Impact of Organic and Natural Farming Practices on Growth, Yield Attributes and Yieldof *Joha* Rice

ABSTRACT

Aims: The aim of the experiment was to study the impact of organic and natural farming practices on the growth,yield attributes and yield of *BokulJoha* variety of rice

Study design: The experiment was laid in a randomized block design with three replications.

Place and Duration of Study: Assam Agricultural University-Assam Rice Research Institute, Titabar, Assam, India, during the kharif season of 2022-2023

Methodology: The number of treatments used were eight in total including control which were T_1 [Absolute control], T_2 [(Natural farming, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)], T_3 [(Enriched compost (5 tha-1) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})], T_4 [Enriched compost (5 t ha^{-1})], T_5 [Vermicompost (5 t ha^{-1})], T_6 [Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})], T_7[Fresh azolla as dual crop (400 $kgha^{-1}$) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 $kgha^{-1}$)] and T_8 [Vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4$kgha^{-1}$), rock phosphate (10 kg $P_2O_5ha^{-1}$)]. The experiment was laid in a randomized block design with three replications.Where T= Treatment, PSB = Phosphate Solubilizing Bacteria, KSB=Potassium Solubilizing Bacteria, DAT = Days After Transplanting and NF=Natural Farming.

Results: Plants that were noticeably taller were observed with treatment T_8: application of vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4 kg ha^{-1}), rock phosphate (10 kg P_2O_5) i.e., at 45 DAT (81.78 cm),90 DAT (128.15 cm) and at harvest (145.71 cm). The same treatment recorded the highest no. of tillers 45 DAT (8.31m^{-2}), at 90 DAT (13.79 m^{-2}) and at harvest (10.40 m^{-2}). Also, dry weight was noted to be highest for the same treatment, at 45 DAT (29.34 g $plant^{-1}$), 90 DAT (79.11 g $plant^{-1}$) and at harvest (92.29 g$plant^{-1}$). Additionally, the same treatment resulted in highest grain (34.62 qha^{-1}) and straw (70.30 q ha^{-1}) yield.

Conclusion: Combined application of vermicompost (1 t/ha) along withinocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg/ha) and rock phosphate (10 kg P_2O_5)can be used as a suitable treatment for attaining higher growth, yield attributes and yield in *Bokul Joha* variety of rice.

Keywords: Natural farming, organic farming, rice,rock phosphate, vermicompost

1. INTRODUCTION

Rice being the staple food for a sizeable portion of the world's population has increase in demand for its production as the population is increasing day by day. In fiscal year 2023,

India's estimated production volume of rice was over 130 million metric tons. There has been a gradual increase in the production of rice since fiscal year 2017 [1]. Rice is the most common staple crop consumed all over India. Rice is mostly being produced by the application of various inorganic sources of fertilizers which in turn costs for the health of these planets. The cultivation methods of rice have a profound impact on the food security and the environmental sustainability. In recent years, there has been a growing interest in organic farming practices and natural farming practices in the Indian sub-continent as well as in the entire world to these critical concerns.

Natural farming, pioneered by Masanobu Fukuoka (1913–2008), is an ecological approach to agriculture. Known alternatively as "the Fukuoka method," "the natural way of farming," or "do-nothing farming," it represents a chemical-free adaptation of traditional farming techniques. This method is regarded as an agroecology-centered, diverse farming system that harmoniously incorporates crops, trees, and livestock alongside functional biodiversity[2].Natural Farming, centered on 'Zero-Budget' input costs, originated in the 1980s through the work of Shri Subhash Palekar. Several variations of this system can be found in ancient Indian literature and Vedic agricultural practices[3,4]. Numerous initiatives in India have been launched to encourage natural farming through capacity building, providing input support, and demonstrating technology to farmers and other stakeholders. Additionally, various financial incentives have been implemented to promote environmentally friendly products[3,5].India has the potential to transition approximately 20% of its conventional farming area to Organic and Natural Farming (ONF) by 2030, while simultaneously ensuring a balance between the increasing demand for agri-food and its supply[6]. Organic cultivation not only emphasizes ecological harmony but also aims to produce healthier and more nutritious crops. Organic manures have the capacity to fulfil nutrient demand of crops adequately and promote the activity of macro and micro flora in the soil [7]. Studies suggest that yields could be sustained without increasing the nutrient inputs by tightening the nutrient cycles through organic nutrition [8]. One such endeavour is the cultivation of *joha* rice by organic farming methods. Joha rice (*Oryza sativa*), a unique and aromatic variety predominantly grown in the north-eastern region of India. Among different qualities of rice these group have high demand because of their specific aroma, superfine kernels, superior quality of cooking and superfine kernels. These group of rice is specifically used for making various dishes during separate occasions. Joha rice cultivars are renowned for their distinctive aroma, superfine kernels, excellent cooking characteristics, and exceptional palatability. Their inherent fragrance makes them highly sought after and greatly desired for export purposes[9]. Proper selection of a variety and appropriate nutrient management are important in organic rice production [10]. Assam being surrounded by hills on all sides and covered by forests makes it a biodiversity rich zone thereby making it suitable for practicing organic farming as well as natural farming. Hence a study was carried out to generate scientific data on production of *joha*rice by organic and natural farming practices.

2. MATERIAL AND METHODS

A field experiment was conducted at the research farm of Assam Rice Research Institute-Assam Agricultural University, Titabar, Jorhat, India during the kharif season of 2022-2023 The soil was clay loam with pH 5.63, organic carbon 8.40 g, available nitrogen 284.12 kg ha $^{-1}$, available P_2O_5 22.52 kg ha^{-1} and available K_2O 127.43 kg ha^{-1}. The number of treatments used were eight in total including control which were T_1 [Absolute control], T_2 [(Natural farming, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)], T_3 [(Enriched compost (5 tha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})], T_4 [Enriched compost (5 t ha^{-1})], T_5 [Vermicompost (5 t ha^{-1})], T6 [Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})], T_7 [Fresh azolla as dual crop

(400 kgha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kgha^{-1})] and T_8 [Vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kgha^{-1}), rock phosphate (10 kg P_2O_5ha^{-1})].The experiment was laid in a randomized block design with three replications The variety used for the experiment was *Bokul Joha*. The seedlings were transplanted after 30 days age with spacing of 20 x 15 cm with 2-3 seedlings per hill. Hand weeding was done as and when required. The organic manures and fertilizers were incorporated 2 weeks before transplantation as per the treatment requirement. In case of the natural farming treatments beejamrita was used as a seed treatment before sowing of the seeds where as jeevamrita and ghanajeevamrita were used as spray. The experimental plot received plant protection by application of neem oil and brahmashtra. For the determination of plant height, dry matter content, number of tillers, leaf area index five samples were collected from each plot, the data was averaged out and used for interpretation. The yield attributing characters were determined by randomly selecting five samples from each plot as well and the average value was used for interpretation. In case of the grain ad straw yield determination, it was recorded as per m2 from each plot and later converted to quintals per hectare. Data related to the experiment were analysed by ANOVA and the significance was determined by using Fisher's least significance difference (p = 0.05%).

3. RESULTS AND DISCUSSION

The application of several organic nutrient sources led to notable changes in growth and yield components. The organic inputs had a favourable impact on the growth and yield-attributing metrics compared to the control. Plants that were noticeably taller were observed with application of vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4 kg ha^{-1}), rock phosphate (10 kg P_2O_5) i.e*.,* at 45 DAT (81.78 cm), 90 DAT (128.15 cm) and at harvest (145.71 cm) followed by fresh azolla application as dual crop (400 kg ha^{-1}) + biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1}) (Table 1). At harvest, the other inputs, which also included natural farming inputs, did not exhibit a discernible difference in height. Biologically, hereditary elements that are less susceptible to extrinsic influences control plant height. However, the use of vermicompost, rock phosphate, and biofertilizers may have increased the availability of nutrients, which may have contributed to the increase in height. The highest number of tillers at 45 DAT (8.31m^{-2}), at 90 DAT (13.79 m^{-2}) and at harvest (10.40 m^{-2}) was found in vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4 kg ha^{-1}), rock phosphate (10 kg P_2O_5 ha^{-1}) at booting stage (Table 2).

Table 1. Effect of organic and natural inputs on plant height (cm) of rice

Treatments	45 DAS	90 DAS	At harvest
T_1: Absolute Control	63.06	89.35	109.59
T_2:NF, Beejamrit as root dip treatment (3%) (100 L ha^{-}	70.06	104.56	112.95

^{1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)			
T_3: Enriched compost (5 t ha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})	76.31	119.55	139.92
T_4: Enriched compost (5 t ha^{-1})	73.32	115.21	135.07
T_5: Vermicompost (5 t ha^{-1})	74.15	112.99	134.21
T_6: Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})	75.45	113.65	137.75
T_7: Fresh azolla as dual crop (400 kg ha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1})	77.88	122.89	141.10
T_8: Vermicompost (1 t ha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg ha^{-1}), rock phosphate (10 kg P_2O_5)	81.38	128.15	145.71
Sem (±)	4.25	6.06	5.68
CD (p=5%)	12.84	18.21	17.06

Here, T= Treatment, PSB = Phosphate Solubilizing Bacteria, KSB=Potassium Solubilizing Bacteria, DAT = Days After Transplanting and NF=Natural Farming.

Table 2. Effect of organic and natural inputs on number of tillers/ m^2 of rice

Treatments	**45 DAS**	**90 DAS**	**At harvest**
T_1: Absolute Control	2.95	9.72	7.99
T_2:NF, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)	5.53	10.59	8.77
T_3: Enriched compost (5 t ha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})	6.78	11.85	9.80
T_4: Enriched compost (5 t ha^{-1})	5.37	11.64	9.12
T_5: Vermicompost (5 t ha^{-1})	4.89	10.64	9.02
T_6: Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})	6.07	9.33	9.22
T_7: Fresh azolla as dual crop (400 kg ha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1})	7.03	12.05	10.17
T_8: Vermicompost (1 t ha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg ha^{-1}), rock phosphate (10 kg P_2O_5)	8.31	13.79	10.40
Sem (±)	0.40	0.53	0.36
CD (p=5%)	1.23	1.63	1.10

Table 3. Effect of organic and natural inputs on dry weight (g/plant) of rice

Treatments	45 DAS	90 DAS	At harvest
T_1: Absolute Control	15.83	60.31	76.09
T_2: NF, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)	22.34	61.60	81.33
T_3: Enriched compost (5 t ha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})	25.49	70.15	88.26
T_4: Enriched compost (5 t ha^{-1})	21.93	64.56	86.17
T_5: Vermicompost (5 t ha^{-1})	20.72	58.50	85.03
T_6: Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})	23.70	69.18	87.05
T_7: Fresh azolla as dual crop (400 kg ha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1})	26.12	71.07	90.14
T_8: Vermicompost (1 t ha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg ha^{-1}), rock phosphate (10 kg P_2O_5)	29.34	79.11	92.29
Sem (±)	0.60	1.25	0.67
CD (p=5%)	1.82	3.79	2.03

Table 4. Effect of organic and natural inputs on yield attributing characters of rice

Treatments	Panicles/m^2	Filled grains/panicle	Test weight(g)
T_1: Absolute Control	266.33	160.73	11.01
T_2: NF, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)	292.33	181.06	11.02
T_3: Enriched compost (5 t ha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})	326.67	228.16	11.31
T_4: Enriched compost (5 t ha^{-1})	316.33	214.39	11.08
T_5: Vermicompost (5 t ha^{-1})	310.67	211.03	11.12
T_6: Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})	320.67	225.90	11.07
T_7: Fresh azolla as dual crop (400 kg ha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1})	339.01	237.85	11.38
T_8: Vermicompost (1 t ha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus*	346.67	256.42	11.45

megaterium P-5 (4kg ha^{-1}), rock phosphate (10 kg P_2O_5)			
Sem (±)	1.84	5.78	0.08
CD (p=5%)	5.60	17.54	NS

Table 5. Effect organic and natural inputs on grain yield, straw yield and harvest index

Treatments	**Grain yield (q/ha)**	**Straw yield (q/ha)**	**Harvest Index (%)**
T_1: Absolute Control	15.50	28.01	35.63
T_2: NF, Beejamrit as root dip treatment (3%) (100 L ha^{-1}) + Jeevamrit as spray (3%) (100 L ha^{-1}) + Ghanajeevamrit as soil treatment at 100 kg (Jeevamrit and Ghanajeevamrit at 30, 60 and 90 DAT)	19.47	35.71	35.31
T_3: Enriched compost (5 t ha^{-1}) + Biofertilizer (*Azospirillum*, PSB as seedling root dip) (4 kg ha^{-1})	28.50	55.90	33.77
T_4: Enriched compost (5 t ha^{-1})	25.30	48.33	34.38
T_5: Vermicompost (5 t ha^{-1})	24.52	46.36	34.62
T_6: Enriched compost (2.5 t ha^{-1}) + Vermicompost (2.5 t ha^{-1})	27.07	52.21	34.15
T_7: Fresh azolla as dual crop (400 kg ha^{-1}) + Biofertilizers (*Azospirillum*, PSB and KSB mix as seedling root dip) (4 kg ha^{-1})	31.12	61.58	33.60
T_8: Vermicompost (1 t ha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg ha^{-1}), rock phosphate (10 kg P_2O_5)	34.62	70.30	32.99
Sem (±)	0.55	0.87	-
CD (p=5%)	1.69	2.64	-

Because it is correlated with the number of final productive tillers at harvest, tiller output is crucial for rice. As a result, it might be seen as an additional benefit of using organic inputs to increase yield through changed canopy growth. The dry weight was found to be significantly enhanced in vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kgha^{-1}), rock phosphate (10 kg P_2O_5 ha^{-1}) at the booting stage i.e., at 45 DAT (29.34 g $plant^{-1}$), 90 DAT (79.11 g $plant^{-1}$) and at harvest (92.29 g$plant^{-1}$) (Table 3). These might be due to the adequate absorption of nutrients by the roots. Phosphorus being a root growth enhancer helped in gaining dry matter content and the other sources of nutrient proved to be efficient. Likewise, vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kgha^{-1}), rock phosphate (10 kg P_2O_5 ha^{-1}) produced highest number of panicles (346.67 m^{-2}), filled grains (256.42 $panicle^{-1}$) over the control. Thus, it is seen that application of the above-mentioned nutrient sources showed overall superiority over the other organic and natural farming inputs in influencing the growth parameters. Similar findings were also observed by [11,12,13]

Application of various bio-inputs significantly influenced *joha* rice grown organically. In control, the *joha* rice production is incredibly low and it is not sufficient to meet the national and global need from limited organic area of Assam. However, an overall increase (0.27 t ha^{-1}) caused by the addition of bio-inputs under the same organic system clearly justifies the search for effective organic input for yield manipulation. The application of

vermicompost (1 tha^{-1}), mixed inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg ha-1), rock phosphate (10 kg P_2O_5 ha^{-1}) resulted noticeable change in grain (34.62 qha^{-1}) and straw (70.30 q ha^{-1}) yield (Table 6). It was followed by fresh *azolla* as dual crop (400 $kgha^{-1}$) + biofertilizers (*Azospirillum*, *PSB* and *KSB* mix as seedling root dip) (4 kg ha^{-1}) (Table 5). The improved availability of nutrients, which eventually preserved a favourable soil physical, chemical, and biological environment may be responsible for the higher grain and straw production using vermicompost, rock phosphate, and biofertilizers.

Under organic situation the availability of essential nutrients is lower at initial stages but organic sources such a vermicompost, enriched compost can provide sustained release of nutrients over the entire crop growth period though at a slower rate than chemical fertilizers. Similar observation on yield improvement under organic systems were observed by [14,15,16].

4. CONCLUSION

The use of organic source of nutrients influenced the physical, chemical, and biological processes in the soil thereby making the nutrients available for the crop. Combined application of vermicompost (1 t/ha) along with inocula of *Azospirillumamazonense* A-10 and *Bacillus megaterium* P-5 (4kg/ha) and rock phosphate (10 kg P_2O_5) can be used as a suitable treatment for attaining higher growth, yield attributes and yield in *Bokul Joha* variety of rice. The use of chemical fertilizers can be replaced with organic fertilizers for the increase in productivity. Thus, organic farming should be promoted among the farmers fraternity as a reliable source for cultivation of *joha* rice which provides adequate nutrition by maintaining the soil health and long-term sustainability of soil resources.

5. COMPETING INTERESTS

The authors assert with utmost clarity that they have no competing interests.

6. REFERENCES

1. Keelery, S. (2024). Production volume of rice India FY 2010-2023.www.statistica.com https://www.statista.com/statistics/1140236/india-production-volume-of-rice/
2. NITI Aayog. 2022. Compendium of Success Stories of Natural Farming. Patel, N., Athira, S., Sethi, T., and Meena, S. Eds. 270 p. NITI Ayog, New Delhi, India
3. Bharucha, Z.P., Mitjans, S.B. and Pretty, J. 2020. Towards redesign at scale through zero budget natural farming in Andhra Pradesh, India. International Journal of Agricultural Sustainability 18(1): 1-20. DOI: https://doi.org/10.1080/ 14735903.2019.1694465.
4. Sharma, S. K., Choudhary, R., Jat, G., Chhipa, B. G., Jain, D., Gupta, L., Yadav, S. K., Jain, R. K., Verma, A., Trivedi, A., and Jain, P. 2022. Compendium- Natural Farming: Perspectives and Prospects in Changing Agriculture Scenario. ICAR-Centre for Advanced Faculty Training on Organic Farming, Directorate of Research, Maharana Pratap University of Agriculture and Technology, Udaipur 313 001, Rajasthan, India
5. Deborah, D. and Shambu Prasad, C. 2022. Motivating youth engagement in sustainable agriculture: institutional innovations in Andhra Pradesh community-managed natural farming. Development in Practice 32(7): 1003-1010.

6. Chand, R. and Singh J. 2023. From Green Revolution to Amrit Kaal Lessons and Way Forward for Indian Agriculture. Working Paper 02/2023. National Institution for Transforming India, Government of India, New Delhi. 44 p
7. Sharma, A. K. (2006). The potential of organic farming in drylands of India. http://ag. arizona. edu/OALS/ALN/aln58/sharma. html, (58).
8. Stockdale, E.A., Lampkin, N.H., Hovi.M., Keatings, R., Lennartsson, E. M., Macdonold, D.W. Padel, S., Tattersall, F.H., Wolfe, M.S., and Watson, C.A. 2001, Agronomic and environmental implications of organic farming systems. Advan. Agron.70: 261- 327.
9. Das, A., Kesari, V., & Rangan, L. (2010). Aromatic joha rice of Assam-A review. Agricultural Reviews, 31(1), 1-10.
10. Manjunath, B.L., Prabhudesai H.R., Wasnik H.M., Falerio J.R., Ramesh,R., Talashilkar, S. 2009. Glimpses of three decades of rice research in Goa, Technical Bulletin No 19, ICAR Research Complex Goa. pp.50.s
11. Bora, D., Goswami, J., Saud, R. K. and Begum, M. (2014). Effect of organic inputs on production and quality of scented rice (Oryza sativa) variety Ketekijoha in Assam and its economic aspect. Agricultural Science Digest-A Research Journal. 34(2): 115-118.
12. Hasanuzzaman, M., Ahamed, K. U., Rahmatullah, M., Akhter, N., Nahar, K., & Rahman, M. L. (2010). Plant growth characters and productivity of wetland rice (Oryza sativa L.) as affected by application of different manures. Emirates Journal of Food and Agriculture, 46-58.
13. Kavitha, R. and Subramanian, P. (2007). Effect of enriched municipal solid waste compost application on growth, plant nutrient uptake and yield of rice. Journal of Agronomy. 6(4): 586.
14. Surekha, K., Jhansilakshmi, V., Somasekhar, N., Latha, P. C., Kumar, R. M., Rani, N. S., Rao, K.V. and Viraktamath, B. C. (2010). Status of organic farming and research experiences in rice. Europe. 7(1.87): 10-12
15. Rualthankhuma, C. and Sarkar, N. C. (2011). Effect of Different Organic Sources on the Productivity of Upland Terraced Rice (Oryza sativa L.) under Organic Farming in Nagaland. International Journal of Bio-resource and Stress Management. 2(4): 386-389.
16. Banerjee, S., Ghosh, M., Pal, S. K., Mazumdar, D. and Mahata, D. (2013). Effect of organic nutrient management practices on yield and economics of scented rice Gobindabhog. ORYZA-An International Journal on Rice. 50(4): 365-369.

Results should be clearly described in a concise manner. Results for different parameters should be described under subheadings or in separate paragraph. Table or figure numbers should be mentioned in parentheses for better understanding.

The discussion should not repeat the results, but provide detailed interpretation of data. This should interpret the significance of the findings of the work. Citations should be given in support of the findings. The results and discussion part can also be described as separate, if appropriate.

Guideline for Reporting *P* values:

P is always italicized and capitalized.

i) Correct expression: (*P* = .05). Wrong Expression: (*P*< .05), unless *P*< .001.

ii) The *P* value should be expressed to 2 digits whether or not it is significant. If *P*< .01, it should be expressed to 3 digits.

iii) When rounding, 3 digits is acceptable if rounding would change the significance of a value (eg, *P* = .049 rounded to .05).

iv) Expressing *P* to more than 3 significant digits does not add useful information since precise *P* values with extreme results are sensitive to biases or departures from the statistical model.

v) Reporting actual *P* values avoids this problem of interpretation. *P* values should not be listed as not significant (NS) since, for meta-analysis, the actual values are important and not providing exact *P* values is a form of incomplete reporting.

vi) Do not use 0 before the decimal point for statistical values *P*, alpha, and beta because they cannot equal 1.

Tables & figures should be placed inside the text. Tables and figures should be presented as per their appearance in the text. It is suggested that the discussion about the tables and figures should appear in the text before the appearance of the respective tables and figures. No tables or figures should be given without discussion or reference inside the text.

Tables should be explanatory enough to be understandable without any text reference. Double spacing should be maintained throughout the table, including table headings and footnotes. Table headings should be placed above the table. Footnotes should be placed below the table with superscript lowercase letters. Sample table format is given below.

Table 1. Physical, chemical and biological properties of experimental soil (0-20 cm)

Particulars	Value	Methods
Sand (%)	61.3	Pipette Method[1]
Silt (%)	21.4	
Clay (%)	17.3	
Bulk density, Mg m^{-3}	1.64	Core Sampler [2]
pH (1 : 2.5:: Soil : Water)	5.20	Glass Electrode pH Meter [3]
Organic carbon (g kg^{-1})	2.9	Glass Electrode pH Meter [4]
Total N, %	0.049	Modified Kjeldahl Method [5]

**Moisture content on oven dry weight basis*

Each figure should have a caption. The caption should be concise and typed separately, not on the figure area. Figures should be self-explanatory. Information presented in the figure

should not be repeated in the table. All symbols and abbreviations used in the illustrations should be defined clearly. Figure legends should be given below the figures.] A sample figure is given in figure 1.

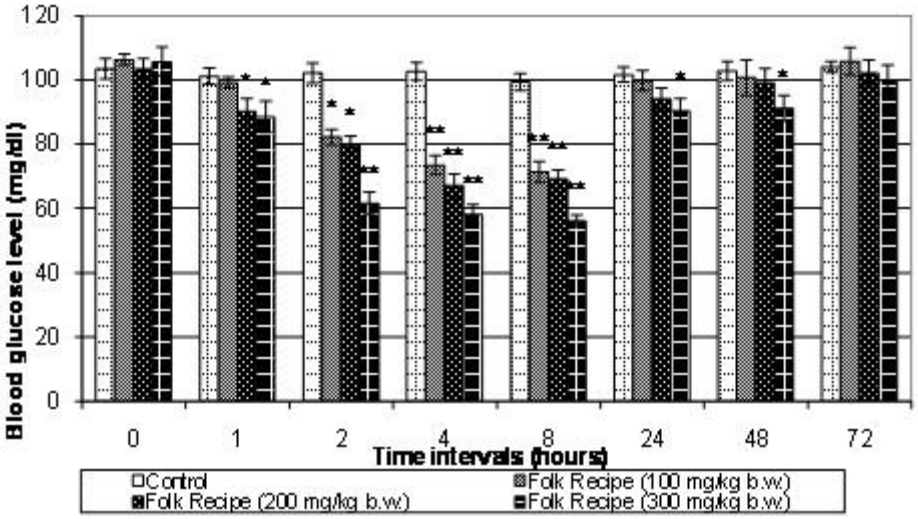

Fig. 1. Effect of different doses of aqueous extract of Folk Recipe (100, 200, 300 mg/kg) on blood glucose levels at different time intervals in normal rabbits

*Test drugs: significant from normal control, * P < 0.05; ** P < 0.001*
Mean ± S.E.M = Mean values ± Standard error of means of six experiments

3.1 Subheading Subheading**(ARIAL, BOLD, 11 FONT, LEFT ALIGNED)** - second level heading.

3.1.1 Sub-subheading(ARIAL, BOLD, 10 FONT, LEFT ALIGNED, underlined)- third level heading.

*3.1.1.1 Sub-sub-subheading***(ARIAL, ITALICS, BOLD, 10 FONT, LEFT ALIGNED)** - fourth level heading.]

4. CONCLUSION

[This should briefly state the major findings of the study.If you are using copy-paste option then select ‘match destination formatting’ in paste option OR use ‘paste special’ option and select ‘unformatted Unicode text’ option]

ACKNOWLEDGEMENTS

A brief acknowledgement section may be given after the conclusion section just before the references. The acknowledgments of people who provided assistance in manuscript preparation, funding for research, etc. should be listed in this section.All sources of funding should be declared as an acknowledgement. Authors should declare the role of funding agency, if any, in the study design, collection, analysis and interpretation of data; in the

writing of the manuscript. If the study sponsors had no such involvement, the authors should so state.

COMPETING INTERESTS

Declaration of competing interest should be placed here. All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. If no such declaration has been made by the authors, SDI reserves to assume and write this sentence: “Authors have declared that no competing interests exist.”.

AUTHORS’ CONTRIBUTIONS

Authors may use the following wordings for this section: “ ‘Author A’ designed the study, performed the statistical analysis, wrote the protocol, andwrote the first draft of the manuscript. ‘Author B’ and ‘Author C’ managed the analyses ofthe study. ‘Author C’ managed the literature searches…… All authors read and approved the final manuscript.”

CONSENT (WHEREEVER APPLICABLE)

No manuscripts will be peer-reviewed if a statement of patient consent is not presented during submission (wherever applicable).
This section is compulsory for medical journals. Other journals may require this section if found suitable. It should provide a statement to confirm that the patient has given their informed consent for the case report to be published. Journal editorial office may ask the copies of the consent documentation at any time.

Authors may use a form from their own institution or SDI Patient Consent Form 1.0. It is preferable that authors should send this form along with the submission. But if already not sent during submission, we may request to see a copy at any stages of pre and post publication.

If the person described in the case report has died, then consent for publication must be collected from their next of kin. If the individual described in the case report is a minor, or unable to provide consent, then consent must be sought from their parents or legal guardians.

Authors may use the following wordings for this section: "All authors declare that ‘written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal."

ETHICAL APPROVAL (WHEREEVER APPLICABLE)

This section is compulsory for medical journals. Other journals may require this section if found suitable. If human subjects are involved, informed consent, protection of privacy, and other human rights are further criteria against which the manuscript will be judged. It should

provide a statement to confirm that the authors have obtained all necessary ethical approval from suitable Institutional or State or National or International Committee. This confirms either that this study is not against the public interest, or that the release of information is allowed by legislation.

All manuscripts which deal with animal subjects must be approved by an Institutional Review Board (IRB), Ethical Committee, or an Animal Utilization Study Committee. , and this statement, and approval number, must accompany the submission. If required, author should be ready to submit a scanned copy of the IRB or Ethical Committee Approval at any stage of publication (Pre of post publication stage). The manuscript should contain information about any post-operative care and pain management for the animals.

For manuscripts involving animal experiments, Authors may use the following wordings for this section"All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable. All experiments have been examined and approved by the appropriate ethics committee"

All manuscripts which deal with the study of human subjects must be accompanied by Institutional Review Board (IRB) or Ethical Committee Approval, or the national or regional equivalent. The name of the Board or Committee giving approval and the study number assigned must accompany the submission. If required, author should be ready to submit a scanned copy of the IRB or Ethical Committee Approval at any stage of publication (Pre of post publication stage).

For manuscripts involving human experiments, Authors may use the following wordings for this section: "All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki."

REFERENCES

References must be listed at the end of the manuscript and numbered in the order that they appear in the text. Every reference referred in the text must also present in the reference list and vice versa. In the text, citations should be indicated by the reference number in brackets [3].

Only published or accepted manuscripts should be included in the reference list.
Articles submitted for publication, unpublished findings and personal communications should not be included in the reference list but may be mentioned in the text (e.g., T Nelson, Purdue University, USA, Unpublished results or personal communication). Avoid citing a "personal communication" unless it provides essential information not available from a public source, in which case the name of the person and date of communication should be cited in parentheses in the text. For scientific articles, obtain written permission and confirmation of accuracy from the source of a personal communication. Unpublished result which has been accepted for publication in any journal should be cited as "in press".
Journal name abbreviations should be those found in the NCBI databases (Link: http://www.ncbi.nlm.nih.gov/nlmcatalog/journals).

All references should follow the following style:

Reference to a journal:

For Published paper:

1. Hilly M, Adams ML, Nelson SC. A study of digit fusion in the mouse embryo. Clin Exp Allergy. 2002;32(4):489-98.

Note: List the first six authors followed by et al.
Note: Use of a DOI number for the full-text article is encouraged. (if available).
Note: Authors are also encouraged to add other database's unique identifier (like PUBMED ID).

For Accepted, unpublished papers.
Same as above, but “In press” appears instead of the page numbers.

1. Saha M, Adams ML, Nelson SC. Review of digit fusion in the mouse embryo. J EmbryolExp Morphol. 2009;49(3): *(In press)*.

Note: List the first six authors followed by et al.
Note: Use of a DOI number is encouraged (if available).
Note: Authors are also encouraged to add other database's unique identifier (like PUBMED ID).

For Articles not in English
Forneau E, Bovet D. Recherches sur l'actionsympathicolytique d'un nouveau dérivé du dioxane. Arch Int Pharmacodyn. 1933;46:178-91. French.

Reference to a book:

Personal author(s)
Rang HP, Dale MM, Ritter JM, Moore PK. Pharmacology. 5th ed. Edinburgh: Churchill Livingstone; 2003.

Editor(s) or compiler(s) as authors
Beers MH, Porter RS, Jones TV, Kaplan JL, Berkwits M, editors. The Merck manual of diagnosis and therapy. 18th ed. Whitehouse Station (NJ): Merck Research Laboratories; 2006.

Authored chapter in edited publication
Glennon RA, Dukat M. Serotonin receptors and drugs affecting serotonergic neurotransmission. In: Williams DA, Lemke TL, editors. Foye's principles of medicinal chemistry. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2002.

Reference to Web-resource or Electronic articles.
Hugo JT, Mondal SC. Parallels between tissue repair and embryo morphogenesis: a conceptual framework. Global Health. 2006;16:4. Accessed 29 March 2012.
Available: http://www.globalizationandhealth.com/content/1/1/14.

Anonymous. Parallels between tissue repair and embryo morphogenesis: a conceptual framework. Global Health. 2006;16:4. Accessed 29 March 2012.
Available: http://www.globalizationandhealth.com/content/1/1/14.

Reference to Organization as author

Diabetes Prevention Program Research Group. A study of digit fusion in the mouse embryo. J EmbryolExp Morphol. 2009;49(2):259–276.

DEFINITIONS, ACRONYMS, ABBREVIATIONS

Here is the Definitions section. This is an optional section.

Term: Definition for the term

APPENDIX