https://doi.org/10.29321/MAJ.10.A03278

Madras agric. J. 63 (2): 81 — 83, February, 1976.

Studies on the Effect of Magnesium on the Yield and Quality of Groundnut (Pol. I) on Two Red Soils of Tamil Nadu

By

R. M. SUBRAMANIAN,[1], T. S. MANICKAM[2] and K. K. KRISHNAMOORTHY[3]

ABSTRACT

Oil content of groundnut as criterian of quality, was enhanced by magnesium application and the increase was a linear function. Linear functions have also been obtained between magnesium levels and their effect both on total nitrogen content and protein content of kernels. Yield of kernels has been increased by magnesium applications.

INTRODUCTION

The yields obtained for groundnut crop in India are far below the average yield in many other countries, like Nigeria and U. S. A. Hence increasing the net yield in groundnut as well as improving the oil content are some of the problems confronting this major oilseed crop. But many of the cultivated soils are found to be deficient in exchangeable and available magnesium. Hence there is the absolute necessity of using fertilizer magnesium for meeting the demand of this crop. Further legumes are said to consume more magnesium than other crops and hence a favourable response can be expected for magnesium applications. But the data available for Tamil Nadu soils and groundnut grown in these soils on the above mentioned aspects are very meagre. Hence with the object of providing information with reference to the influence of magnesium to groundnut, an experiment was conducted with POL. 1 groundnut as the test crop grown in calcareous red and non-calcareous red soils.

MATERIALS AND METHODS

A pot culture experiment was carried out with two red soils (calcareous and non-calcareous) and POL. 1 groundnut as the test crop. The treatments were as follows:

Soils: 2, non-calcareous red (NC) and calcareous red (C).

Treatments: 12

Magnesium: 6 levels, 0, 30, 60, 90, 120 and 160 kg./ha as $MgSO_4$

Rhizobium: No rhizobium (NR) and Rhizobium (R)

1. Bank of India, Baroda.
2. Assistant Professor and 3. Professor of Soil Science and Agricultural Chemistry. Tamil Nadu Agricultural University, Coimbatore-641003.

Non-calcareous (NC)		Calcareous (C)		
NR	Mg_0	NR	Mg_0	Replicated two times
NR	Mg_1	NR	Mg_1	
NR	Mg_2	NR	Mg_2	
NR	Mg_3	NR	Mg_3	
NR	Mg_4	NR	Mg_4	
NR	Mg_5	NR	Mg_5	
R	Mg_0	R	Mg_0	
R	Mg_1	R	Mg_1	
R	Mg_2	R	Mg_2	
R	Mg_3	R	Mg_3	
R	Mg_4	R	Mg_4	
R	Mg_5	R	Mg_5	

25 kg of N, 50 kg of P_2O_5 and 75 kg of K_2O per hectare were applied as ammonium sulphate, mono-ammonium phosphate and potassium chloride respectively. Plant samples were collected at reproductive and post-harvest stages and analysed for nitrogen, phosphorus, potassium, calcium and magnesium using micro-kjeldahl method, vanado-molybdo-phosphoric acid method, flame photometric method and versenate titration method respectively. Soil samples were collected at 4 stages *viz.*: pre-sowing, vegetative, reproductive and post-harvest and analysed for nitrogen, P, K, Ca, Mg, organic carbon, total N using Subbiah and Asija's method, Olsen's method, flame photometric method, versenate titration method, Walkley-Black method and Macro-kjeldhahl method respectively.

RESULTS AND DISCUSSION

It has been observed that oil content was gradually and considerably increased with increase in magnesium levels, *i. e.*, from 44.7 per cent to 49.7 per cent. Application of magnesium alone or in combination with nitrogen, phosphorus and potassium resulted in an increase in oil content in sunflower and similar trends for other oilseed crops have been reported elsewhere. Venema (1962) noticed in peanut that application of magnesium as magnesium sulphate enhanced the oil production. Thus there has been an indication that magnesium carriers can be used to increase the oil content up to the limit possible (Table)

TABLE. Results of statistical analysis

	Treatments						SED	CD
	Mg_0	Mg_1	Mg_2	Mg_3	Mg_4	Mg_5		
Effect of magnesium on oil content (per cent)	44.7	44.9	45.8	46.6	47.6	49.7	0.74	2.03
Effect of magnesium on protein content (per cent)	17.3	18.4	19.6	20.8	22.4	24.5	0.72	1.99
Effect of magnesium on yield of kernel (g/plant)	9.72	9.57	9.71	9.76	9.85	9.63	0.74	1.77

Same trend has been observed in the present investigation also. This has been substantiated by earlier workers *viz.*, Key and Kurtz (1960) and Rani Perumal (1972) for soyabean and groundnut respectively.

Protein content and nitrogen content of kernels as criteria of quality were enhanced by magnesium and the increase was a linear function.

Yield of kernel, the most important economic product, was significantly enhanced by magnesium application (Table). Fourth level of magnesium ranks first in increasing the kernel yield, while first level stood last among all, even though they lack statistical significance. Ever increasing supporting evidences have been published from all over the world on the above aspect. Tajuddin (1971) has shown that application of magnesium as magnesium sulphate increased the yield and quality of groundnut in acid soils of Kerala. Hence magnesium can be profitably used for increasing yield as well as the oil content of groundnut.

REFERENCES

KEY, J. L. and L. T. KURTZ. 1960. Response of corn and soyabeans to magnesium fertilizers. Dept. of Agron. Illinois Agr. Exp. Sta. Urbana, *Agron. J.* 52 : 5.

RANIPERUMAL. 1972. Studies on the mode of rhizobial incorporation and its interactions with phosphorus, magnesium and boron on the availability, uptake, yield and quality in groundnut (*Arachis hypogaea* L.). Thesis submitted to and approved by Tamil Nadu Agricultural University.

TAJUDDIN, E. 1971. Effect of lime and magnesium on the yield and quality of groundnut in acid soils of Kerala. *Agric. Res. J. Kerala* 8 (2) : 89—92.

VENEMA, K. C. W. 1962. Some notes regarding function of sulphate anion in the metabolism of oil producing plants, especially oil palms. *Trop. Agric.* 5 (3) : 24—30.