

EVALUATION OF ANTIFUNGAL ACTIVITY OF ANAEROBIC DIGESTATE AND ITS EFFECT ON GROWTH AND YIELD OF MAIZE

Nazia Zaffar, Alam Khan, Abdul Haq and Malik Badshah

Department of Microbiology, Faculty of Biological Sciences, Quaid-i-Azam University, Islamabad
malikbadshah@gmail.com

Pakistan is an agricultural country. The increased population leads to increasing demand for food. Unfortunately, crops are infected by different microbes and nutrient deficiency of soil adversely affects the yield of the crop. Furthermore, the use of chemical fertilizers like Nitrogen, Phosphorus, Potassium (NPK), Urea, Diammonium phosphate (DAP) and pesticides have environmental consequences. Therefore, so there is need to find alternative renewable and sustainable biofertilizers.

Maize is capable of phytoextraction from contaminated soil and one of the top growing crops in Pakistan. Unfortunately, it has low yield compared to other countries due to deficiency of organic matter, widespread nutrient deficiencies (deficiency of phosphorus and nitrogen), unbalanced use of fertilizers, disease, and pest.

Digestate as partially degraded organic material residue has been suggested for the control of a few plant diseases and as a better replacement for the chemical fertilizers.

The present study was designed to evaluate the antifungal activity of anaerobic digestate and its effect on growth and yield of maize. The antifungal activity, minimum inhibitory concentration (MIC), and minimum fungicidal concentration (MFC) against selected phytopathogens (*Colletotrichum coccidis*, *Pythium ultimum*, *Phytophthora capsici*, *Rhizoctonia solani*, *Bipolaris oryzae* and *Fusarium Fujikuroi*) was determined by microtiter plate method. The effect of various fertilizers on different growth parameters height, diameter, chlorophyll, leaf area, biomass, and yield were studied in field experiments.

The extracts from anaerobic digestate have shown antifungal activity against selected phytopathogens, the highest activity was noted against *P. ultimum*, the MIC activity was high in case of *P. ultimum* and *B. oryzae*.

The present study concludes that anaerobic digestate has a positive effect on maize growth and yield as well as an antifungal activity which can be potentially a good biofertilizer. Maize can be a potential for phytoextraction technology in contaminated soils when anaerobic digestate is applied in soil due to its liquid and organic nature, soil nutrients and elements can easily be taken up by roots. In this way, we can remediate or extract the elements from contaminated soil by the plant through biofertilizer. However, maize plant can be used as a substrate in anaerobic digestion process so that we can produce energy (biogas) through this process and also extract the desired elements from various extraction procedures.

Key words: Phytoextraction, Growth and Yield of Maize, Biofertilizer