30 DAS.

Results and Discussion

The result shown in [Table-1] indicates that effect of micronutrient on plant population at 20 DAS and at harvest did not affect on plant population and it's observed non significant. It was revealed [Table-2] that the significantly higher plant height was observed under treatment T₃- ZnSO₄ @ 8 kg/ha (57.200 cm) and it was statistically at par with the treatment, T₂- FeSO₄ @ 15 kg/ha (50.93 cm) and T₅- Foliar Spray of ZnSO₄ @ 0.5 % (54.067 cm) at 60 DAS, whereas, at 90 DAS and at harvest result reveals non significant. Application of micronutrient improve the growth attributes of groundnut [2,3]. No. of pods per plant was significantly higher under the treatment T₉- ZnSO₄ @ 8 kg/ha + Foliar Spray of FeSO₄ @1 % and statistically at par with T₈ - FeSO₄ @ 15 kg/ha + Foliar Spray of ZnSO₄ @ 0.5 %, T₇- FeSO₄ @ 15 kg/ha + ZnSO₄ @ 8 kg/ha, T₂- FeSO₄ @ 15 kg/ha, T₅- Foliar Spray of ZnSO₄ @ 0.5 %, T₁- Water spray and T₃- ZnSO₄ @ 8 kg/ha. Pod yield was significantly higher under the treatment T₉- ZnSO₄ @ 8

Table-1 Effect of Micronutrient on Plant population of groundnut.

Treatment	Plant population	
	20 DAS	At Harvest
T ₁ – Water spray	6.500	5.557
T ₂ – FeSO ₄ @ 15 kg/ha	5.333	4.400
T ₃ – ZnSO ₄ @ 8 kg/ha	7.133	6.200
T ₄ – Foliar Spray of FeSO ₄ @1 %	5.733	4.800
T ₅ – Foliar Spray of ZnSO ₄ @ 0.5 %	5.800	4.867
T ₆ – Foliar Spray of FeSO ₄ @1 % + Foliar Spray of ZnSO ₄ @ 0.5 %	7.333	6.400
T ₇ – FeSO ₄ @ 15 kg/ha + ZnSO ₄ @ 8 kg/ha	5.267	4.333
T ₈ – FeSO ₄ @ 15 kg/ha + Foliar Spray of ZnSO ₄ @ 0.5 %	6.267	5.333
T ₉ – ZnSO ₄ @ 8 kg/ha + Foliar Spray of FeSO ₄ @1 %	6.600	5.667
SE(m)	0.678	0.678
C.D. (0.05)	NS	NS
C.V. (%)	18.85	22.17

Table-2 Effect of Micronutrient on plant height (cm) of groundnut.

Treatment	Plant Height (cm)		
	60 DAS	90 DAS	At Harvest
T ₁ – Water spray	49.067	60.533	77.267
T ₂ – FeSO ₄ @ 15 kg/ha	50.933	63.600	79.667
T ₃ – ZnSO ₄ @ 8 kg/ha	57.200	66.533	79.867
T ₄ – Foliar Spray of FeSO ₄ @1 %	45.800	60.933	71.867
T ₅ – Foliar Spray of ZnSO ₄ @ 0.5 %	54.067	63.267	79.533
T ₆ – Foliar Spray of FeSO ₄ @1 % + Foliar Spray of ZnSO ₄ @ 0.5 %	44.067	61.733	77.067
T ₇ – FeSO ₄ @ 15 kg/ha + ZnSO ₄ @ 8 kg/ha	49.800	62.200	84.200
T ₈ – FeSO ₄ @ 15 kg/ha + Foliar Spray of ZnSO ₄ @ 0.5 %	50.267	62.400	75.200
T ₉ – ZnSO ₄ @ 8 kg/ha + Foliar Spray of FeSO ₄ @1 %	52.533	60.267	79.333
SE(m)	2.173	2.106	3.134
C.D. (0.05)	6.570	N/A	N/A
C.V. (%)	7.46	5.847	6.939

Table-3 Effect of micronutrient on no. of pods per plant, pod yield (kg/ha), haulm yield (kg/ha) of groundnut.

Treatment	No. of Pods per plant	Pod Yield (kg/ha)	Haulm yield (kg/ha)
T ₁ – Water spray	51.0	3763	6763
T ₂ – FeSO ₄ @ 15 kg/ha	52.0	3466	5944
T ₃ – ZnSO ₄ @ 8 kg/ha	49.0	3748	6876
T ₄ – Foliar Spray of FeSO ₄ @1 %	42.3	3280	5614
T ₅ – Foliar Spray of ZnSO ₄ @ 0.5 %	51.7	3318	6026
T ₆ – Foliar Spray of FeSO ₄ @1 % + Foliar Spray of ZnSO ₄ @ 0.5 %	38.0	2696	6325
T ₇ – FeSO ₄ @ 15 kg/ha + ZnSO ₄ @ 8 kg/ha	52.7	3793	6179
T ₈ – FeSO ₄ @ 15 kg/ha + Foliar Spray of ZnSO ₄ @ 0.5 %	54.3	3178	4818
T ₉ – ZnSO ₄ @ 8 kg/ha + Foliar Spray of FeSO ₄ @1 %	61.7	4608	8059
SE(m)	4.22	315.19	482.12
C.D. (0.05)	12.77	953.07	1,457.83
C.V. (%)	14.54	15.43	13.28

kg/ha + Foliar Spray of FeSO₄ @1 % and at par with T₇- FeSO₄ @ 15 kg/ha + ZnSO₄ @ 8 kg/ha, T₁- Water spray and T₃- ZnSO₄ @ 8 kg/ha. Haulm yield also found significantly higher under the treatment T₉- ZnSO₄ @ 8 kg/ha + Foliar Spray of FeSO₄ @1 % which was at par with the treatment T₃- ZnSO₄ @ 8 kg/ha and T₁- Water spray. It might be due to improvement in nutrient uptake particularly iron and zinc that increased transformation of photosynthetic activity towards growing plant parts [4-8].

Application of research: Yellowing problem observed kharif season and incidence increased day by day. To nullify the deficiency of ferros sulphate and zinc sulphate in soil of Gujarat it will be very helpful to the farmers of groundnut cultivated areas of Gujarat.

Research Category: Soil Science, oilseed crop

Abbreviations:

DAS: Days after sowing

%: Percentage

N: Nitrogen

ZnSO₄: Zinc Sulfate

FeSO₄: Ferrous Sulfate

Acknowledgment / Funding resource: Author thankful to Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, 385506, Gujarat

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Research project name or number: Nil

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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