

JEEVAMRUTHA AS AN ALTERNATIVE OF CHEMICAL FERTILIZERS IN RICE PRODUCTION

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ABSTRACT

Field experiments were conducted for three successive seasons of *kharif* and *rabi* during 2007 and 2009 at Kothavaripalli Village, Madanapalle Mandal of Chittoor District, Andhra Pradesh, with an objective to evaluate the impact of Jeevamrutha on yield and returns of two varieties of rice (*Oryza sativa*) Masura and Hamsa. Jeevamrutha was prepared in the farm with urine and dung of native cows and the same was applied in cultivation of both varieties of rice. The cost of production, yield net return and benefit-cost ratio were estimated using jeevamrutha and compared with those of chemical farming. The analysis of the results showed that the yield with application of jeevamrutha is 2.775 tons/acre in Masura and 2.625 tons/acre in Hamsa variety of rice. These were 3.0 tons and 2.5 tons per acre by chemical method of farming. It indicated that application of Jeevamrutha could yield better than chemical farming in Hamsa variety. But the cost of cultivation was 18% higher in Masura and 19% higher in Hamsa variety of rice when grown with recommended dose of fertilizers as compared to the production using jeevamrutha. In both the varieties benefit-cost ratio was better with application of Jeevamrutha method being 3.39 in Masura variety 3.0 in Hamsa as compared to 1.09 and 0.6 in chemical methods of rice production respectively. The economic analysis showed that jeevamrutha production method is commercially viable since it registered better net returns and benefit-cost ratio than recommended dose of fertilizers in rice production.

Key words: Hamsa, Jeevamrutha, Masura, *Oryza sativa*.

Rice is grown in almost all the districts of Andhra Pradesh both in *kharif* and *rabi* seasons as an irrigated crop. The area of rice is nearly 40 lakh hectare in the state with production of 133.24 lakh tons and a productivity 3345 kgs/ha according to the Bureau of Economics and Statistics report 2007-2008. Increasing demand for food production and food security due to ever increasing population has forced the green revolution to use huge quantities of chemical fertilizers and pesticides in crops like rice. Recent finding of the blue baby syndrome in West Godavari district of Andhra Pradesh attributed to indiscriminate application of nitrogen in agricultural fields especially for rice crop. This incident hints us that chemical farming is not only hazardous to the health of environment, soil and other flora and fauna but also human beings. The farmers are facing problem in rice production due to high cost of production through chemical farming. Hence there

is need to blend traditional knowledge with modern technologies in achieving not only high yield but also for good quality of product.

Natural farming or organic farming is gaining importance in view of sustained agriculture and maintaining ecological balance. It lies in a simple principle of utilizing cheap and local inputs with zero utilization of chemicals in any form like fertilizer, herbicide, pesticide, antibiotic, hormone etc. Apart from using conventional farm based products there is an increasing demand for improvised materials like Jeevamrutha, Panchagavya, fish amino acids, fermented plant juices, etc. which not only enrich the soil with indigenous micro organisms but also decrease the incidence of diseases in many crops.

Jeevamrutha is a low cost improvised preparation that enriches the soil with indigenous

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micro organisms required for mineralization of the soil (Gore *et al* 2011). It is prepared from native cow's urine, dung, horse gram and jaggery. It is a time tested practice to use cow based products in agriculture. The yield of hybrid rice was 12 quintal per ha when grown using jeevamrutha in experimental plots, while it was 10.8 quintal per ha in selected local varieties like Jaya and Padma and 9 quintal per ha in local Basmati variety in experiments at Mehasani district of Gujarat. The yield of jowar, ragi, pearl millet, maize and pulses like red gram and Bengal gram was also higher due to application of jeevamrutha. In field experiment effect of Jeevamrutha on the yield and economics of two varieties of rice, Masura and Hamsa were studied and compared with returns of chemical farming. The experiment was conducted by cultivating Masura and Hamsa varieties of rice (*Oryza sativa*) in open fields at Kothavaripalli village in 4 acres of land for three consecutive seasons during 2007-2009. The tick burning and fungal infections were effectively kept under control by application of fermented butter milk. Jeevamrutha was applied as foliar spray in the nursery and given with irrigation every fortnight in the main fields. No chemical fertilizer or pesticide of any kind was used in the field during the whole period of cultivation. Neemasthram (a neem leaf decoction) and

Brahmasthan were used for insect and pest control. Jeevamrutha was prepared with horse gram, jaggery, native cow urine, dung, a hand full of virgin or garden soil (devoid of any chemicals) and water as shown in Table 1. The ingredients in proper proportions were mixed in a cement tank and covered with a gunny bag. The contents are stirred well twice or thrice a day with a wooden stick. The Jeevamrutha is ready for use after second day. It is used before one week after its preparation. The cultivation of rice under irrigated condition during the Kharif and *rabi* seasons of 2007-2009 using only Jeevamrutha without NPK or any other form of complex fertilizers were monitored and the data was collected and analyzed. The pooled averages for the three seasons are shown in Table 2. These results were compared with the rice grown in Andhra Pradesh through chemical farming as given in Vyavasaya Panchangam 2008-09.

TABLE 1: Cost of preparation of 200 liters of jeevamrutha required to spray in one acre rice crop

Ingredient	Cost (Rs/acre)
2 kg Horse gram powder @ Rs.25/ Kg	50
2 kg Jaggery @ Rs.40 per Kg per tank	80
5 liter cow urine	00
10kg dung	00
200 liter water	00
Total cost per tank (200 lts)	130

TABLE 2: Comparative cost of rice production and benefit-cost ratio using Jeevamrutha and chemicals

Particulars	Jeevamrutham		Chemical farming		Difference in chemical farming as compared to Jeevamrutham		% increase / decrease in chemical farming	
	Masura	Hamsa	Masura	Hamsa	Masura	Hamsa	Masura	Hamsa
Cost of application of manure / acre in Rs	1430	1300	5000	5000	+ 3570	+ 3700	+ 249	+ 284
Grain yield tons/acre	2.775	2.625	3.000	2.500	+ 0.225	-0.125	+ 8	-5
Gross returns/acre @ Rs.30 and Rs.15 respectively	83250	39375	90000	37500	+ 6750	-1875	+ 8	-5
Total cost of production Rs/ acre	18930	18800	22500	22500	+ 3570	+ 3700	+ 18	+ 19
Net returns Rs. / acre	64320	20575	67500	15000	+ 3180	-5575	+ 4	-37
Benefit -cost ratio	3.39	1.09	3.0	0.6	-0.39	-0.49	-13	-81

An analysis of the results showed that the cost of application of chemical fertilizers in rice varieties Masura and Hamsa is 249% and 284% more as compared to cost of application of Jeevamrutha. The grain yield and gross return using chemicals in Masura cultivation were 8% higher than that of cultivation with Jeevamrutha. But both grain yield and gross return through chemical farming were found to be 5% less than that of jeevamrutha in case of Hamsa variety. The total cost of production of Masura rice through chemical farming is 18% higher and production of Hamsa rice is 19% higher than that of production with Jeevamrutha. The net return through chemical farming in Masura is only 4% higher than that produced with Jeevamrutha, whereas the net return through chemical farming in Hamsa is 37% lower than that of jeevamrutha. The benefit-cost ratio of Masura rice production through chemical farming was 3.0 whereas it was 3.39 with Jeevamrutha an increase of 13% over chemical farming. The benefit-cost ratio of Hamsa rice production through chemical farming was 0.6, whereas the same with Jeevamrutha was

1.09, indicating an increase of 81% in Jeevamrutha method over chemical farming.

CONCLUSION

The study shows that replacement of chemical fertilizers by Jeevamrutha is a better option in cultivation of rice varieties like Masura and Hamsa. These results also suggest that improvised natural methods in cultivation of rice gave better yield than the conventional chemical farming. Further the farmers need less money if they prepare and use soil friendly preparations like Jeevamrutha. There is an increasing awareness in the farmers regarding use of these supplements. The governments and other agricultural agencies may promote usage of these supplements by providing Nutrient Based Subsidy to the farmers directly and encouraging the breeding of native cows suitable for Indian Agriculture. The Government of Andhra Pradesh can save up to 19% of expenditure on chemical fertilizers and pesticides every year by introduction of Jeevamrutha application in rice production. The use of jeevamrutha as a soil enriching manure is both farmer and farm friendly and capable to produce high yield of good quality.

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