SUSTAINABLE PRODUCTION OF SCENTED RICE (ORYZA SATIVA) WITH MANURES AND BIOFERTILIZERS

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Scented rice with organic tag has huge export potential because of superior quality. In India area under scented rice is increasing due to attractive price and growing demand in market. Production of scented rice using organic manures and biofertilizers is found to favorably alter the availability of several plant nutrients through their impact on chemical and biological properties of soil. With this in view the present study was undertaken to develop manurial schedule for sustainable production of scented rice using manures and biofertilizers as sole source of nutrients.

A field experiment was conducted at Kalai (Aligarh) research station of C.S. Azad University of Agriculture and Technology, Kanpur during rainy (kharif) season of 2004 and 2005. The experimental soil was sandy loam in texture having pH 7.5, EC 0.59 ddm⁻¹, organic carbon 0.57% and available P and K 16.01 and 153.39 kg/ha, respectively. The experiment was conducted in randomized block design with four replications consisted of FYM (0.6%N, 0.2%P, and 0.5%K), vermicompost (1.4%N, 1.1%P, and 0.6%K), green manure (Sesbania esculata), Azospirillum, phosphate solubilizing bacteria (PSB), and blue green algae (BGA) having nine treatments viz. T₁, NPK@ 90 : 40 : 40 : kg/ha; T₂, FYM @ 10 t/ha + Azospirillum (Azos) + PSB + BGA; T₃, vermicompost (VC) @ 5t/ha Azos + PSB + BGA; T₄, GM + FYM (5 t/ha) + BF (A + P + B); T₅, GM + FYM (10t/ha) + Azos + PSB; T₆, GM + VC (5t/ha) + Azos + PSB, and T₇, Absolute control (N, o Po Ko). Scented rice cultivar ‘Pusa basmati-T’ was transplanted one week after incorporation of green manure (in situ) at 20x10 cm spacing in third week of July during both the years. Application of FYM, VC, and green manure were repeated each year during kharif. In organic combinations, chemical inputs were not used.

The grain and straw yield of rice during both the seasons of experimentation showed significant variation to different treatments (Table 1). The mean values of two years revealed that maximum grain yield (27.77q/ha) was obtained when rice was grown after green manuring along with biofertilizers (Azos + PSB + BGA) coupled with FYM (5t/ha) or VC (2.5t/ha) followed by GM + FYM (10t/ha) or VC (5t/ha) + biofertilizers (Azos + PSB), which was at par with the combination of green manure in conjunction with biofertilizers in transplanted rice has also been reported earlier (Singh et al., 2003). Application of NPK through chemical fertilizers recorded higher grain yield (22.96 q/ha) over higher doses of FYM (10t/ha) or VC (5t/ha) applied along with biofertilizers (Azos + PSB + BGA) without green manuring. Reduction in yield may be attributed to slow and inadequate availability of nutrients required at different growth stages. Experimental results clearly indicated that green manuring plays an important role in minimizing yield of rice because of its faster decomposition and mineralization leading to higher availability of plant nutrients. Advantages of green manuring in rice cultivation has also been observed by Chandra and Pareek, (1998), Sriramachandrashekharan and Ravichandran (2004). Straw yield of rice responded similarly.

The economic analysis of various treatments revealed that green manuring along with biofertilizers (Azos + PSB + BGA) coupled with FYM (5t/ha) or vermicompost (2.5t/ha) recorded higher average net return (Rs 1957/ha) and benefit : cost ratio (2.24) followed by application of biofertilizers (Azos + PSB + BGA) along with green manuring. Though higher doses of FYM (10 t/ha) or VC (5 t/ha) alongwith green manuring and biofertilizers (Azos+PSB) recorded higher yield over NPK application.
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Through chemical fertilizers but higher benefit:cost ration could not be realized due to higher input cost of FYM and vermicompost. The price of rice was not differentiated (organic/inorganic) in calculating the economics. Plots fertilized with chemical fertilizers recorded net return of Rs. 14454/ha with benefit:cost ratio of 1.99. Lowest net return (Rs 674 t/ha) and benefit:cost ratio (1.05) was recorded with absolute control (N0P0K0).

The study revealed that among the various combinations of green manure, FYM or vermicompost and biofertilizers tested, green manure along with FYM (5 t/ha) or vermicompost (2.5 t/ha) in conjunction with biofertilizers (Azos + PSB + BGA) proved better manurial schedule for yield maximization in scented rice. The results clearly indicated that scented rice may efficiently and profitable be cultivated without using chemical fertilizers with the additional advantage of quality grain besides improvement in soil health as well as balance in agro-ecosystem.

**REFERENCES**

