ZERO BUGGET NATURAL REFORMING WITH THE HELP OF COW DUNG AND COW URINE

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Abstract- Biological control involves the use of beneficial organisms their genes and product such as metabolites that reduces the negative effects of the plants pathogens and promote positive responses by the plant the needed for popularizing "Jeevamrutha" a mixture of cow dung, cow urine, jaggery, pulse flour, soil, lime and water prepared without any expenditure. The chemical forming which involves spraying of pesticides and use of fertilizers is not only financially burdening the farmers but also reducing fertility of the soil, running the health of the people and wasting water. Natural farming which involves Zero-Bugget agriculture practices, is a better option than even organic farming production from a natural Trichoderma culture using solid state fermentation as well as in biofertilizer use in cotton, groundnuts, maize, caster chillies all are uses in Natural Trichoderma biofertilizers. Several farmers who have taken up natural farming are doing well in contrast to those depending on fertilizers.

Keywords- Cow dung, Cow urine, Jaggery, Pulse Flour, Lime, Soil, Water etc.

I. INTRODUCTION

We know that Farmers are the back bone of our country but , since 1997 , more than one lack farmers committed suicide, because of agriculture products has drasticaly fallen. this happened due to wrong practices of farming heavy uses of chemical fertilizers, using tractors, excess amount of water reserves.[1]

In modern agriculture, due to heavy usage of chemical fertilizers and harmful pesticides on the crops, sustainability of the agriculture systems collapsed, income of farmers stagnated and food security and safety became a daunting challenge. Our all modern agricultural practices widely carry on a very different heavy range of agrochemicals including different types of organic and inorganic fertilizers. They washed off from lands along with water through irrigation rainfall drainage etc. reaching into the rivers, lakes and streams and so on. Where they turn fully to our natural ecosystem then effect human life in direct/indirect ways and Increasing concern about environmental hazards.[2]

To sort out these problems , to save our environment as well as to save many life of famers, its our duty to avoid the use of chemical fertilizers and adopt the methods of producing the Natural Bio-fertilizers.[2]

Bio enhancers are best defined as biologically active products containing one or more beneficial bacteria which are easy to use and economical carrier materials which add, conserve and mobilize crop nutrients in the soil. [1]. In other words, bio enhancer is a substance which contains living microorganisms which when applied to seed, plant surfaces , it promotes growth by increasing the availability of primary nutrients to the host plant.

Trichoderma species is a genus of fungi also commonly occurring worldwide with different species native to different areas; thus the 'species.' [1] designation above. The species are frequently isolated from agricultural soils or are seen as green spots on bark and deteriorating wood. Several strains of species have been developed as bio-control agents, attacking harmful fungi with various mechanisms, including living inside the host plant symbiotically. However, this anti-fungal activity can make Trichoderma harmful in the vicinity of mushroom production. [4]

Trichoderma fungi have been studied in lab conditions. Strains with the most effective beneficial properties have been separated, reproduced and are commercially available in Southeast Asia. Enzymes produced by these fungi differ depending on the strain; therefore, the effects are unpredictable. [3] For this reason, it is not recommended to attempt finding and reproducing your own 'local' variety. We do recommend, however, creating soil conditions to promote the growth of these beneficial fungi in your soil by practicing minimal or no-till, mulching and refusing to spray chemical fungicide. [4]

Trichoderma is a very effective biological mean for plant disease management especially the soil born. It is a freeliving fungus which is common in soil and root ecosystems. It is highly interactive in root, soil and foliar environments. It reduces growth, survival or infections caused by pathogens by different mechanisms like competition, antibiosis, mycoparasitism, hyphal interactions, and enzyme secretion. [4]

1.2 Benefits of Trichoderma:

A) Disease Control:

Trichoderma is a potent biocontrol agent and used extensively for soil born diseases. It has been used successfully against pathogenic fungi belonging to various genera, viz. Fusarium, Phytopthara, Scelerotia etc. [4]

B) Plant Growth Promoter:
Trichoderma strains solubilize phosphates and micronutrients. The application of Trichoderma strains with plants increases the number of deep roots, thereby increasing the plant's ability to resist drought. [6]

C) Biochemical Elicitors of Disease:
Trichoderma strains are known to induce resistance in plants. Three classes of compounds that are produced by Trichoderma and induce resistance in plants are now known. These compounds induce ethylene production, hypersensitive responses and other defense related reactions in plant cultivars. [6]

D) Transgenic Plants:
Introduction of endochitinase gene from Trichoderma into plants such as tobacco and potato plants has increased their resistance to fungal growth. Selected transgenic lines are highly tolerant to foliar pathogens such as Alternarialternata, A. Solani, and Botrytis cirerea as well as to the soilborne pathogen, Rhizectonia species. [6]

E) Bioremediation:
Trichoderma strains play an important role in the bioremediation of soil that are contaminated with pesticides and herbicides. They have the ability to degrade a wide range of insecticides: organochlorines, organophosphates and carbonates. [6]

II. MATERIALS AND EXPERIMENTAL METHOD

2.1. Materials

Cow dung
Cows dung is a most important source of bio-fertilizer and used in many developing countries for generating energy. It is very effective's alternatives to chemical fertilizers by enhancing productivity in long term with maintaining the soil health and enhances the microbial population. Cow dung manure and vermicomposting increases soil organic matter content, and this leads to improved water infiltration and water holding capacity as well as an increased cation exchange capacity.

It is one of the renewable and sustainable energy resources through dung cakes or biogas which replace the dependence upon charcoal, fuel wood, firewood and fossil fuel etc. Beside it, application of cow dung in proper and sustainable way can enhance not only productivity of yield but also minimizing the chances of bacterial and fungal pathogenic disease. Therefore, improper use of cow dung should be stopped and use as organic manure for maintaining productive and sustainable farming system
Cow Urine
The use of cow urine is known for a long time in India. Gaw-mutra (cow's urine) has been described as a liquid with innumerable therapeutic values, capable of curing several incurable diseases in human beings and plants. Cow urine is rich source of macro, micronutrients and has disinfectant and prophylactic properties. It puri- fies the atmosphere and improves the soil fertility. Cow urine has amazing germicidal power to kill wide variet- ies of germs. It helps in the proper functioning of the liver which ensures supply of healthy and pure blood. It gives disease resistance power to the body which can be summarized. [4]

Jaggery
Jaggery is used to purify the upcoming Jeevamruta fertilizer . The micro nutrients present in the jaggery possess antitoxic and anti-carcinogenic properties. It has moderate amount of calcium, phosphorous and zinc . [4]

Pulse flour
It is used as a feed for the micro organisms present in Jeevamruta .So that, they will be grow for degradating the waste materials and increase the microbial actions in bio enhancer. [4]

Soil
A vital function of soil is storing and supplying minerals and nutrients which is essential for plant life[4]. Soil is deficient plant extractable phosphorus, and it helps to plant growth. Soil acidity is improves by uptake of major plant nutrients (Nitrogen, Phosphorus, Potassium) of plants growth.

Lime
It provides source of calcium and magnesium for plants. It permits improved water penetration for acidic soils because acid soil reduce plant growth. It increases the pH of acidic soil , it helps to growth of plant.The benefits of lime application include long term control of aphanomyces disease on crops/plants. [4]

2.2 Experimental Method



Fig 1: Istrumental setup for Bioenhancer

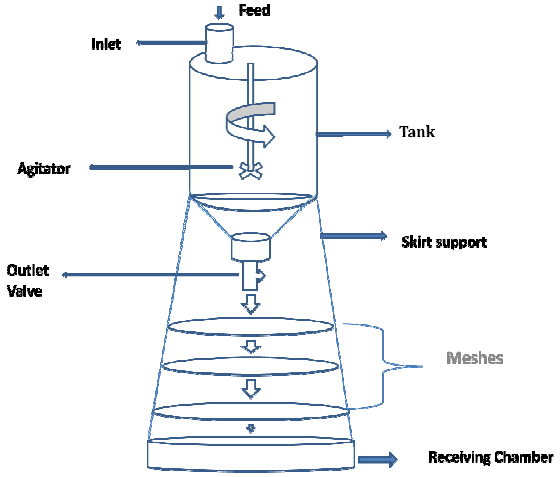


Fig 2: Schematic diagram of setup

Table 1. Composition of Sample

A	Fresh local Cowdung	1.5 kg
B	Cow Urine	1 litres
C	Jaggery	125 gm
D	Pulse flour	50
E	Water	3litre
F	Soil	50 gm
G	Lime water	20 ml

Add the samples of above compositions in a tank which we mention above. And fix a agitator in the tank externally it is connected by wire to motor, and electric supply is pass to motor. Stir the solution via agitator thoroughly both in morning and evening for hours and keep it for 7 days, for to ferment it.

On 8th day, our solution was ready and it was in a slurry form. So, by using screening different sizes of mesh is use. Place these mesh's below the valve of tank on stand. Open the valve slowly to screening properly.

III. RESULTS AND DISCUSSION

After eighth day the liquid product is test for fungiis are present in that product. For that done two test:

1. Microscopic test
2. Isolation test for fungi

2.1. Microscopic Test

3.1.2. Rhizobium and Legume Containing Nitrogen



Fig 3.Fungi of Rhizobium

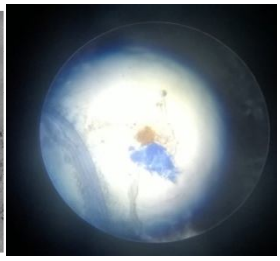


Fig 4. Microscopic view of Rhizobium Bacteria



Fig 5. Legume root



Fig.6. Microscopic view of Legume root

Rhizobium is a genus of Gram-negative soil bacteria that fix nitrogen. Rhizobium species form an endosymbiotic nitrogen-fixing association with roots of legumes and Parasponia. Rhizobium forms a symbiotic relationship with certain plants such as legumes, fixing nitrogen from the air into ammonia, which acts as a atural fertilizer for the plant.

Legumes are notable in that most of them have symbiotic nitrogen-fixing bacteria in structures called root nodules. For that reason, they play a key role in crop rotation

3.2 Fungi Isolated from soil (Manure) and liquid samples.

Isolation of the fungi: For the isolation of fungi from collected soil samples, soil plate method and soil dilution plate method were employed (Warcup, 1950, Waksman, 1922). After six days, fungi were distinguished according to the macroscopic characteristic features. Spores of different morphological fungi were streaked on separate PDA plate under aseptic conditions. (Potato dextrose agar (abbreviated "PDA") is the most widely used medium for growing fungi).

Method: The soil micro fungi were enumerated by Serial dilution (Waksman, 1927): Liquid provided was diluted to 10^{-4} and one ml liquid dilution plated on Potato dextrose agar. Culturing carried out in triplicate.

2. Direct plating : Soil plate method (Warcup, 1950). micro fungi.

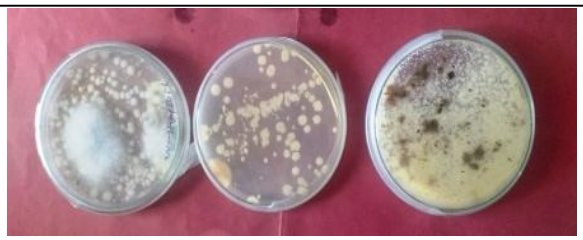
Observations:

Table 2. From the organic manure following fungi found

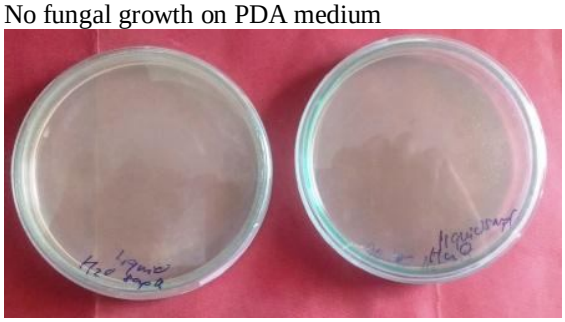
S. No.	Name of the Fungi	Occurance
1.	Mucor sp.	Few Colonies
2.	Aspergillus nidulance	Few colonies
3.	Aspergillus niger	Few colonies
4.	Trichoderma sp.	Many colonies

Plate 1.: Isolation of fungi : Fungal colonies on PDA medium

Method : Warcup, 1950, Colonies of Trichoderma sp. And other fungi growing on PDA medium



2. Method : Waksman, 1922). Results of serial dilution technique,
No fungal growth on PDA medium



CONCLUSIONS

It can be concluded that our bio enhancer could be a potent source to improve soil fertility, crop productivity and quality. This can also be a potential alternative for fertigation which is becoming common in most of the crops. However, care should be taken that bio enhancer which are used in limited quantities cannot meet the entire nutrient requirement of the crops. These simply catalyze quick decomposition of organic wastes in to humus, hence incorporation of enough bio mass preferably combination of monocot and legumes duly supplemented with animal wastes will be helpful in quality production of humus, which is prerequisite for improving soil fertility and crop productivity.Combined with manures and frequent use of bio enhancer can address many challenges of agriculture and will be pave way for sustainable agriculture through organic resources.

An urgent need to increase food production globally under shrinking land resources. The only solution to address this problem is switching over to cow basedBio enhancers products instead of chemical led farming. Bio enhancers therefore, could be an effective tool to address multi nutrient deficiencies in most of soils in the country.

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