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A research review on the use of different organic sources of nitrogen in groundnut (*Arachis hypogaea* L.)

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Abstract
Groundnut is the single largest source of edible oils in India and constitutes roughly about 50% of the total oilseeds production. Currently, India grows about more than 8 million tonnes of groundnut (in the shell). Use of organic manures to meet the nutrient requirement of the crop would be an inevitable practice for sustainable agriculture. Since organic manures generally improve the soil's physical, chemical and biological properties along with conserving the moisture holding capacity of the soil and thus resulting in enhanced crop productivity along with maintaining the quality of crop production. Organic farming in recent years is gaining significance due to the realization of inherent advantages it confers in sustaining crop production and also in maintaining dynamic soil nutrient status and safe environment. The aim of this review paper is to know the use of nutrient management in groundnut crops for vegetative growth, flowering behaviour, yield, and quality attributes. Also, provide a ready source of literature review for researchers involved in agricultural sciences.

Keywords: Organic fertilizer, nutrient uptake, yield, quality

Introduction
Groundnut (*Arachis hypogaea* L.) is family Leguminosae is that the "King of oilseed" in our country is a very important crop each for oil and food crop of tropical and semi-arid tropical countries, wherever it provides a serious supply of edible oil and vegetable super molecule. Groundnut has the primary place among all the seed crops in the Republic of India accounting for quite forty % surface area and sixty % production within the country. The Republic of India ranks initial in space of eight. 4 million hectares causative eight.4 million tonnes production of groundnut (Tank *et al.*, 2006) [24]. Vegetable oil is primarily utilized in the manufacture of oil. Groundnut naturally enriches the soil through mutuality. Organic sources that area unit smart for improvement of soil properties, besides supply nutrients for an extended amount of your time while not feat sick effects on soil has been accomplished. Organic farming will offer quality food while not adversely touching the soil health and atmosphere (Yadav *et al*., 2013) [25]. Lenin *et al*. (2013) [26] declared that the vermicompost + AMF application increase the all nutrient content of groundnut. Use of organic manures to satisfy the nutrient demand of crop would be inevitable practices within the years to return for property agriculture since, organic manures usually improve the soil physical, chemical and biological properties at the side of protecting the wet holding capability of soil and so leading to increased crop productivity at the side of maintaining the standard of crop turn out. Organic farming in recent years is gaining significance thanks to the realization of inherent blessings. It confers in sustaining crop production and additionally in maintaining dynamic soil nutrient standing and safe setting. Organic manures play an important role in increasing the productivity of pulses by many suggests that manure or compost application to supply for corn N necessities might greatly increase soil levels of P and different ions. This is often as a result of the N/P ratios of cattle building manure and composted manure is considerably smaller than N/P uptake ratios of the most crop. Utilization of natural composts to satisfy the supplement necessity of harvest would be inevitable practices within the years to want endurable farming since, natural fertilizers for the foremost half improve the dirt physical, artificial and organic properties aboard parceling the moistness holding limit of soil and consequently transportation regarding upgraded crop potency aboard maintaining the character of yield turn out. Organic cultivating as currently is reading essentiality attributable to the acknowledgment of characteristic benefits. It presents in continued yield creation and moreover to keep up distinctive soil supplement standing and safe condition. Natural excrements assume an essential job in increasing the potency of heartbeats by a couple of strategies.

body waste or chemical application to accommodate corn N wants might considerably expand soil dimensions of P and totally different particles. this can be on the grounds that the N/P proportions of meat steers building chemical and treated the soil compost are primarily littler than N/P take-up proportions of typically crops. Manure management is outlined as a call creating method that aims to mix profitable agricultural production with lowest nutrient losses from manure, each within the gift and within the future (Brandjes *et al.,* 1996) [27]. Such property agricultural management practices area unit is important within the production of healthy food for humans and animals. within the soil organic cropping system, the intention is to fill the nutrient standing and organic matter content of the soil through the employment of plant residues, yard manure (FYM) and plant rotation (Niemi *et al.,* 2008) [28]. Manure has long been thought-about as a valuable input to the soil for crop production. in an exceedingly broad sense, manure management relates to the suitable use of animal manure in step with the capabilities and goals of every farm, whereas enhancing the soil quality, crop nutrition, and profit (Nowak *et al.,* 1998) [29].

Nitrogen includes an important role in manufacturing the agricultural product and choosing the quantity of nitrogen-containing fertilizers are necessary for having the best production level. Surface assimilation of adequate amounts of N by a plant ends up in additional super molecule content and bigger cereal and legume seeds. Maintenance of spare levels of organic matter in soils is necessity for property and high production of crops (Arafat, S.M., 1994) Iron (Fe) within the vermicompost play a major role in growth processes together with synthesis of pigment, energy transfer, respiration, and chemical change processes, organic process (Gohari, and Niyaki, 2010) [30] Organic manure contains a profound result on up soil physical, chemical, and biological properties and enhancing productivity of field crops. In groundnut, application of FYM @ 10-15 t ha-1 exaggerated the pod and stalk yields and improved the yield parameters like shelling percentage, one hundred seed weight and sound mature

kernel compared to the suggested dose of fertilizers (Subrahmaniyan *et al*., 2000) [31]. Yard manure not solely provided nutrients however additionally improved soil conditions to supply higher yields (Jagdev and Singh, 2000) [32]. FYM application had exaggerated the dry matter production, which could flow from to exaggerate unharnessed of macro yet as micronutrients in higher extraction by the groundnut (Dosani *et al*., 1999) [33]. Badole *et al.* (2004) [3] confirmed that application of organic manures (Farmyard manure, vermicompost, neem seed cake) observed that positive residual effect on yield of succeeding groundnut crop.

Increased pod yield because of the appliance of pressmud either on an individual basis or together with inorganic plant food was reported by Sriram Chandrasekaran (2001) [35] and Manikandan (2003) [36] in groundnut. D. Senthil Kumar *et al*. 2014 tasted that the impact of vermicompost, integrated with vermicompost enriched with biofertilizers for growth, yield, and quality of groundnut. The organic fractions of flower waste vermicompost and microorganisms within the biofertilizers may be an alternate to chemical fertilizers to up the expansion and yield of groundnut. Kamdi, T. S. (2014) [38] impact of organic treatment on crop institution and seed quality in groundnut and to develop an organic farming protocol for maximizing seed quality of groundnut. seed treatment was most useful for enhancing seed quality of groundnut owing to an increase in accessibility of nutrient, enhance nutrient uptake and activity of microorganism agent. Poultry manure is superb organic manure because it contains high nitrogen, phosphorus, metal and alternative essential nutrients. In distinction to mineral fertilizer, it adds organic concern soil that improves soil structure, nutrient retention, aeration, soil wetness holding capability, and water infiltration (Deksissa *et al*., 2008) [39]. Plant nutrient deficiency found to affect plant growth and reduced yield and quality of groundnut. The main objective of this paper to review different hypothesis and experimental results on nutrient functions.

The major response of different organic source of nitrogen in groundnut

Vegetative growth and Flowering Behaviour

Many reports have shown higher vegetative growth in use different organic source of nitrogen over the comparable inorganic source of nitrogen. Applications of a different organic source of nitrogen significantly influence the vegetative growth of groundnut. Kadam *et al.* (2000) [8] studied the effects of plating layout, FYM and application of sulphur (0, 20, and 40 kg S ha^{-1}) on growth of groundnut and observed significantly increased the plant height, number of branches, functional leaves, dry matter and leaf area plant with 10 tonne FYM ha^{-1} application. Lourduraj (2000) [13] reported that application of organic manure with recommended fertilizers significantly enhance the growth parameters of groundnut Thakare *et al.* (2003) [18] in a field trail observed increased plant height, number of nodules, dry weight of shoot per plant, dry weight of root per plant, number of developed pods, number of undeveloped pods at harvest, weight of undeveloped pods and number of gynophores at harvest of groundnut when applied with 50% RDF + 5t FYM ha^{-1} + PSB + Rhizobium. Mohanty *et al.* (2005) [14] conducted an experiment to find out the response of groundnut to the application of different organic manure (FYM, Poultry and Vermicompost) and observed growth parameters was significantly superior to control. Kausale *et al.* (2006) [10] observed that organic manure significantly increased the number of root nodules per plant and dry matter accumulation per plant of groundnut. Abraham *et al.* (2008) [1] observed that application of FYM at 13tonnes ha^{-1} significantly increased growth parameters of groundnut *viz.* number of branches per plant, number of branches per plant, number of pegs per plant and dry weight of plant as compared to control. Singh and Jagadeesh (2009) [17] reported that significantly increased nodulation, chlorophyll content, and number of nodules, nodule weight, and shoot, root and total biomass of groundnut. Zalate and Padmani (2009) [23] concluded that application of FYM 6 t/ha + Rhizobium + PSM was found significantly increase plant height, nodules per plant, of groundnut, respectively over no manuring. Fertilizing the crop with vermicompost 2.0 t/ha + Rhizobium + PSM and FYM 3.0 t/ha+Rhizobium+PSM found equally effective and significantly superior to control in respect to growth parameters of groundnut. Badole *et al.* (2004) [34] have reported that significant residual effect of different organic treatments may be ascribed to the increased availability of nutrients due to mineralization of organic materials, the release of CO_2, increasing fertilizer use efficiency, accumulation of organic carbon and improvement of physical properties of soil. This finding has also been supported by Bhattacharya and Ghosh (2001) [5] and Gopalakrishnan (2007)

[36] have reported while organic sources besides supplying N, P and K also improved the soil condition, which enhanced the root proliferation and source-sink relationship. This significant influence on growth characters might have been due to the enhancement of uptake of nutrients favoured by the addition of organic manures. Nitrogen from organic manures is released slowly and 25-50% is released in the first year. Recovery of P from organic manure is slightly better than from fertilizers as CO_2 released by decomposition improves availability from the soil. Anburani and Manivannan (2002) [2] have reported the better efficiency of organic manures might be due to the fact that the organic manures have provided the micronutrients such as Zn, Cu, Fe, Mn, and Mg in an optimum level. Application of organic manures thus would have helped in the plant metabolic activity through the supply of such important micro nutrients in the early vigorous growth. Kausale *et al.* (2006) [10] have reported that organic manure favors root development which results in to increase in root nodule number, a number of root nodules increases in nitrogen and other nutrients which were a significantly higher number of nodules per plant. The chlorophyll content in the leaves might have been significantly improved with the application of an organic source of nutrients. The application of different organic manures, which contain appreciable quantities of magnesium, might have helped in chlorophyll synthesis which in turn increased the rate of photosynthesis. This finding has also been supported by Nehra *et al.* (2001) [15] and Sanwal *et al.* (2007) [16]. Increase in plant dry weight with the application of organic manures might have been due to enhanced cell multiplication, elongation and expansion a deep green color to leaves due to better chlorophyll synthesis, which is turn increase the effective area for photosynthesis resulting in relatively greater amounts of plant dry matter accumulation. Similar findings were also obtained by Thakare *et al*. (2003) [18] and Kausale *et al.* (2009) [9]. Bhattacharya and Ghosh (2001) [5] and Gopalakrishnan (2007) [7] have reported while organic sources besides supplying N, P and K also improved the soil condition, which enhanced the root proliferation and source-sink relationship. This significant influence on growth characters might have been due to the enhancement of uptake of nutrients favored by the addition of organic manures. Nitrogen from organic manures is released slowly and 25-50% is released in the first year. Recovery of P from organic manure is slightly better than from fertilizers as CO_2 released by decomposition improves availability from the soil.

Yield and yield Attributes

Many reports have shown higher yield in use different organic source of nitrogen over the comparable inorganic source of nitrogen. Applications of a different organic source of nitrogen significantly increased yield attributes of groundnut (*Arachis hypogaea* L.). Thimmegowada (1993) [19] while studying the effect of the application of organic manures preceding crop had a significant residual effect on yield of succeeding groundnut. Wankhede and Bhathkal (1994) [22] while studying the residual effect of different organic treatments and particularly integrated nutrient supply system resulted in a significantly higher dry pod and haulm yield. Loganathan (1996) [12] reported a significant increase in the yields attributing characters of groundnut with the application of 9 kg N, 54 kg K20 and 6.25 t FYM/ha. Barar *et al*. (1999) [4] concluded that application of FYM at 10 tonne ha-1 or poultry manure at 3 tonnes ha-1 significantly increased the yield attributing characters of groundnut. Kadam *et al*. (2000) [8] reported that pod yield and haulm yield of groundnut significantly increased with application 10-tonne FYM ha-1. Kumaran (2000) [11] reported that highest shelling percentage, harvest index, and pod yield with basal NPK plus 12.5 t basal FYM/ha plus 17 kg P2O5/ha at 30 days after sowing (DAS) plus 400 kg gypsum at 40 DAS. Lourduraj (2000) [13] reported that application of organic manure with recommended fertilizers significantly enhances the yield attributing characters of groundnut. Verma *et al*. (2003) [21] reported that FYM is a very important input for groundnut production and accounted for 40.92% of the total variation in pod yield. Thorave and Dhonde (2008) [20] in a field trail observed the maximum pod yield of groundnut with 100% recommended dose and was at par with 75% N through inorganic fertilizer + 25% N through vermicompost. Singh and Jagadeesh (2009) [17] reported that significantly enhance the yield attributing characters of groundnut with the application of compost and farmyard manure, this may be approximately 13% higher total biomass yield than that of the control. Zalate and Padmani (2009) [23] observed that application of 6 t/ha and 3 t/ha FYM along with Rhizobium+PSM and gave significantly increased pod, haulm, biological yields and shelling percentage of groundnut over no manuring. The shelling percent too exhibited a similar trend as the different organic treatments helped to increase the pod filling and test weight, which in turn favored the improvement in shelling percent. Similar results have been reported by Abraham *et al*. (2008) [1].

Quality characters

In recent time, use a different organic source of nitrogen is getting value and popularity due to its positive results in Nutrient management and quality food produced. Many reports have indicated that improved the performance of groundnut quality. Dutta and Mondal (2006) [6] reported that application of FYM @ 7.5 tonnes/ha and fertilizer @ N_{30} P_{60} K_{40} kg/ha along with 500 kg gypsum/ha was found significantly higher oil content of yield of groundnut. Kadam *et al.* (2000) [8] while studying the effect of the application of 10 tonnes FYM ha-^{1}, reported in groundnut significant increase in the oil content and protein content. Thimmegowada (1993) [19] reported that oil content and protein content of succeeding groundnut were significantly increased due to the residual effect of organic sources of nutrients. Zalate and Padmani (2009) [23] showed that application of 6 t/ha and 3 t/ha FYM along with Rhizobium+PSM gave significantly increased oil yield and protein content of groundnut over no manuring.

Conclusion

With the help of reviews mentioned above, it is concluded that the application of a different organic source of nitrogen in nutrient management of groundnut will continue to increase in the near future, depending primarily upon the economic benefits of this nutrient management in comparison to another inorganic source of Nitrogen management. Groundnut being a leguminous crop, it is capable of fixing atmospheric nitrogen Peanut perform better in terms of yield and quality when good cultivar was sown under optimum nutrient management coupled with organic nutrient management. Application of different organic sources of nitrogen may be adopted for obtaining maximum yield and quality of groundnut with highest net profit.

References

1. Abraham T, Thenua OVS, Singh SP, Jacob P. Performance of groundnut as influenced by organic and

inorganic sources of nutrients and their method of application. Legume Res. 2008; 31(3):224-226.
2. Anburani A, Manivannan K. Effect of integrated nutrient management on growth in brinjal. South Indian Hort. 2002; 50(4-6):377-386.
3. Badole SB, More SN, Adsul PB, Shaikh AK, Dhamak AL. Residual effect organic manures and inorganic fertilizers on yield and gross monetary returns of groundnut. J Soil and Crops. 2004; 14(1):196-197.
4. Barar BS, Dhillon NS, Vig A. CIntegrated use of farmyard manure, biogas slurry and inorganic phosphate in plant nutrition of wheat crop. Journal of Indian Society of Soil Science. 1999; 47:268-271.
5. Bhattcharya P, Ghosh P. Phosphorus use efficiency in brinjal with FYM and sulfur. Journal of Indian Society of Soil Science. 2001; 49(3):456-462.
6. Dutta D, Mondal SS. The response of summer groundnut (*Arachis hypogaea* L.) to moisture stress, organic manure, and fertilizer with and without gypsum under lateritic soil of West Bengal. Indian Journal of Agronomy. 2006; 51(2):145-148.
7. Gopalakrishnan TR. Vegetable Crops. Hort. Sci. Series 2007; 4:32-33.
8. Kadam UA, Pawar VS, Pradeshi HP. Influence of planting layouts, organic and levels of sulphur on growth and yield of summer groundnut. J Maharashtra Agric. Univ. 2000; 25(2):211-213.
9. Kausale SP, Shinde SB, Patel LK, Borse NS. Effect of integrated nutrient management on nodulation, dry matter accumulation and yield of summer groundnut at South Gujarat conditions. Legume Research. 2009; 32(3):227-229.
10. Kausale SP, Kote GM, Awasarmal VB, Borse NS. Effect of INM on nodulation, growth, and yield of summer groundnut. Ann. Plant Physiol. 2006; 20(2):226-229.
11. Kumaran S. Role of organic manure, fertilizer levels, split application of phosphorus and gypsum application on shelling percentage, harvest index, pod and oil yield of irrigated groundnut. Research on Crops. 2000; 1(3):344-347.
12. Loganathan S, Helkiah J, Thangavelu S. Effect of FYM, nitrogen, and potash on yield and uptake of nutrients in groundnut. Madras Agri Journal. 1996; 83(8):484-487.
13. Lourduraj AC. Effect of irrigation manure application on the growth and yield of groundnut. Acta-agronomic Hungarica. 2000; 43(1):83-88.
14. Mohanty S, Paikaray NK, Rajan AR. Uptake of major nutrients from organic manures in groundnut sequence. Ann. Agric. Res New series. 2005; 26(3):3449-352.
15. Nehra AS, Hooda IS, Singh KP. Effect of integrated nutrient management on growth and yield of wheat (*Triticum aestivum L.*) Indian J Agron. 2001; 45:112-17.
16. Sanwal SK, Lakminarayana K, Yadav RK, Rai N, Yadav DS, Mousumi B. Effect of organic manures on soil fertility, growth, physiology, yield, and quality of turmeric. Indian J Hort. 2007; 64(4):444-449.
17. Singh MD, Jagadeesh KS. Use of composted eupatorium as a source of nutrients for groundnut. Karnataka Journal of Agri Sciences. 2009; 22(1):190-191.
18. Thakare GV, Ulemale RB, Shivankar RS, Dahipale AV. Morphological indices and yield attributes as influenced by integrated nutrient management in summer groundnut. Ann. Plant Physiol. 2003; 17(1):1-5.
19. Thimmegowada S. Effect of residual fertility and direct fertilization on kernel, protein and oil yield of peanut grown in rice fallow. J Sci. Food Agric. 1993; 61:385-387.
20. Thorave DS, Dhonde MB. Effect of integrated nutrient management on yield and nutrient uptake in summer groundnut. Journal of Maharashtra Agric. Univ. 2008; 33(2):284-285.
21. Verma PD, Munsh MA. FYM, A key component in enhancing groundnut productivity in the Saurashtra region of Gujarat Haryana Agricultural University Journal of Research. 2003; 33(2):143-147.
22. Wankhede ST, Bhathkal BG. The residual effect of nitrogen applied to deshi cotton varieties under different densities on succeeding summer groundnut. J PKV Res. 1994; 18(1):29-32.
23. Zalate, Padmani. Effect of organic manure and biofertilizers on growth and yield attributing characters of Kharif groundnut (*Arachis hypogaea* L.). International Journal of Agricultural Sciences. 2009; 5(2):343-345.
24. Tank DA, Meisheri TG, Usadadia VP. Integrated nutrient management in summer groundnut. Crop Res. 2006; 31(1):61-62.
25. Yadav SK, Subhash Babu. Yadav MK, Kalyan Singh, Yadav GS, Suresh PA. review of organic farming for sustainable agriculture in Northern India. International J Agronomy, 2013, 1-8.
26. Lenin M, Rapamycin T. The effect of different levels of vermicompost (VC) on the nutrient contents of (*Arachis hypogaea* L.) under Arbuscular mycorrhiza fungi (AMF) (Glomus intraradices) application. Ind. J Sci. Res. and Tech. 2013; 1(2):37-45.
27. Brandjes PJ, de Wit J, van der Meer HG, Van Keulen H. Environmental impact of animal manure management. In: Livestock and the Environment: Finding a Balance. International Agriculture Centre, Wageningen, The Netherlands, 1996, 53.
28. Niemi RM, Vepsalainen M, Wallenius K, Erkomma K, Kukkonen S, Palojarvi A *et al*. Conventional versus organic cropping and peat amendment: impact on soil microbiota and their activities. Eur J Soil Biol. 2008; 44(4):419-428.
29. Nowak P, Shepard R, Madison F. Farmers and manure management: a critical analysis. In: Hatfield, J.L., Stewart, B.A. (Eds.), Animal Waste Utilization: Effective Use of Manure as a Soil Resource. Ann Arbor Press. Ann Arbor. MI. USA, 1998.
30. Abizaid Gohari A, Niyaki SAN. Effects of Iron and Nitrogen fertilizers on Yield and Yield components of Peanut (*Arachis hypogaea* L.) in *Astaneh Ashrafiyeh*, Iran. Ame. Eur. J Agri. Env. Sci. 2010; 9(3):256-262.
31. Subrahmaniyan KP, Kalaiselvan, Arulmozhi N. Studies on the effect of nutrient spray and graded level of NPK fertilizers on the growth and yield of groundnut. Intern. J Trop. Agric. 2000; 18(3):287-290.
32. Jagdev Singh, Singh KP. Effect of Acetobacter FYM and fertility levels on yield nitrogen recovery and use efficiency in spring sunflower. Haryana University journal of Agronomy. 2000; 16:57-60.
33. Dosani AAK, Talashilkar SC, Metha VB. Effect of poultry manure applied in combination with fertilizer on the yield, quality and nutrient uptake of groundnut. J Indian Soc of Soil Sci. 1999; 47(1):166-169.
34. Badole SB, More SN, Adsul PB, Shaikh AK, Dhamak AL. Residual effect organic manures and inorganic fertilizers on yield and gross monetary returns of groundnut. J Soil and Crops. 2004; 14(1):196-197.

35. Sriram Chandrasekaran MV. Effect of industrial and organic wastes on groundnut in typic ustifluvent soil. Am. Agric. Res. New series. 2001; 22(3):436-438.
36. Manikandan K. Studies on the effect of organics on their soils of Thoothukudi district and the yield and quality of groundnut (*Arachis hypogaea* L.) var. VRI 2, M.Sc. (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, 2003.
37. Kumar DS, Kumar PS, Kumar VUG, Anbuganapathi. Influence of Biofertilizer Mixed Flower Waste Vermicompost on the Growth, Yield and Quality of Groundnut (*Arachis hypogea)* World Applied Sciences Journal. 2014; 31(10):1715-1721.
38. Kamdi TS, Sonkamble P, Joshi S. Effect of organic manure and biofertilizers on seed quality of groundnut (*Arachis hypogaea* L.) The Bi oScane. 2014; 9(3):1011-1013.
39. Deksissa Short TI, Allen J. Effect of Soil Amendment with Compost on Growth and Water Use efficiency of Amaranth. In: Proceedings of the UCOWR/NIWR Annual Conference: International Water Resources: Challenges for the 21st Century and Water Resources Education, July 22-24, Durham, 2008.