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No./DRS/ADR-II/ PPP /2022/4828 Raipur Dated: 29 / 03/2022

To,

State Marketing Manager
Indian Fertilizer Cooperative Limited
House No.-2, Sector 2, Geetanjali Nagar, Raipur

Sub:- Submission of progress report on effect of Sagarika product and Nano N, Zn, Cu on Rice crop for Kharif 2020 &2021

Find enclosed herewith one copy of progress report on effect of Sagarika product and Nano N, Zn, Cu on Rice crop conducted during Kharif 2020 and 2021 . The report is being submitted for information and farther needful.

Encld:- One copy of project report

Director of Research

Endt.No./DRS/ADR-II /PPP/2022/ Raipur dated: /03/2022

Copy for information to-

1. Prof.& Head, Department of Soil Science, COA, Raipur.

Director of Research

Progress Report

on

"Effect of Sagarika product and Nano N, Zn, Cu on Rice Crop" (Kharif 2020 and 2021)

Submitted By:

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Project Conducted at:

Department of Soil Science & Agricultural Chemistry
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Sponsored by: Indian Farmer's Fertilizer Cooperative Limited, Raipur

IFFCO
पूर्णतः सहकारी स्वामित्व
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Progress Report

IFFCO Sponsored Project: Sagarika

Experiment Title 1:-Effect of Sagarika (Liquid and Granules) on performance of Rice (Rajeshwari) crop

Experimental details

Location	: Research Farm, I.G.K.V. Raipur (C.G.)	
Soil type	: *Vertisol*	
Season	: *Kharif 2020 & 2021*	
Crop	: Rice (*Oryza sativa* L.)	
Variety:	: Rajeshwari	
Plot size	: 30 m^2	
Treatments	: 10	
Replications	: 03	
Design	: Randomized Block Design (RBD)	
RDF	: 120-60-40 (N-P-K)	
	Kharif 2020	**Kharif 2021**
Date of Transplanting	: 21/07/2020	13/07/2021
Date of Spray	: 14/08/2020	05/08/2021 (21 DAS)
	07/09/2020	26/08/2021 (42 DAS)
Date of Harvesting	: 10-11-2020	08/11/2021

Soil characteristics:

The experimental soil is locally called *Kanhar* which come in *Vertisol* order. The soil was neutral in the reaction, low in organic carbon and available nitrogen, medium in available phosphorus and higher in available potassium. All the micronutrients were above the critical limits. The initial physio-chemical characteristics of the experimental soil are given in Table 1.1

Table 1.1: Important chemical properties of soil:

Properties	Value
pH	7.4
EC(dS/m)	0.32
Organic carbon (%)	0.48
Available Nitrogen (kg ha^{-1})	200.8
Available Phosphorous (kg ha^{-1})	16.46
Available Potassium (kg ha^{-1})	385.7
DTPA extract Fe (ppm)	10.50
DTPA extract Zn (ppm)	1.61
DTPA extract Mn (ppm)	6.90
DTPA extract Cu (ppm)	2.60

Table 1.2: Effect of Sagarika (liquid and granules) and NPK consortia on the grain yield of Rice.

Treatment	Grain Yield (q/ha)			Straw Yield (q/ha)		
	2019-20	2020-21	Pool	2019-20	2020-21	Pool
T1- RDF (120:60:40)	58.46b	59.58^{b}	59.02^{c}	67.43a	68.75^{b}	68.09^{b}
T2- RDF + Seed Coating with NPK consortia @5ml/Kg	60.43ab	63.03^{ab}	61.73^{abc}	70.84a	73.93^{ab}	72.39^{a}
T3- RDF + Seed Coating with NPK consortia @5ml/Kg + Spray of Sagarika L. (0.25%) at 21 DAS	61.66ab	64.98^{ab}	63.32^{ab}	72.24a	76.17^{a}	74.21^{a}
T4- RDF + Spray of Sagarika L. (0.25%) at 21 DAS + 42 DAS	60.51ab	62.82^{ab}	61.67^{abc}	70.24a	72.95^{ab}	71.6^{ab}
T5- RDF + Seed Soaking with Sagarika L. (0.1%) + Spray of Sagarika L. (0.25%) at 21 DAS	59.85ab	62.48^{ab}	61.17^{bc}	70.46a	73.35^{ab}	71.91^{ab}
T6- RDF + Soil application of Sagarika G. (25 Kg/ha) at 21 DAS	62.23ab	64.77^{ab}	63.5^{ab}	72.07a	75.04^{a}	73.55^{a}
T7- RDF + Soil application of Sagarika G. (25 Kg/ha) at 21 DAS + Spray of Sagarika L. (0.25%) at 42 DAS	62.90a	65.35^{ab}	64.12^{ab}	72.41a	75.27^{a}	73.84^{a}
T8- 75% RDF+ Soil application of Sagarika G. (25 Kg/ha) at 21 DAS + Spray of Sagarika L. (0.25%) at 42 DAS	60.00ab	62.48^{ab}	61.24^{bc}	71.77a	74.45^{ab}	73.11^{a}
T9- RDF + Soil application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS	62.94a	65.7^{a}	64.32^{a}	72.56a	75.78^{a}	74.17^{a}
T10- Control	27.67c	29.72^{c}	28.7^{d}	32.25b	34.78^{c}	33.52^{c}
S Em	1.46	1.72	0.90	1.86	1.87	1.29
CD	4.32	5.11	2.68	5.52	5.57	3.83

RESULTS

Grain yield

The mean grain yield of two years data presented in Table 1.2 showed that all the treatments applied were superior over control. Further, the various treatments combination **T9** (RDF + Soil

application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS), **T7**(RDF + Soil application of Sagarika G. (25 Kg/ha) at 21 DAS + Spray of Sagarika L. (0.25%) at 42 DAS), **T6** (RDF + Soil application of Sagarika G. (25 Kg/ha) at 21 DAS) and **T3** (RDF + Seed Coating with NPK consortia @5ml/Kg + Spray of Sagarika L. (0.25%) at 21 DAS) yielded similar yield but significantly higher as compared to RDF.

The treatment **T9** (RDF + Soil application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS) was significantly higher to **T8** (75% RDF+ Soil application of Sagarika G. (25 Kg/ha) at 21 DAS (25 kg/ha)+ Spray of Sagarika L. (0.25%) at 42 DAS), **T5** (RDF + Seed Soaking with Sagarika L. (0.1%) + Spray of Sagarika L. (0.25%) at 21 DAS). Further , **Treatment 8** (75% RDF+ Soil application of Sagarika G. (25 Kg/ha) at 21 DAS (25 kg/ha)+ Spray of Sagarika L. (0.25%) at 42 DAS) was also found at par with **T1** (RDF), which saved 25% of NPK.

The maximum grain yield (64.32 q ha^{-1}) was observed under the treatment**T9** (RDF + Soil application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS) and minimum grain yield (28.70q ha^{-1}) was obtained under control (**T10**).

Straw yield

The data presented in Table 1.2 showed that straw yield increased significantly in all treatments applied over control **(T10)** treatments. Further, all the treatments combination of Sagarika were found at par with each other and superior over RDF (T1), whereas **T4** (RDF + Spray of Sagarika L. (0.25%) at 21 DAS + 42 DAS) found at par. **Treatment 8** (75% RDF+ Soil application of Sagarika G. (25 Kg/ha) at 21 DAS (25 kg/ha)+ Spray of Sagarika L. (0.25%) at 42 DAS) also found significantly superior over **T1** (RDF). The maximum straw yield (74.17 q ha^{-1}) was observed under the treatment **T9** (RDF + Soil application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS) and minimum straw yield (33.52q ha^{-1}) was obtained under control (**T10**).

Findings

1. The increase in the rice yield was ranged from 3.64 to 8.98 % by application of different combination treatments (NPK Consortia as Seed coating and Soil application with and

without Sagarika) and sole application or combination of Sagrika as Seed soaking, foliar spray and soil application with and without NPK Consortia) over RDF.

2. The maximum grain yield was observed with **T9** (RDF + Soil application of Sagarika G. (25 Kg/ha) with NPK consortia @3 L/ha at 21 DAS + Sagarika L. spray at 42 DAS) and **T7** (RDF + Soil application of Sagarika G. (25 Kg/ha) at 21 DAS + Spray of Sagarika L. (0.25%) at 42 DAS) T6, T3.
3. Treatment **T8** (75% RDF+ Soil application of Sagarika G. (25 Kg/ha) at 21 DAS (25 kg/ha) + Spray of Sagarika L. (0.25%) at 42 DAS) was produced similar as of 100% RDF, which saved 25% of NPK.

Experiment of Nano N, Zn and Cu

Experiment of NPK Consortium and Sagarika (Liquid and Granules)