

Research  
Paper

## Effect of integrated nutrient management on quality parameters of summer groundnut

D.S. THORAVE AND M.B. DHONDE

See end of the paper for authors' affiliations

Correspondence to :

**D.S. THORAVE**

Department of Agronomy,  
Agriculture Technical School,  
(M.P.K.V.) Manjri farm,  
Rahuri, AHMEDNAGAR  
(M.S.) INDIA

### ABSTRACT

Groundnut (*Arachis hypogaea* L.) is an important oilseed and cash crop of the country. Independent use of neither the chemical fertilizers nor the organic sources can sustain the fertility of soil and productivity of crops. The present investigation was carried out to find out the effect of integrated nutrient management on quality parameters of summer groundnut. The results revealed that the highest kernel yield, oil yield, protein yield, oil content (%) and protein content (%) were recorded in the treatment of 100 per cent GRD while lowest quality attributes were obtained in treatment of 25% nitrogen through organic fertilizer plus 75% nitrogen through processed urban compost.

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**KEY WORDS :** Quality, Integrated nutrient management, Summer groundnut

In Maharashtra, the groundnut occupies a dominant position as an oilseed crop. The major groundnut growing districts are Dhule, Jalgaon, Akola, Nasik, Kolhapur, Satara, Pune, Ahmednagar and Parbhani. During 2003-04 groundnut occupied an area of 3241 lakh hectares with annual production of 3552 lakh metric tonnes with its productivity of 1096 kg ha<sup>-1</sup> in *Kharif* season (Anonymous, 2005). During summer season, it occupied an area of 547 lakh hectares with production of 816 lakh metric tonnes and the average productivity of 1492 kg ha<sup>-1</sup> (Anonymous, 2005). It appears from the above figures that, yields are higher during summer season and this may be due to adequate sunlight, temperature, availability of timely irrigation and fairly disease and pest free condition. Fertilizers are the 'kingpin' in the present system of agriculture. Scientific uses of fertilizer assume vital importance in sustainable agriculture. Fertilizers pay back to the farmer more profit per unit investment. Integrated nutrient management plays an important role in boosting groundnut production. In other words this concept refers to the maintenance of soil fertility and supply of plant nutrients on desired levels for obtaining optimum or higher groundnut production through all possible sources as organic, inorganic, biotic etc. in an integrated manner. The incorporation of bulky organic manures such as farmyard manure, vermicompost etc. play an important role in plant nutrition especially for nitrogen. The decomposition of

organic matter results into formation of humus which can bring out physical, chemical changes in soil and play an important role in maintaining soil fertility in both light and heavy textured soils. The processed urban compost is the organic manure which also gives beneficial effect on soil health and production of crop.

### RESEARCH PROCEDURE

The field experiment was conducted during summer season 2005 at Post Graduate Institute Research Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri. The ten treatments consisted of 100 per cent recommended dose of NPK (25:50:00 kg ha<sup>-1</sup> plus 5 t FYM ha<sup>-1</sup>) and nine treatment combinations with 25, 50 and 75 per cent N through inorganic fertilizer plus 75, 50 and 25 per cent N through organic manures namely FYM, processed urban compost and vermicompost were laid out in randomized block design with three replications. The soil of the experimental plot was sandy clay loam in texture with low in available nitrogen (235 kg ha<sup>-1</sup>), moderately high in available phosphorus (32 kg ha<sup>-1</sup>) and very high in potassium (393 kg ha<sup>-1</sup>) with alkaline in reaction (pH 8.1).

### RESEARCH ANALYSIS AND REASONING

The data recorded during the course of investigation were tabulated, statistically analysed and results are

interpreted here under appropriate heads:

### Quality studies:

Data pertaining to the mean kernel yield, oil content, oil yield, protein content and protein yield of groundnut as influenced by different treatments are presented in Table 1.

Table 1 revealed that mean kernel yield, oil content, oil yield, protein content and protein yield were 23.76 q ha<sup>-1</sup>, 49.03 per cent, 11.68 q ha<sup>-1</sup>, 23.83 per cent and 5.69 q ha<sup>-1</sup>, respectively.

### Kernel yield:

Table 1 showed that the treatment of 100 per cent GRD recorded the highest kernel yields (28.26 qha<sup>-1</sup>) and was significantly superior to most of the treatments. However, it was at par with 75 per cent N through inorganic fertilizer plus 25 per cent N through vermicompost (27.26 q ha<sup>-1</sup>), which was also at par with 75 per cent N through inorganic fertilizer plus 25 per cent N through FYM (26.66 q ha<sup>-1</sup>) and 50 per cent N through inorganic fertilizer plus 50 per cent N through vermicompost (26.40 q ha<sup>-1</sup>). The lowest kernel yield (17.80 q ha<sup>-1</sup>) was recorded in treatment of 25 per cent N

through inorganic fertilizer plus 75 per cent N through processed urban compost.

### Oil content:

Table 1 pertains to treatment of 100 per cent GRD recorded the highest oil content of groundnut (49.82 %) and was significantly superior to treatment of 75 per cent N through inorganic fertilizer plus 25 per cent N through processed urban compost (48.54 %), 50 per cent N through inorganic fertilizer plus 50 per cent N through processed urban compost (48.12 %) and 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost (47.32 %). However, it was at par with most of the treatments. The lowest oil content of (47.32 %) was recorded in treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost.

### Oil yield:

Table 1 shows that treatment of 100 per cent GRD recorded the highest oil yield of groundnut (14.07 q ha<sup>-1</sup>) and was significantly superior to most of treatments. However, it was at par with 75 per cent N through inorganic fertilizer plus 25 per cent N through

**Table 1 : Mean kernel yield, oil yield and protein yield and oil content and protein content as influenced by different treatments**

Sr. No.	Treatments	Kernel yield (q ha <sup>-1</sup> )	Oil content (%)	Oil yield (q ha <sup>-1</sup> )	Protein content (%)	Protein yield (q ha <sup>-1</sup> )
1.	100 % General recommended dose (GRD)	28.26	49.82	14.07	24.56	6.94
2.	25 % N through inorganic fertilizer + 75 % N through FYM	19.71	49.23	9.70	23.58	4.64
3.	50 % N through inorganic fertilizer + 50 % N through FYM	24.94	49.45	12.33	24.18	6.02
4.	75 % N through inorganic fertilizer + 25 % N through FYM	26.66	49.52	13.20	24.34	6.48
5.	25 % N through inorganic fertilizer + 75 % N through processed urban compost	17.80	47.32	8.41	21.29	3.79
6.	50 % N through inorganic fertilizer + 50 % N through processed urban compost	22.43	48.12	10.78	23.91	5.36
7.	75 % N through inorganic fertilizer + 25 % N through processed urban compost	23.49	48.54	11.56	24.00	5.71
8.	25 % N through inorganic fertilizer + 75 % N through vermicompost	20.65	49.12	10.14	23.74	4.90
9.	50 % N through inorganic fertilizer + 50 % N through vermicompost	26.40	49.48	13.06	24.23	6.39
10.	75 % N through inorganic fertilizer + 25 % N through vermicompost	27.26	49.78	13.57	24.45	6.67
	CV %	2.93	1.31	3.04	2.26	4.02
	S.E. ±	0.40	0.37	0.20	0.31	0.13
	C.D. (P=0.05)	1.19	1.09	0.61	0.92	0.39
	General Mean	23.76	49.03	11.68	23.83	5.69

Note: GRD: 25:50:00 N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O kg ha<sup>-1</sup> + 5 t FYM ha<sup>-1</sup>

vermicompost (13.57 q ha<sup>-1</sup>). The lowest oil yield (8.41 q ha<sup>-1</sup>) was observed in treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost.

#### Protein content:

Table 1 revealed that treatment of 100 per cent GRD recorded the highest protein content of groundnut (24.56 %) and was significantly superior to treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through FYM (23.58 %). However, it was at par with most of the treatments. The lowest protein content (21.29 %) was observed in treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost.

#### Protein yield:

Table 1 pertains that treatment of 100 per cent GRD recorded the highest protein yield of groundnut (6.94 q ha<sup>-1</sup>) and was significantly superior to most of treatments. However, it was at par with treatment of 75 per cent N through inorganic fertilizer plus 25 per cent N through vermicompost (6.67 q ha<sup>-1</sup>). The lowest protein yield (3.79 q ha<sup>-1</sup>) was observed in treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost. Similar findings were observed by Rahate *et al.* (1990), Chittapur *et al.* (1993), Deshmukh *et al.* (1995), Chawale *et al.* (1995), Badole *et al.* (2001) and Shekh *et al.* (2004).

#### Conclusion:

The highest kernel yield, oil yield, protein yield, oil content and protein content were 28.26 q ha<sup>-1</sup>, 14.07 q ha<sup>-1</sup>, 6.94 q ha<sup>-1</sup>, 49.82 per cent and 24.56 per cent, respectively recorded in treatment of 100 per cent GRD. The lowest quality attributes were recorded in treatment of 25 per cent N through inorganic fertilizer plus 75 per cent N through processed urban compost.

#### Authors' affiliations:

**M.B. DHONDE**, Department of Agronomy, Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth, Rahuri, AHMEDNAGAR (M.S.) INDIA

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