A REPORT ON

Effect of different organic and inorganic amendments on wheat yield and protein quality

SUBMITTED TO:

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CERTIFICATE

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DECLARATION

I hereby declare that the project work entitiled **"Effect of different organic and inorganic amendments on wheat yield and protein quality of wheat** is an authentic record of my work carried out by Lovely Professional University as requirement of project work for the award of degree of Master of Science in Agronomy, under the guidance of **Dr.MAYUR G THALKAR** Department of Agronomy, School of Agriculture, Lovely Professional University, Phagwara, Punjab

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INTRODUCTION:

In India, one third of the total food which is the use in human life. India is the second place wheat growing in terms of area and production. In india this crop is grown for the flour since long time. Wheat is most common crop in India. In the world food crops 80% are creals. 27 countries in the world grow wheat which is food source for the two billion people (more the one third of world's population) 55% carbohydrates and 20% calories are given by wheat in the worldwide (Breiman and Graur,1995). Continuous use of fertilizers creates polluting effects in the environment. Synthesis of chemical fertilizers consumes a large amount of energy and money. However, an organic farming approach with or without chemical fertilizers seems to be possible solution for these problems. Worldwide, there is growing interest in the use of organic manures due to depletion in the soil fertility. Economic premiums for certified organic grains have been driving many transition decisions related to organic farming. Organic farming is a production system which provides or largely excludes the use of synthetic inorganic fertilizers, pesticides and growth regulators. Organic fertilizers including farmyard manure (FYM), sewage sludge and poultry manure may be used for crop. Organic manures in combination with each other render greater beneficial effects (Channabasanagowda et al., 2008) on plant growth and yield. Soil fertility can be increased through the utilization of minerasl as well as organic matter (Azad and Yousaf, 1982).

The use of organic materials in combination with inorganic fertilizers to optimize nutrient availability to plants is a difficult task as organic materials have variable and complex chemical nature. This requires the understanding and knowledge about the chemical composition, particularly the nutrient content and C quality of organic materials and its interaction with inorganic nutrient sources. Unfortunately, there has been little synthesis of the integrated effects of organic materials on net nutrient management. Numerous trials have compared the yields from a given amount of inorganic fertilizer (A), an organic material (B), and their combination (A+B), and in many situations (A+B) have produced higher yields than A or B alone. It should not be surprising that the combination does better because more total nutrients have been added than A or B alone. A four years experiment in India (Goyal et al., 1999) suggested that the yields of pearl millet (Pennisetum glaucum), N uptake, and N recovery after 4 years of the experiment were greater with the combination of FYM, or sesbania green manure and urea compared with urea alone but less when wheat straw was combined with urea. The decrease in yields with wheat straw even after 4 years was related to net N immobilization that would be expected from a material with a C/N ratio of 102 (Shah and Khan, 2003). The authors attributed the higher N use in the combined sesbania or FYM with urea to the immediate availability of N from urea and its delayed releases from the organics, achieving greater synchrony with crop demand.

Objectives

1.The effect of various fertilizers used in the research is assessed by using organic and inorganic fertilizers on wheat crop.

2.To study the effect of various treatments on the protein quality of wheat crop.

3.To study the effect of inorganic and organic amendments on yield of wheat crop.

Review of literature

Farm Yard Manure

Organic matter like FYM has supplied available nutrients to the plants provided favourable soil environment and increase water holding capacity of soil for longer time. Application of farm yard manure helps to increase the DMP, yield and nutrient uptake by wheat (Singh and Tomar, 1991). The soil incorporation of mustard/taramira + FYM and FYM at 10 t /ha significantly increased grain yield of wheat across the years (Regar et al., 2005). FYM application (10t/ha) resulted in a 2004 and 21.5 per cent increase in grain and straw yield over control, respectively also reported that soil density undergoes greater reduction with the use of FYM than chemical fertilizers. Application of FYM @ 10 and 20 tonnes / ha increased the grain yield and the total N P and K uptake in wheat crop (Singh and Agrawal, 2005). Response of FYM measured as kg grain / tonne was highest in wheat (Mahapatra et al., 2007). Trial conducted at farmer's field in Sehore and Bhopal districts for three years.

The effect of integrated use of urea and Farm Yard Manure (FYM) on yield and N uptake of wheat was assessed in a field experiment carried out on a silty clay loam soil in Peshawar valley of North West Frontier Province, Pakistan during 2001-02. Urea and FYM were combined in a way to supply N at 120 kg ha-1 from both sources in 0:0, 100:0, 75:25, 50:50, 25:75 and 0:100 ratios arranged in a RCB design with four replications. Wheat (variety: Ghaznavi) was planted in rows. Data on biological, grain and straw yields of wheat were recorded. Samples of grain and straw were also analyzed for total N to determine its uptake by the crop. The results indicated that maximum biological (10952 kg ha-1), straw (7710 kg ha-1), and grain (3242 kg ha-1) yields of wheat were obtained in treatment receiving N from urea and FYM in 75:25 ratio. The next higher yield was obtained in treatment receiving N from the two sources in 50:50 ratio.

Vermicompost:-

Today recognized economic and environmental losses due to excessive use of chemical fertilizers in agriculture. Therefore must be considered a good alternative for these types of fertilizers (Kochaki et al. 2008). One solution could be the use of vermicompost organic manure.

Vermicompost contains highly enriched nutrients, especially nitrogen, which gradually makes them available to plants (.Atiyeh, 2001). Gaind and Nain (2007) showed that application of vermicompost to 3 ton ha-1 phosphorus content in the wheat 121.11 µg per gram of dry matter. Whereas its content obtained 116.86 µg per gram of dry matter in the control treatment. The use of vermicompost organic fertilizer with chemical fertilizer could be reduced consumption of chemical fertilizers. Andhikari and Mishra (2002) showed in that the combined application of vermicompost organic manure with urea chemical fertilizer can reduce by 50 percent the amount of urea in the field conditions. Also the yield was 12% higher than treatments that only received fertilizer. Behera et al. (2007) showed that the use of 2.5 ton ha-1 vermicompost manure fertilizer with 50 percent fertilizer recommendations for wheat, grain yield in 4.08 ton ha-1 . While the in treatments of only the fertilizer was added to yield 4.87 ton ha-1 , respectively.

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Sewage sludge:-

Wang Rong et al., (2015) The effect of sewage sludge application on the growth and absorption rates of Pb and As in water spinach. Th experimental result was is treatment with sludge promoted the absorption of Pb and As in water spinach, with a significant ($p < 0.05$) increase of absorbed Pb following treatment concentrations above 10%, and a peak absorption of As at 8%.Diana, (2017) effect of sewage sludge application on Wheat crop productivity and heavy metal accumulation in soil and wheat grain. Th experimental result was showed demonstrated that a dose of 25 t/ha sewage sludge application provides highest wheat crop productivity, while Cd and Pb concentration levels in soil and wheat grain were under the maximum values allowed by the regulation.

A set of field experiments were conducted in order to study the effects of sludge application to agricultural soil on the heavy metal accumulation in soil and plant and on availability of certain nutrients for plant together with the productivity of wheat, maize and vetch, The experiment included four treatments i.e., (control; inorganic fertilizer according to Ministry of Agric. and Agra. Reform (MAAR) recommendation; sludge (the amount of sludge containing MAAR recommendation of N without any addition of mineral N; and double the amount of sludge without any addition of mineral N) with four replications at Kamari Research

station in Aleppo for the seasons 2004-2005. The applied sludge was described and soil was analyzed prior to cultivation. Upon harvesting, the heavy metals (Cd, Pb, Ni and Cr) were estimated in soil and plant in addition to certain nutrients (Total N, P, macronutrients) and organic matter. Significant build up of some heavy metals in soil and plant was noticed by increasing the addition of sludge as compared to the control. Significant increase in organic matter of soil in sludge-fertilized treatment was noticed as compared to the control. Moreover, a significant increase in soil available P was also noticed by increasing the addition of sludge. No significant difference in total N and macronutrients. There were no significant differences in sludge-fertilized treatments on wheat productivity (2.66 and 2.86 ton ha) as compared to mineral-fertilized treatment (2.93 ton ha). Maize 11 production significantly increased in sludge-fertilized treatments as compared to the control (3.88 ton ha) and 1 the best was that fertilized with double the amount (6.34 kg ha **)**

Material and methods

(A). Name of experiment: Effect of organic and inorganic fertilizers on yield and protein quality of wheat.

(B). Location: The experiment will be conducted on Agricultural Reseach Farm, **LOVELY PROFESSIONAL UNIVERSITY, Phagwara(Punjab).**

(C).Expeimental Details:

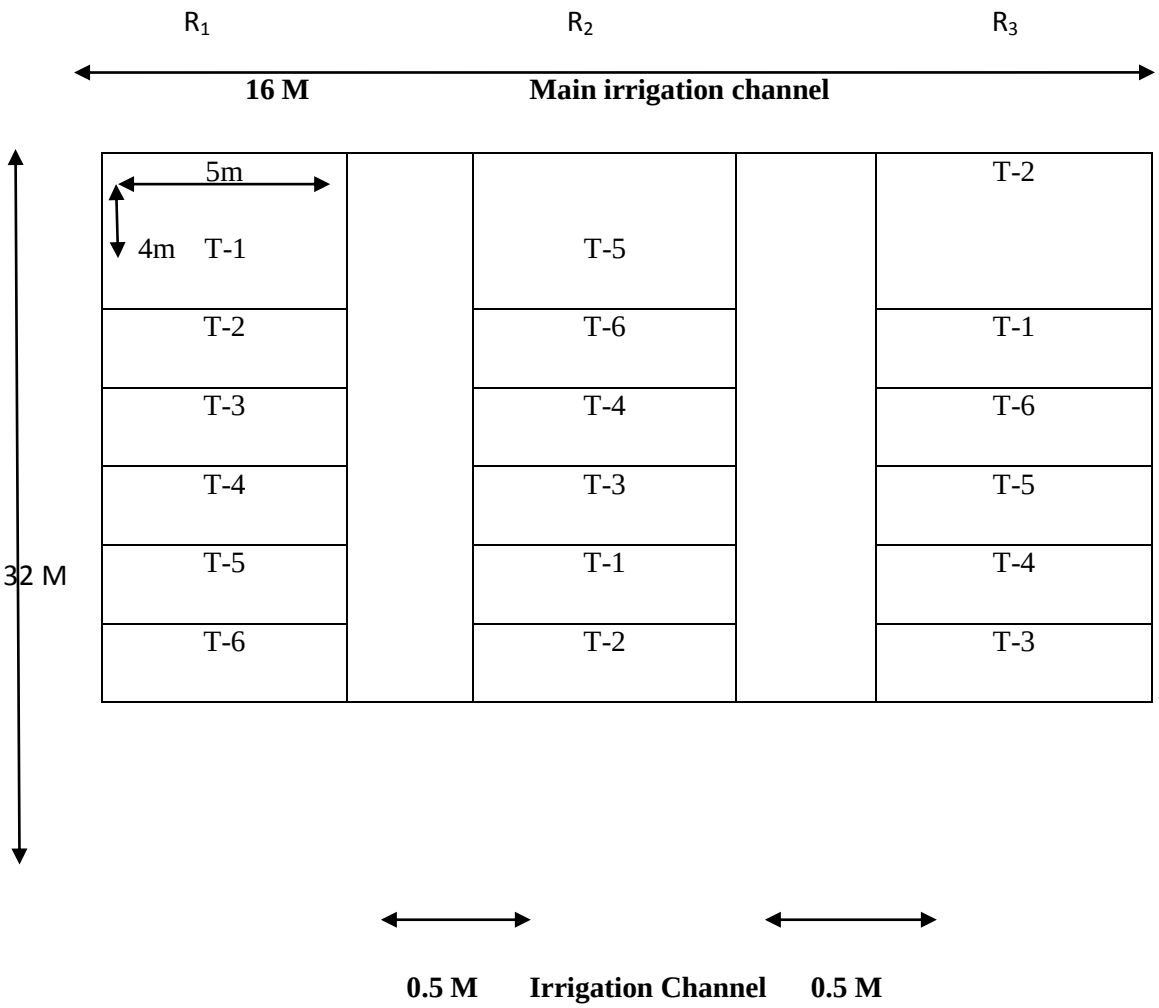
1. Year of experimentation : 2017
2. Recommended dose of fertilizer : As per the treatments
3. No of treatment : 06
4. No of replication : 03
5. Total no. of plots : 3 X 8 = 24
6. Plot size : 4m X 5m
7. Date of sowing : 1st November
8. Experimental design : Randomized complete block design
9. Crop and variety ; Wheat (*Triticum aestivum) and HD-2967*
10. Row to row spacing : 20-22.5 cm
11. Estimated area needed : 544 m^2
12. Seed rate : 100 kg/ha

Observation (collection of sample)

A periodical observation will be undertaken during the experiment for the following parameters DAS and at the time of harvesting the green Wheat (Triticum aestivum)

Serial no.		
A. Growth parameters		
1.	Plant height (cm)	
2.	No. of leaves	
3.	Size of leaf	
4.	Length of leaf (cm)	
5.	Weight of husk	
6.	Yield (kg/ha)	
C .**Meteorological observations**		
1.	Rainfall (mm)	
2.	Relative Humidity (%)	
3.	Evaporation	
4.	Bright sunshine hour	

FIELD LAYOUT



Treatment details

T1	Control
T2	100% RDF
T3	100% vermicompost
T4	100% sewage sludge
T5	100% FYM
T6	25% Vermicompost+ 25% FYM+ 25% sewage sludge+25%RDF

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