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Sustainable Agriculture; the Use of Biofertilizers for Improved Agriculture

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PROJECT TITTLE: SUSTAINABLE AGRICULTURE; THE USE OF BIOFERTILIZERS FOR IMPOVEDAGRICULTURE

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Abstract

Study show that in Tanzania crop production has become unsustainable due to high increase in soil infertility. This problem is a result of inadequate soil fertility management such as prolonged use of chemical fertilizers. Study indicates the use of biofertillozers could be a practical solution to the problem. This study focused on the use of Azotobacter as a plant promoting bacteria. Bacteria obtained from Microbiology laboratory in the college of veterinary medicine and biomedical sciences at Sokoine University of Agriculture. The bacteria isolate was grown in the large flask vessel (liquid form). The trial conducted to vegetables using seedling method of application in comparison to chemical fertilizers. High yield were obtained in vegetables grown by biofertillozers than to that used chemical fertilizers, also the soil content was analyzed and soil fertility were retained with the application of biofertillozers than with the use of chemical fertilizers.

Introduction

Agriculture also contribute to most of the chemical pollutants due to prolonged use of synthetic chemical fertilizers and pesticides. These pollutants can lead to environmental pollution and endanger various life forms. For example, the use of nitrogen based chemical fertilizers lead to production of harmful gas nitrous dioxide which leaches into the ground water as started by Galloway et al., (2008).

Towards sustainable Agriculture goal, crop produced should be of resistant to diseases, drought, heavy metals as well as of high nutrition value. In order to ensure these features are achieved there is a need to use soil microorganisms such as bacteria, fungi and algae which increase nutrients uptake and efficient water utilization. Armada *et al.,* (2014). Among these microbes' bacteria such Rhizobacteria, Azotobacter and Azospirilum are commonly used as biofertillozers (Glick, 2012).

Although the use of biofertillozers in Agriculture activities are very minimal worldwide. This is done to inconsistent inoculation of these microbes, survival in the soil and compatibility with the crops. These factors made to limited use of biofertillozers (Martinaz et al., 2010).

As started by Nakkeeran et al., (2005) In ideal biofertillozers should possess high rhizosphere compliance to allow plant growth, should have broad spectrum of action, safe to environment, compatible to other Rhizobacteria, tolerant to UV radiation and oxidizing agent.

This preprint will discuss the preparation and application of Azotobacter.

Methodology

Preparation of mother culture

Azotobacter isolate from the lab were grown in the laboratory using mannitol agar and inoculated into a broth.

Inoculant production

The inoculum in three broths were grown after sterilization of the broth.

Carrier preparation and mixing and packaging.

The distilled water was added in the proportion and packed in a plastic bag ready for application

Biofertillozers application on crops.

The product was used to vegetables by seedling method

Results and discussion

The proper growth and high yields were obtained in vegetables grown with Azotobacter than with chemical fertilizers.

Conclusion and recommendation

Based on these findings Azotobacter could be a practical solution to the problem of soil infertility.

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