

RESEARCH ARTICLE

Effect of integrated nitrogen management on quality of rice

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SUMMARY

A field experiment was conducted during *Kharif*, 2012 at Rice Research Unit, Bapatla to study the quality of rice affected by integrated use of nitrogen. The experiment was laid out in Randomized Block Design with ten treatments. Results of the investigation revealed that significantly the highest quality parameters of rice like head rice recovery, volume expansion ratio, iron and zinc content were recorded by the application of 50 per cent nitrogen through organics and 50 per cent nitrogen through in-organics and it was on par with 100 per cent RDN through organic source treatment.

Key Words : Rice, Quality, Integrated use of nitrogen

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Rice is the staple food crop in Asia including India. In the year 2011, the area under rice in India 44.41 m ha with a production of 104 m ha with productivity of 2.2 t ha⁻¹ CMIE, 2011). In Andhra Pradesh the area was 4.0 lakh ha and production is 12.8 lakh tonnes. Introduction of high yielding varieties responsive to chemical nutrients brought a spectacular increase in use of chemical fertilizers in rice. Nutrient mining by high yielding varieties was usually more than that applied through chemical fertilizers. This type of nutrient mining over years led to improvement of soil fertility and decline in crop productivity (Nambiar *et al.*, 1992). Integrated

use of chemical fertilizers with manures and green manure crop is important for sustainable rice production. With increased consciousness of consumer for quality and globalization in the country should not only look at sustainable production but also satisfactory quality of produce. Among them, nutrient management affects the quantity and quality of rice production.

MATERIAL AND METHODS

A field experiment was conducted during *Kharif* season of 2012 at Rice Research Station, Bapatla. The Soil of the experiment field was Sandy clay loam in texture with pH 7.7, organic carbon 0.47 per cent and available N, P₂O₅ and K₂O as 245.61, 28.5 and 301 kg/ha, respectively during *Kharif* season of 2012. The experiment laid out in Randomized Block Design with 10 treatments and replicated thrice. FYM and pressmud was incorporated in main field 25 days before transplanting as per treatments. Twenty five days old

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Table 1: Quality parameters of rice affected by integrated use of nitrogen

Treatments	Protein content (%)	Head rice recovery (%)	Volume expansion ratio	Fe content (ppm)	Zinc content (ppm)
T ₁ -control	6.57	60.3	3.03	14	18
T ₂ -100% RDN through urea	7.4	61.8	3.44	16	20
T ₃ -100% RDN through FYM	6.9	65.8	3.96	23	24
T ₄ -100% RDN through pressmud	6.7	65.2	3.94	23	24
T ₅ -50% RDN through urea+ 50 % RDN through FYM	7.6	67.7	4.00	25	25
T ₆ -50% RDN through urea+ 50 % RDN through pressmud	7.1	66.5	3.98	24	25
T ₇ -75% RDN through urea+ 25 % RDN through FYM	8.1	63.3	3.50	21	22
T ₈ -75% RDN through urea+ 25 % RDN through pressmud	7.9	63.0	3.49	19	22
T ₉ -100 % RDN through urea+ 25 % RDN through FYM	8.2	62.3	3.47	18	21
T ₁₀ -100 % RDN through urea+ 25 % RDN through pressmud	8.2	62.0	3.45	17	21
S.E. _±	0.06	0.5	0.12	0.5	0.5
C.D. (P=0.05)	0.1	1.4	0.36	1.0	1.0
CV (%)	1.4	1.3	5.8	4.2	3.6

seedlings were transplanted into main field by adopting a spacing of 20 cm between rows and 15 cm between plants with in a row. Nitrogen was applied as per the treatments in three equal splits in the form of urea. First split of nitrogen was applied as basal dose at the time of planting of the crop remaining two equal splits of nitrogen was broadcasted at maximum tillering and panicle initiation stages. Phosphorus was applied at the rate of 60 kg P₂O₅ ha⁻¹ in the form of single super phosphate as basal and potassium 40 kg K₂O ha⁻¹ in the form of muriate of potash was applied in two equal splits as basal dose at the time of transplanting and panicle initiation stage. Irrigation and weed management was done in time to time. Adequate and timely plant protection measures were taken up. Data collected on quality were analyzed by the following standard statistical analysis procedure.

RESULTS AND DISCUSSION

The data revealed that quality parameters were significantly influenced by different treatment combinations. In general protein content is dependent on nitrogen content of grain and thereby increasing the protein synthesis under the adequate supply of nitrogen. Results revealed that T₉ treatment which received 100 per cent N through in-organic and 25 per cent N through organic sources. The highest protein content recorded the availability of nitrogen throughout the crop growth period reported by Bhuyan and Borah (1997); Dixit and Gupta (2000) and Priyadarsini and Prasad (2003).

The highest head rice recovery was recorded in T₅

treatment *i.e* 50 per cent nitrogen through organic + 50 % nitrogen through in-organic fertilizers. In this higher dose of organic fertilizers in combination with in-organic fertilizers perfects the grain filling process without air vacuoles. These findings were supported by Ram *et al.* (2000).

Highest volume expansion ratio Fe and zinc contents were obtained with the combined application of 50 per cent nitrogen through organic + 50 % nitrogen through in-organic fertilizers which was on a par with 100 per cent nitrogen through in-organic source treatment.

From the above results it may be concluded that quality parameters like head rice recovery, volume expansion ratio Fe and zinc contents can realized with combined application of 50 per cent nitrogen through organic + 50 per cent nitrogen through in-organics.

REFERENCES

- Bhuyan, D.J. and Borah, R.C. (1997). Effect of time schedules and method of urea application on soil N, leaf nitrogen reeducate activity grain protein and yield of rice under rainfed lowland condition. *Oryza*, **34**(3):213-216.
- CMIE (2011). *Executive summary, GDP growth*. Centre for monitoring Indian Economy (CMIE) Pvt. Ltd., Mumbai, April, 2011, 1-10.
- Dixit, K.G. and Gupta, B.R. (2000). Effect of farm yard manure, chemical and biofertilizers on yield and quality of rice and soil properties. *J. Indian Society of Soil Science.*, **48**(4): 773-780.

Nambiar, K.K.M., Sohi, P., Sehgal, M.R. and Mehta, D.K.(1992). *Annual report 1987-88, 1988-89, All India co-ordinated project on long term fertilizer experiment*, Indian Council of Agricultural Research, 1992. New Delhi, India.

Priyadarsini, J. and Prasad, P.V.N. (2003). Grain quality of rice

affected by varieties and nitrogen sources. *Andhra Agricultural J.*, **50**(1&2): 14-17.

Ram, S., Chauhan, R.P.S., Singh, B.B. and Pal Singh, V. (2000). Integrated use of organic and fertilizer nitrogen in rice (*Oryza sativa*) under partially reclaimed sodic soil. *Indian J. Agric. Sci.*, **70** (2): 114-116.

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