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Research Notes

Influence of organic, biofertilizer and inorganic forms of nutrients o rice quality

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With the increase in rice production, greater emphasis is being given to rice grain quality traits. As the rice consumer wants the products with best quality to international standard and also in view of the export potential where stringent quality parameters are imposed, the current rice research is being oriented towards the development of improved germplasm with good grain quality, with good nutrient management practices to obtain a rice variety with superior grain qualities. Adoption of agronomic and nutrient management practices play a vital role in improving rice productivity as well as in obtaining rice grain with the superior grain qualities. In the preserverance of these objectives, the present study was undertaken to evaluate the complementary effect of organic and inorganic N along with biological N sources (*Azospirillum* and *Azolla*) on rice grain yield and quality.

Field experiment was laid out during the *rabi* season, 1996 at experimental station of Tamil Nadu Agricultural University, Coimbatore on a clay loam soil with pH 8.2; organic carbon, 0.78%; available N, 285 kg ha^{-1}; available P, 15.4 kg ha^{-1} and available K, 616 kg ha^{-1}. The experiment comprised of 15 treatments laid out in Randomized Block Design with three replications. The treatments included were 50% N as *Sesbania rostrata* + 25% N as *azolla* + 25% N as *Azospirillum* (T_1); 50% N as *Sesbania rostrata* + 50% N as neemcake (T_2); 50% N as *Sesbania rostrata* + 50% N as poultry manure (T_3); 50% N as FYM + 25% N as *azolla* + 25% N as *Azospirillum* (T_4); 50% N as FYM + 50% N as neemcake (T_5); 50% N as FYM + 50% N as poultry manure (T_6); 50% N as pressmud + 25% N as *azolla* + 25% N as *Azospirillum* (T_7); 50% N as pressmud + 50% N as neemcake (T_8); 50% N as pressmud + 50% N as poultry manure (T_9); 50% N as biogas slurry + 25% N as *azolla* + 25% N as *Azospirillum* (T_{10}); 50% N as biogas slurry + 50% N as neemcake (T_{11}); 50% N as biog slurry + 50% N as poultry manure ($T_{1:}$ recommended NPK 150:50:50 kg ha^{-1} in *ra* (T_{13}); absolute control (No NPK) (T_{1} recommended NPK + herbicide butachlor @ 2 kg a.i ha^{-1} + herbicide (pendimethalin 1.5 l a.i ha^{-1}) (T_{15}).

The seedlings of hybrid CORH-1 we transplanted at 20 x 15 cm spacing on 10.11.9 The organic manures were analyzed for th nutrient contents and based on their N conte required quantities (150 kg N for rabi) w incorporated 10 days before transplanting. Pl protection by biocontrol agents *viz. Trichogram japonica* and *Trichogramma chilonis*, were adopt for controlling the leaf folder. At maturi the head rice recovery (%) was computed using the procedure followed by Govindasar and Ghosh (1969). The alkali value was estimat by the extent of spreading and cleaning milled rice treated with 1.7% KOH solutic for 23 hrs at 30°C as suggested by Litt *et al.* (1958). The fat content, fibre, ash a carbohydrate content were estimated by usi the procedure suggested by A.O.A.C., (198 and amylose content by Williams *et al.* (1958 Ten milled rice kernels were used for measurin length and breadth and length : breadth rati was calculated. The length and breadth of cooke kernels was measured in a graduated cardboa as suggested by Pillaiyar and Mohandoss (1981 The rice samples were subjected to panel te in cooked form. Parameters evaluated includ color, texture, taste and overall acceptabilit of cooking rice. A nine point hedonic scal was used to evaluate the samples (Sunithakuma and Padmavathi, 1999).

The chemical composition of the grai was significantly influenced by the organic manure when compared to chemical N fertilizer treatment (Table 1). The application of nutrients eithe

ible 1. Effect of organic manure, biofertilizer and chemical fertilizer on physio-chemical properties and cooing quality traits on hybrid rice

eat-ents	L/B ratio	Head rice Recovery (%)	Alkali value (%)	Protein (%)	Fat(%)	Fibre(%)	Amylose content	Kernel length after cooking (mm)
1	0.30	68.72	5.52	7.18	0.53	0.19	23.05	9.3
2	0.30	68.54	5.31	7.15	0.52	0.21	22.95	9.3
3	0.27	69.78	5.42	7.37	0.53	0.19	24.68	9.3
4	0.29	69.97	5.41	7.34	0.50	0.19	22.56	9.5
5	0.31	67.58	5.86	7.18	0.53	0.21	24.60	9.7
6	0.29	70.03	5.78	7.79	0.53	0.28	24.02	9.6
7	0.28	68.52	5.54	7.34	0.51	0.23	22.98	9.7
8	0.33	68.54	5.31	7.56	0.53	0.21	20.98	9.8
9	0.35	71.92	6.22	7.88	0.54	0.18	23.95	9.5
10	0.30	68.23	5.58	7.10	0.52	0.19	22.95	9.5
11	0.29	68.25	4.95	7.23	0.52	0.16	22.95	9.4
12	0.27	70.13	5.14	7.35	0.53	0.16	22.95	9.3
13	0.29	67.32	5.66	7.65	0.53	0.17	23.67	9.5
14	0.31	64.25	4.66	6.65	0.53	0.20	22.91	8.9
15	0.32	67.58	5.70	7.81	0.5	0.17	23.95	9.4
Ed	0.008	0.24	0.15	0.08	0.016	0.005	0.418	0.002
D	0.02	0.42	0.29	0.16	0.03	0.054	0.82	0.01
P=0.05%)								

Table 2. Effect of organic manures, biofertilizer and chemical on panel test on hybrid rice*

Treatments	Colour	Texture	Taste Acceptability	Overall
T_1	7.1	5.2	5.2	5.2
T_2	7.1	5.3	5.3	5.2
T_3	7.1	5.4	5.2	5.3
T_4	7.2	5.3	5.3	5.1
T_5	7.4	5.5	5.5	5.3
T_6	7.2	5.4	5.4	5.3
T_7	5.3	5.3	5.2	5.2
T_8	7.2	5.3	5.3	5.1
T_9	7.4	5.7	7.2	7.2
T_{10}	7.4	5.3	5.4	5.2
T_{11}	7.2	7.0	7.1	7.1
T_{12}	7.2	5.2	5.2	5.2
T_{13}	7.3	5.4	5.2	5.3
T_{14}	7.2	5.3	5.2	5.2
T_{15}	7.2	5.3	5.2	5.3

* Data not statistically analysed

through a combination of pressmud (10 t ha^{-1}) and poultry manure (3 t ha^{-1}) T_9 or chemical N fertilizer (150 kg N ha^{-1}) T_{13} being at par in producing significantly higher crude-protein, alkali value, fat, carbohydrate and amylose content. The values are 7.88, 6.22, 0.54, 23.95 for protein percentage, alkali value percentage, fat percentage and amylose content respectively for T_9 treatment. However, application of nutrients in other organo-inorganic combinations proved better than control although not comparable to T_9 or T_{13} treatments, for these quality traits. It is suggested that application of organic combination of nutrients may contribute to the inhibition of nitrogen accumulation in rice grain and consequently, the superior grain quality traits (Nakagawa *et al.* 2000).

The observations on kernel length and breadth, length: breadth ratio, kernel length after cooking and elongation ratio were consistently better for these treatments. However, the organic manure in combination of pressmud with neemcake (T_8) and poultry manure (T_9) were superior in recording higher kernel length after cooking (9.8 mm); length: breadth ratio (0.35), elongation ratio (1.52) and head rice recovery (71.92%) respectively. Grain size appeared to be affected more by genetic than agronomic factors, since grain length and breadth were largely unaffected by N rate (Borell *et al.* 1999).

Among the treatments, pressmud (10 t ha^{-1}) combined with poultry manure (3 t ha^{-1}) and farmyard manure (10 t ha^{-1}) + neemcake (7 t ha^{-1}) were found superior to the remaining treatments with 7.4 points in color, whereas the former treatment also recorded higher points (7.2) for all the three traits *viz.* texture, taste and overall acceptability and was followed by biogas slurry in combination with neemcake treatment. Similar superior physical quality parameters due to organic nutrients applications were also reported by Kuruma and Ichimara (2000) and in summary it can be concluded that pressmud (10 t ha^{-1}) combined with poultry manure (3 t ha^{-1}) may be recommended for enhancing the grain quality traits of hybrid rice.

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