डा. रमेश कुमार शर्मा
प्रधान वैज्ञानिक एवं मु.अ. (सं.प्र.)
Dr Ramesh Kumar Sharma
PS & PI (RM)

# गेहूँ अनुसंधान निदेशालय

(भारतीय कृषि अनुसंधान परिषद)

पोस्ट बाक्स 158, कुंजपुरा रोड, करनाल – 132 001, भारत

# DIRECTORATE OF WHEAT RESEARCH

(Indian Council of Agricultural Research)
Post Box 158, Kunjpura Road, Karnal - 132001, India

SPEED POST

भाकृअनुप
ICAR

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DWR/RM/21/2014/
Dated: 23.12.2014

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M/s Geolife Agritech India Private Limited,
301 Marathon Max, LBS Marg, Mulund,
Mumbai0 400080, Maharashtra, India

**Subject**: Report of the project on "Bio-efficacy evaluation of organic fertiliser combination GEOFERT in wheat crop for better growth, development and yield" -regarding

Sir,

Please find enclosed herewith the report of the project entitled, "Bio-efficacy evaluation of organic fertiliser combination GEOFERT in wheat crop for better growth, development and yield" for information, record and FNA.

With regards,

Yours faithfully,

(RK Sharma) 23/12/14

Telephone: +91- 268256 (Office), +9 4-2267 (Residence)
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*For official use*

# Report of
# Bio-efficacy evaluation of organic fertilizer combination GEOFERT in wheat crop for better growth, development and yield

## DWR/ CRP/ RM - 29

**A**
**Contract Research Project**
**2012-13 and 2013-14**

**Funded By**
**M/S Geolife Agritech India Private Limited,**
**301 Marathon Max, LBS Marg, Mulund,**
**Mumbai - 400080 (Maharashtra - India)**

**DIRECTORATE OF WHEAT RESEARCH**
**(Indian Council of Agricultural Research, New Delhi)**
Post Box No. 158, Kunjpura Road, Karnal-132 001

# EXPERIMENTAL DETAILS

Name of the study: "**Bio-efficacy evaluation of organic fertilizer combination GEOFERT in wheat crop for better growth, development and yield**"

**Trial information**

| | | |
|---|---|---|
| 1 | Place of experiment | : Directorate of Wheat Research, Karnal- 132001 (Haryana) |
| 2 | Trial conducted by | : Dr. Subhash Chander Gill, Principal Scientist (Agronomy) |
| 3 | Crop | : Wheat |
| 4 | Variety | : PBW 550 |
| 5 | Season | : Rabi 2012-13 and Rabi 2013-14 |
| 6 | Date of sowing | : 03.12.2012 and 04.12.2013 |
| 7 | Spacing | : Row to row 20 cm |
| 8 | Gross Plot size | : 8 m x 1.8 m |
| 9 | Net plot size | : 6m x 1.4m |
| 10 | Plot Layout Design | : Randomized Block design |
| 11 | No. of treatments | : 12 |
| 12 | No. of replications | : 3 |
| 13 | Date of harvesting | : 21.04.2013 and 28.04.2014 |

## "Evaluation of organic fertilizer combination GEOFERT in wheat crop for better growth, development and yield"

Nutrients play an important role in plant growth and development. Imbalance of applied nutrients and continuous cropping has induced multiple nutrients deficiencies in the crop plants. Various combinations of nano-technology based organic products such as ***GEOFERT*** are being tried in many cereals, pulses and vegetable crops which are claimed to improve their growth and productivity. Nano technology is a system of therapy which uses small doses of remedies. These remedies are effective, micro and safe since prepared from substances found in nature such as plant minerals and any other natural substances.

***GEOFERT*** contains the combination of various liquid as well as solid organic nano-technology based compounds applied sequentially, which are required in low quantity and are non-toxic and eco-friendly. It is believed to work on the entire system along with providing all nutrients required for the optimum plant growth. It is also supposed to protect plants from sensitivity to climate change and helps to develop soil bacteria and improves soil nutrition. Their primary function is to improve the growth and development of crop plants by facilitating absorption of water and nutritional resources from the soil. The increased efficiency of applied nutrients is caused by the active uptake and transport of nutrients by nano-technology based organic compounds.

Lots of work is in progress on applied nutrients research since the recovery of applied nutrients is low to very low depending upon the type of nutrients applied. Now a-days, the possibilities are being explored for the use of naturally occurring fauna and flora for their role in plant nutrients supply for cultivated crops especially in making the fixed nutrients available to these crops. Some nano-technology based organic products are also being explored for improving applied nutrients use and these are now commercially available for their use in cultivated crops. Hence, it was felt pertinent to evaluate their role in plant nutrients supply for cultivated crops and the present study was conducted with the aim to evaluate the organic fertilizer combination ***GEOFERT*** in wheat crop for better growth and yield.

## MATERIALS AND METHODS

Soil samples were collected for physico-chemical analysis before sowing of wheat crop. The soil of the experimental field was low to medium in fertility status having pH of 8.17 and 8.09, EC of 0.091 and 0.098 dS/m, medium in organic carbon (0.48 and 0.42%), low in available nitrogen (193.6 and 176.8 kg/ha), medium in available phosphorus (21.7 and 19.7 kg/ha) and high in available potassium (293.4 and 282.9 kg/ha) in 0-15 cm soil depth during 2012-13 and 2013-14, respectively. Recommended dose of fertilizers (RDF) applied was 150:60:40 kg N, $P_2O_5$ and $K_2O$/ha, respectively. During the kharif season of 2012-13, the preceding crop was sorghum and during the kharif season of 2013-14, the preceding crop was paddy (coarse rice). The treatment details during the crop season 2012-13 and 2013-14 are given in Table 1. The meteorological data of wheat crop season for the year 2012-13 and 2013-14 are given in Table 4 and Table 5.

**Table 1. Treatments details for the evaluation of organic fertilizer combination *GEOFERT* in wheat crop**

| Sr. No. | Treatment (T) | Dosages & Time of Applications | | | | |
|---|---|---|---|---|---|---|
| | | At Sowing | | Crown Root Initiation – Early Tillering (20-25 DAS) | | Pre-flowering (45-55 DAS) |
| | | Seed Treatment with Geofert-1 (ml/Kg) | Basal application of N:P:K(Kg/ha) | Top dressing of ½ N(Kg/ha) | Foliar Spray of Geofert-2 (ml/ha) | Foliar Spray of Geofert – 3 (ml/ha) |
| T1 | Untreated Check | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| T2 | 100 % RDF, No split N | 0.0 | Full N:P:K | 0.0 | 0.0 | 0.0 |
| T3 | 100 % RDF, Two split N | 0.0 | ½ N:P:K | ½ N | 0.0 | 0.0 |
| T4 | Biozyme+ RDF,Two split N | 0.0 | ½ N :P:K | Biozyme @ 20 kg + ½ N | 0.0 | Biozyme @ 20 kg (broadcasting) |
| T5 | Vigore dose 1 + RDF, Two split N | 0.0 | (½ N+Vigore @125 g/ha):P:K | (½ N + Vigore 125 g/ha) | 0.0 | 0.0 |
| T6 | Vigore dose 2 + RDF, Two split N | 0.0 | (½ N + Vigore 312.5 g/ha):P:K | (½ N + Vigore 312.5 g/ha) | 0.0 | 0.0 |
| T7 | Geofert minus Vigore, No RDF | 4.0 | 0.0 | 0.0 | 500 | 500 |
| T8 | Geofert, No RDF | 4.0 | Vigore 125 g/ha-Sand mix (1:10) | Vigore 125 g/ha Sand mix (1:10) | 500 | 500 |
| T9 | Geofert + 25 % RDF, Two split N | 4.0 | (1/8 N + Vigore 125 g/ha) : P: K | 1/8 N + Vigore 125 g/ha | 500 | 500 |
| T10 | Geofert + 50 % RDF, Two split N | 4.0 | (1/4 N + Vigore 125 g/ha) : P: K | 1/4 N + Vigore 125 g/ha | 500 | 500 |
| T11 | Geofert + 75 % RDF, Two split N | 4.0 | (3/8 N + Vigore 125 g/ha) : P: K | 3/8 N + Vigore 125 g/ha | 500 | 500 |
| T12 | Geofert + 100 % RDF, Two split N | 4.0 | (½ N + Vigore 125 g/ha) : P: K | ½ N + Vigore 125 g/ha | 500 | 500 |

RDF; Recommended dose of Fertilizer N; Nitrogen app; Application DAS; Days After Sowing

**Note:** Rec. doses of NPK fertilizers were 150 kg/ha N, 60 kg $P_2O_5$ and 40 kg $K_2O$

## Results

Plant growth and yield attributes data were recorded during crop growing cycle and at the time of harvest. Thousand grain weight and grain protein content

were recorded from the samples of grains taken from grain yield of each treatment and replication.

**Table 2. Effect of *GEOFERT* on growth, yield attribute and productivity of wheat (2012-13)**

| Treatment | Plant height (cm) | Earheads /$m^2$ | Earhead length (cm) | 1000 grains weight (g) | Biomass (q/ha) | Grain yield (q/ha) | Straw yield (q/ha) | Grain Protein (%) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | 73.0 | 313 | 7.3 | 38.15 | 57.54 | 22.46 | 35.08 | 10.50 |
| $T_2$ | 85.9 | 437 | 9.5 | 38.59 | 123.02 | 51.10 | 71.92 | 12.47 |
| $T_3$ | 87.4 | 452 | 9.6 | 39.17 | 126.98 | 51.37 | 75.61 | 13.37 |
| $T_4$ | 88.9 | 475 | 9.7 | 38.89 | 125.00 | 51.18 | 73.82 | 12.87 |
| $T_5$ | 87.1 | 466 | 9.5 | 37.85 | 125.79 | 50.44 | 75.35 | 12.97 |
| $T_6$ | 87.1 | 465 | 9.6 | 38.37 | 121.03 | 50.73 | 70.30 | 13.00 |
| $T_7$ | 72.4 | 322 | 7.9 | 39.45 | 69.44 | 24.81 | 44.63 | 10.17 |
| $T_8$ | 76.5 | 330 | 7.3 | 40.45 | 65.48 | 22.10 | 43.38 | 10.10 |
| $T_9$ | 84.3 | 358 | 8.9 | 39.41 | 103.17 | 37.80 | 65.37 | 10.57 |
| $T_{10}$ | 88.0 | 436 | 9.3 | 39.71 | 111.11 | 44.99 | 66.12 | 11.20 |
| $T_{11}$ | 88.9 | 458 | 9.0 | 38.80 | 121.03 | 50.81 | 70.23 | 12.20 |
| $T_{12}$ | 89.4 | 465 | 9.7 | 38.99 | 123.02 | 52.52 | 70.50 | 12.57 |
| CD(0.05) | 5.21 | 25.1 | 0.72 | NS | 9.17 | 2.49 | 8.21 | 0.59 |

*Treatments details are given in Table 1

**Table 3. Effect of *GEOFERT* on growth, yield attribute and productivity of wheat (2013-14)**

| Treatment | Plant height (cm) | Earheads /$m^2$ | Earhead length (cm) | 1000 grains weight (g) | Biomass (q/ha) | Grain yield (q/ha) | Straw yield (q/ha) | Grain Protein (%) |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | 71.5 | 266 | 7.1 | 35.92 | 46.43 | 20.27 | 26.15 | 9.83 |
| $T_2$ | 85.7 | 406 | 10.3 | 36.37 | 107.94 | 48.65 | 59.29 | 12.20 |
| $T_3$ | 87.5 | 397 | 10.3 | 35.99 | 107.54 | 49.44 | 58.10 | 12.07 |
| $T_4$ | 87.0 | 416 | 9.9 | 36.85 | 115.48 | 49.80 | 65.67 | 12.10 |
| $T_5$ | 88.1 | 415 | 9.9 | 36.00 | 110.71 | 50.75 | 59.96 | 11.93 |
| $T_6$ | 87.7 | 404 | 9.8 | 36.47 | 109.52 | 50.85 | 58.68 | 11.97 |
| $T_7$ | 66.5 | 256 | 7.0 | 35.79 | 42.06 | 19.90 | 22.16 | 9.50 |
| $T_8$ | 67.6 | 301 | 7.1 | 35.92 | 44.05 | 20.73 | 23.32 | 9.53 |
| $T_9$ | 79.5 | 306 | 9.3 | 37.14 | 72.62 | 31.54 | 41.08 | 9.50 |
| $T_{10}$ | 84.1 | 342 | 9.7 | 37.43 | 98.81 | 41.56 | 57.25 | 10.27 |
| $T_{11}$ | 84.9 | 354 | 9.7 | 36.66 | 110.32 | 49.41 | 60.91 | 11.00 |
| $T_{12}$ | 85.8 | 429 | 10.3 | 36.24 | 115.08 | 51.73 | 63.35 | 12.17 |
| CD(0.05) | 5.01 | 24.57 | 0.68 | NS | 5.16 | 1.48 | 4.23 | 0.43 |

*Treatments details are given in Table 1

The results presented in Tables 2 and 3 for the crop season 2012-13 and 2013-14, respectively, revealed that the application of ***GEOFERT*** as seed treatment

at sowing (as per treatment detail given in Table 1) with 75 per cent of RDF (120, 45 & 40 kg N, $P_2O_5$ and $K_2O$ /ha, respectively) in treatment $T_{11}$ recorded significantly higher growth, yield attributes and yield of wheat crop (Tables 2 and 3) over the untreated check (control) treatment $T_1$, ***GEOFERT*** minus *Vigore*, with no RDF in $T_7$ and ***GEOFERT*** with no RDF in $T_8$ as well as ***GEOFERT*** with 25 percent of RDF (37.5, 15 & 10 kg N, $P_2O_5$ and $K_2O$ /ha, respectively) in treatment $T_9$ and 50 percent of RDF (75, 30 & 20 kg N, $P_2O_5$ and $K_2O$ /ha, respectively) in treatment $T_{10}$. During the year 2013-14, application of ***GEOFERT*** with 100 percent RDF in treatment $T_{12}$ gave significantly higher yield as compared to application of RDF alone with no split (full basal) or with two splits(½ basal and ½ at first irrigation).

On the basis of two years study, it can be concluded that application of organic fertilizer combination ***GEOFERT*** can help in saving of 25 per cent of recommended N, P and K indicating benefit of organic fertilizer combination ***GEOFERT*** in N, P and K fertilizers saving.

08.11.2014
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