

Potential of Biogas Slurry and Compost to Improve Growth and Yield of Okra at Different Levels of Chemicals Nitrogen

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Overview

- Bioslurry and compost
- Application in the soil
- Link of Bioslurry and compost with organic fertilization

Current status in Pakistan

- Among Asian countries, China, India and Bangladesh are major user of bioslurry and compost for sustainable agriculture.
- use of bioslurry and compost concept is on initial stages in Pakistan
- Dire need to focuss on this technology for sustainable agriculture.

What is Bioslurry?

- **Bioslurry is a byproduct, obtained from the biogas plant after the digestion of dung or other biomass for the generation of methane rich gas.**(smith & Elliot,1990; George et al.,2005)
- **Digested slurry contains**
 - organic nitrogen (mainly amino acids)
 - abundant mineral elements i.e macro & micronutrients
 - low-molecular-mass bioactive substances
 - Hormones
 - humic acids
 - Vitamins

(Liu et al., 2008)

Bioslurry application to soil: advantages

- **•Supplies essential nutrients**
- **•Enhances water holding capacity**
- **•Enhances soil aeration**
- **•Accelerates root growth**
- **•Inhibits weed seed germination**
 - (Pathak et al., 1992; Garg et al., 2005).
- **prevents adverse environmental impacts of waste disposal (Garg et al., 2005)**

Multi-Dimensional Benefits of Bioslurry

- **Balanced Nutrition**
- **Pollution Free**
- **Defense Against Pests**
- **Maintains Soil Fertility**
- **Quality Food**
- **Wholesome**

What is Compost?

- **Aerobically decomposed organic material derived from plants and animal source.**
- **Rich in nutrients**
- **Used in gardens, landscaping, horticulture and agriculture (for field crops)**



(Martens,2000)

Advantages of Compost

- **Act as soil conditioner**
- **Organic fertilizer**
- **Source of humus or humic acid**
- **Act as a natural pesticide for soil**
- **Useful for erosion control**
- **Useful for Land and stream reclamation**

(Martens.,2000)



Need for project:

Organic matter in soils of Pakistan **less than 1%**

Reasons?

- Semiarid and arid climate
- Extensive farming i.e continuous mining of nutrients
- Extensive use of inorganic fertilizers
- Lack of organic farming
- Poor extension services

How to use organic material for sustainable crop production?"

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- **Organic fertilizer can't be substitute of inorganic fertilizers**
 - **But integrated use of organic and inorganic fertilizers can restore**
 - **fertility**
 - **Organic matter status of soil**
 - **Improve soil physical and chemical properties of soils**
 - **Mediate environmental adverse effects**
 - **Improve quantitatively and qualitatively crop production**
(sing et al,1995)

Boislurry and Compost

Mineral Fertilizer

Pesticides

Organic Fertilizer

**Sustainable
Crop Land**

**Sustainable
Environment**

**Sustainable
Farm Produce**

Objectives

- **Efficient utilization of waste material for sustainable agriculture**
- **To reduce the poverty by decent work i.e this concept create new jobs,bring the development of biogas and compost related business in pakistan**
- **Improvement of the physical status of the soil.**

Increased soil fertility.

Increased water-holding capacity of the soil.

Enhanced activity of the micro-organisms in the soil.



MATERIALS AND METHODS

- **Kind of experiment: Field Experiment**
- **Crop: Okra**
- **No of treatments 7**
- **No of replication 3**
- **Experimental design RCBD**

Treatments Plan:

- **T₁ = Control (Recomende NPK)**
- **T₂ = Biogas slurry @ 600 kg ha⁻¹ + Recomendde NPK**
- **T₃ = Biogas slurry @ 600 kg ha⁻¹ + 75% of N+recommended PK**
- **T₄ = Biogas slurry @ 600 kg ha⁻¹ + 50% of N+recommended PK**
- **T₅ = Compost @ 600 kg ha⁻¹ + Recomendde NPK**
- **T₆ = Compost @ 600 kg ha⁻¹ + 75% of N+recommended PK**
- **T₇ = Compost @ 600 kg ha⁻¹ + 50% of N+recommended PK**

Parameters studied

1. **Plant height (in cm)**
2. **Number of branches**
3. **Number of flowers**
4. **Number of fruit sets**
5. **Fruit yield per plant**
6. **Root weight**
7. **Root Length**
8. **Nitrogen concentration in Okra fruit and shoot (%)**
9. **Nitrogen uptake by Okra fruit and shoot**
10. **Soil physical properties**

Summary

- Bioslurry and compost may increase growth and yield of crops, act as a soil conditioner and source of nutrients for sustainable agriculture.



THANKS