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## THE ROLE OF LIQUID ORGANIC MANURE FOR SUSTAINABLE CROP PRODUCTION

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### **Abstract**

*Sustainable crop production can best be achieved when the soil is rich in essential elements required for plant growth. This study examines the role of liquid organic manure for sustainable crop production. The study identified the following materials for making liquid organic manure: plants, fresh cow dung, wood ash, urine and water among others. Five ways of making liquid organic manure were examined in the study. The study reveals the role of liquid organic manure in crop production which includes environmental friendliness, reduces the harmful effects of the use of chemical fertilizer on human health and increased crop productivity. The study recommends that farmers should be encouraged to use liquid organic manure because of its roles in sustainable crop production and environmental friendliness. The study suggested that further studies should be carried out to ascertain the level of awareness and use of liquid organic manure by farmers in various farming zones of Nigeria.*

**Key word:** Role, Liquid, Organic, Manure, Sustainable, Crop and Production.

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### **Introduction**

Intensive agricultural practices depend heavily on external input (such as fertilizer and pesticides) application. Rising cost of inputs and soils environment have been causing

farmers to think of alternate practices to sustain soil fertility many farmers are beginning to take such initiatives. Manure is an important resource for meeting the nutrient needs of crops.

Land application is the most widely accepted and best economic and agronomic use of manure (Sawyer 2013). Liquid manure contains urine manure, waste water waste feed and animal waste. It can also contain such foreign objects as construction debris, medical supplies and other objects dropped in the barns (Kari 2014). However care should be taken to prevent these foreign objects from being added to the manure. Soil application of liquid manure can enhance plant growth and increase crop yield. Lithourgidis, Mats, Barbayiannous, & Dordas (2017). The beneficial effect of liquid manure on crop growth, yield and macro-nutrients absorption is mainly due to the improvement of soil fertility with respect to macro-nutrients, especially nitrogen in general the amounts of readily available nitrogen in manures mainly in the form of  $\text{NH}_4\text{-N}$  are lower than that of inorganic fertilizers. (Pfluke, Jokela & Misselbrook 2014).

However, liquid manure contains high amounts of immediately available nitrogen due to its urine content. The quantity of this immediately available nitrogen can be almost half of the total nitrogen and this percentage is higher than that of the solid cattle manure (Bechini & Marino 2019). A significant amount of the ammoniacal nitrogen in liquid manure can be lost as  $\text{NH}_3$  by volatilization, shortly after liquid manure application to the soil (Pfluke et al 2011). However this depends on the properties of the liquid manure and soil, where manure is applied, and also on the rate, manner and time of application, weather conditions and interaction among these factors (Reijs 2017). Soil incorporation of liquid manure mainly by using injection techniques, seems to reduce  $\text{NH}_3$  volatilization drastically and such techniques not only to arable soils but also grasslands, no-tillage and forest systems. (Maguire 2011). Due to the high quantity of immediately

available nitrogen, liquid manure can be as efficient as inorganic fertilizers in satisfying plants nitrogen needs when it is applied at equivalent rates (Lithourgidis et al 2017).

#### Meaning and definition of liquid organic manure

Liquid manure is manure in liquid form. It consists of dung and urine in a liquid form. Manure is changed into a liquid form by mixing the manure with water. Generally liquid manure is used as a convenient alternative to manure which cannot be spread as evenly as its liquid form. Liquid manure can work as a pest control, and also provides nutrients for the plants.

Organic manure are naturally available mineral resources that contain moderate quantity of plants essential nutrients. (Hitha & Linu, 2021). They are capable mitigating problems associated with the use of chemical fertilizers on our soil. Organic manure gradually

releases nutrients into the soil solution and maintain nutrient balance for healthy crop growth. Organic manure comprises of plant and animal material and litters to agricultural by products with the nutrient contents varying greatly among source materials. (Green 2015). Liquid organic manure therefore is organic manure prepared in liquid form. It consists of essential plant nutrients and beneficial microorganisms, which recycles organic matter

Materials for making liquid organic manure.

Materials needed to make liquid organic manure are made up of various plants example seaweed, fruits, vegetables, wood ash, animal dung, urine, and water other ingredients are. ((Chris, and Jakob, 2019)

Local resource	Quality	Function
Neem	Bitter	Medicine + nutrients
Worm wood	Bitter	Medicine + nutrients
Garlic	Smell	Medicine + nutrients
Adhatoda vasica	Bitter	Medicine + nutrients
Wrightia arborea	Poisonous	Medicine + nutrients
Persian Lilac	Bitter	Medicine + nutrients
Artemisia indica	Bitter + smell	Medicine + nutrients
Marigold	Smell	Medicine + nutrients
Chilli	Hot	Medicine + nutrients
Xanthoxylum	Hot	Medicine + nutrients
Nettle	Fertile	Medicine + nutrients
Lemongrass	Scent	Nutrients
Morning glory	Fertile	Nutrients
papaya	Fertile	Nutrients

Source: The farmer's hand book, near the house chapter 10 Liquid manure.

#### How to make liquid manure.

(1) Collect as many plants as possible that will fit in the container available.

(2) Cut the plants into small pieces and fill the container. Add water to fill up the top.

(3) Add ash and cow dung wrapped in a sack. This helps to produce micro-organisms.

(4) When the mixture starts to smell, it is ready for use.

(5) When the weather is hot, the preparation will be ready in 5 days, or in 2-3 weeks if it is colder.

A huge percentage of liquid organic manure can be made from kitchen waste,(Samlman, 2018),identified seven ways of making home made liquid organic manure which

1. Use of banana peel which contains good amount of potassium.This can be made by soaking banana peels in water for three days. This is a good source of manure for garden crops like tomatoes.

2. Use of eggshell which contains calcium and small amount of potassium. Crush the eggshell put in a container and fill with water for one week.

3. Vegetable cooking water :after boiling vegetables,do not dispose the water off. Let it cool then dilute with water.

4. Epsom salt contains sulfur and magnesium. Put a gallon of water,add

a tablespoon of Epsom salt the mixture in a sprayer and use it for tomatoes,pepper and onions farm.

5. Compost tea: put compost in a bucket, pour water cover it partially after one or two days pour the water in a different bucket dilute it in a ratio of one to ten.

6. Weed tea:place grasses and weed clippings in a 5-gallon container and add water. Ensure the water goes slightly above the components, cover for three days. Drain the liquid and dilute with water in the ratio of one is to ten.

7. Droppings Tea: collect chicken,rabbit or goat droppings, put them in a bucket and add water until slightly above the droppings.Drain the water after two or three days dilute it with a one to twenty water ratio,this is rich in nitrogen.

Role of liquid organic manure in crop production

The beneficial effect of using liquid organic manure on the yield of various crops can be proven by means of field experiments. However the outcome from each application can be attributed to differences in composition of materials used in making the liquid manure and different application approaches. Generally the application rate of the liquid manure are chosen on the basis of its nitrogen content. Increased crop yields upon liquid manure application to soil are usually accompanied by increases in plant uptake of macronutrients (Matsi, Lithourgidis, & Gagianas 2013). Nitrogen, phosphorous and potassium uptake of different plant species will increase upon repeated annual application of liquid manure. (Lithourgidis et al, 2017). Soil properties that affect liquid manure nitrogen transformations after its soil application, seem to be PH, texture and water regime along with land use, cultivation practices and weather

conditions. Ammonia volatilization is expected to reduce after liquid cattle manure application to acid soils compared to calcareous soil (Bechini & Marino, 2019).

Other benefits of liquid organic manure according to the farmers hand book are as follows.

- Liquid organic manure protect crops .
- Liquid organic manure prevent pest and diseases.
- Liquid organic manure avoids the use of harmful manufactured chemicals.
- Liquid organic manure provides nutrients to plants.
- Liquid organic manure provides irrigation.
- Liquid organic manure uses local resources thereby saves cost.
- Liquid organic manure application is environmental friendly (protects the environment) .

- Liquid organic manure improves the soil.
- The use of liquid organic manure saves our health by reducing the use of harmful chemicals.

How to make use of liquid organic manure

How to use liquid organic manure on young plants, newly made liquid organic manure is very strong so it needs diluting with more water. When the liquid is used up water is added again to the biomass in the container, which becomes less strong each time water is added.

How to use liquid organic manure on older plants. When the plants are bigger and more matured, they can stand stronger liquid organic manure. Insects are often stronger as well. Liquid organic manure helps to repel these insects. Plants can take in nutrient from liquid manure through their leaves or the soil. Liquid manure also act as irrigation. Furthermore(

Samman,2018), states that farmers should ensure that plants are sufficiently watered before using liquid organic manure as this prevents them from absorbing excess salts.

When to spray liquid manure

Spray any time after germination of crops, especially in the morning or evening. Spray whenever pest is present or before they are expected to arrive. The objective is to repel, them from attacking the crops, there is need to reapply liquid manure because it can only repel pest not killing them so there is every probability that they will attack again.

## **Conclusion**

The use of liquid manure as an organic fertilizer for crops is based on the fact that liquid manure is a valuable source of plant nutrients, especially of nitrogen since it contains

high amounts of readily plant available  $\text{NH}_4\text{-N}$ , due to its urine content. Large percentage of this ammonia-cal N. can be lost during the storage of liquid manure especially liquid cattle manure, after application to the soil through  $\text{NH}_3$  volatilization. The beneficial effect of soil application of liquid manure on micro-nutrients availability in soil and plant uptake can become apparent only after a long- term continuous use. Liquid manure also helps to repel pest from attacking crops and serves as irrigation to the soil.

### **Recommendation**

The study recommends that farmers should be encouraged to use liquid organic manure because of its roles in sustainable crop production and environmental friendliness. Extension workers should also educate local farmers on the various benefits of using liquid organic manure and how to make it.

### **Suggestion for further studies**

1. Further studies should be carried out to ascertain the level of awareness and use of liquid organic manure by farmers in various farming zones of Nigeria.

### **References**

- Bechini, L. & Marino, P. (2019). Short –term nitrogen fertilizing value of Liquid dairy Manures is mainly due to ammonium. Soil science society of America Journal, V01.73, NO.6, P P. 2159- 2169, ISSN 1435-0661.
- Chris,E,& Jakob, J.,(2019),Liquid fertilizer;*The Farmers handbook near the house, permies.com.*
- Green, B.W.,(2015),Fertilizer in aquaculture,feed and feeding practices in Aquaculture:Woodhead publishing;  
[www.sciencedirect.com](http://www.sciencedirect.com).
- Hitha,S.,&Linu, M.,(2021), Organic fertilizer as a controlled release of nutrients; *Controlled release fertilizer for sustainable Agriculture,pp.231-245.*  
[www.researchgate.net](http://www.researchgate.net).



Kari V- D (2014), Liquid Manure solids Management Agricultural and Natural

Resources, Journal University of Arkansas System.

Lithourgidis, A, S , Matsi T, Barbayiannisi N & Dordas C. A .(2017), Effect of

liquid Cattle Manure on Corn Yield , Composition and soil properties.

Matsi , T. , Lithourgidis A. S & Ggianas .A .A. (2013). Effects of Liquid Cattle

Manure on growth and Yield of winter wheat and soil characteristics. Agronomy Journal V 0 1. 95 N0.3 p p, 5 9 2 – 5 9 6.

1ISSN 1 4 3 5 -0645.

Pfluke, P.D, Jokela, W. E .& Misse/ Brook, T. H.(2011).Dairy stun application

method impacts ammoniac emission and nitrate leaching in no –till corn silage . Journal of environmental quality, vo1.40. N0.2 (March 2011) PP.383-392, ISSN 1537-2537.

Sawyer J. E,(2013), Liquid Swine Manure Nitrogen Utilization for crop

production: Integrated crop Management Conference. Iowa state University. Ames.

Samlman,.Z, (2018),Easy way to make organic liquid fertilizers:DIY Gardening recycling waste management, [www.ecomena.org](http://www.ecomena.org).