

# Comparative Study of Different Sewage Farming on Soil Quality: A Review

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Sewage sludge is dried and taken from 6.5 MLD STP Vrindavan Yojna which is SBR based STP. The Sludge is taken from centrifuge machine which removes the water content from sludge. The study shows by taking three plants namely Alovera, tomato and chilli and grown with sewage sludge, normal soil and chemical fertilizer. The normal soil taken is silty clay loam. The chemical fertilizer taken is Poorna 19 which contains nitrogen, present in ammonical, amide and nitrate forms, this further supplemented with zinc, iron, copper and manganese. The use of this chemical fertilizer always requires a attention for proper dosage for better result. Firstly the physical test are performed and recorded which shows the sewage sludge is better compare to normal and chemical fertilizer. The rate of growth of plant with sewage sludge is much better than other two. Initially the research is performed ipot which doesn't show better effect initially. The water used for the irrigation is taken from the outlet of 6.5 MLD STP which further improves the soil quality as it also contains some parameter within the discharge limit to inland surface. The outlet water is taken before the chlorination stage. Thereuse of treated water is common nowadays for small community in premises to make Zero Liquid Discharge scheme.

The sewage sludge in India is disposed far away from city which improves the soil quality of that area where it is

## ABSTRACT

Sewage Sludge contains high amount of nutrients in the form of wastewater. This wastewater is treated in Sewage treatment plant and separation of Sludge from wastewater is taken out using various type of technology. The sludge separated from wastewater is further treated in sludge treatment unit and removal of maximum amount of water is done using various equipment. The treated water is reused for various purposes or discharge into river bodies and the sludge after treatment are sending to disposal site. This study focuses on the utilization of this sewage sludge as a fertilizer and comparison of this sludge with chemical fertilizer. The content of nutrient in sewage shows significant results on application with various plants and discussed the effect of sewage farming on soil quality.

**KEYWORDS:** Sewage Sludge, Chemical fertilizers, Normal soil, Nutrients value

## 1. INTRODUCTION

Sewage Sludge is one the major issue facing for any Sewage Treatment Plant for its proper disposal. The final Sludge collected from STP's required large space for disposal and space should be far away from residential community. The dry sludge is rich in nutrient and contain significant amount of mix nutrients which is useful as a fertilizer. The study focus on the use of sewage sludge as a fertilizer and a comparison between normal soil and chemical fertilizer with sewage sludge is studied. The study focus on the use of sewage sludge as a fertilizer and a comparison between normal soil and chemical fertilizer with sewage sludge is studied.

disposed. The land where it is disposed is rich in nutrients after few years and the growth of vegetation is much better. The research also focus on the application of sewage sludge spread on nearby area in plant premises which result in green grass all over where the sewage sludge spreaded. Further the application of sewage sludge is done on various plants grown in premises. The results show the significant growth of tomato over all the field. The use of sewage is cost economical, eco-friendly and doesn't require enough attention for proper dosage. The sewage sludge as a fertilizer will solve the problem for disposal of sludge and providing almost zero costlier fertilizer to farmers.

## 2. LATEST RESEARCH TRENDS

Lucrezia Lamastra, Nicoleta Alina Suciuc\* and Marco Trevisan [1]; Sewage sludge for sustainable agriculture: contaminants' contents and potential use as fertilizer; An effective analytic method for organic pollutants detection in the sewage sludge has been developed, showing an excellent repeatability and recoveries. Ecotoxicological risk assessment was evaluated using risk quotients (RQs) for sludge-amended soil. Most of the analyzed samples do not contain NP, NPnEOs, and DEHP at levels higher than the limit established by the draft-working document of the European Commission on Sludge. The assessment using RQs reports that NP and NPnEOs never give values higher than 1, and for DEHP the obtained

RQs exceed the value of 1 just three times. Data obtained were compared to the data from other European and Asiatic countries, showing a huge variability for all the compounds considered. Based on the obtained results, it appears that the proposed EU limits for the selected substances on sewage sludge intended to be used as soil fertilizer in agriculture are sufficiently conservative to avoid negative effects on soil fauna.

Md. Lokman Hossain<sup>1\*</sup>, Mohammed Abdus Salam<sup>2</sup>, Ashik Rubaiyat<sup>3</sup>, Mohammed Kamal Hossain<sup>4</sup> [2]; Sewage Sludge as Fertilizer on Seed Germination and Seedling Growth: Safe or Harm; The study was conducted to evaluate the effects of sludge (industrial and residential) on seed germination and growth performance of *Swietenia mahagoni* seedlings at the nursery of Institute of Forestry and Environmental Sciences, Chittagong University (IFESCU), Bangladesh. Before sowing of the seeds, different combinations of sludge were incorporated with the nutrient-deficient natural forest soils. Seed germination and growth parameters of the seedlings (shoot and root length, collar diameter, fresh and dry weight of shoot, and root and total dry biomass) were recorded after one, two and three months of seed sowing. Physico-chemical parameters (pH, organic carbon, nitrogen, phosphorus, and potassium) and heavy metals (chromium, nickel, manganese, cadmium and zinc) of each treatment were also analyzed before sowing of seeds and after harvesting of seedlings. Results show that the seed germination percentage and the seedling growth parameters varied significantly in the soil added with sludge in comparison to control. The highest germination percentage (92%) was observed in the treatment of soil with residential sludge of 3:1 compared to control. The highest growth and biomass of the seedlings were recorded in the soil with industrial sludge of 3:1. So, from the present findings it may be recommended that soil and industrial sludge (3:1) can be used as fertilizer in nursery for the growth of *S. mahagoni* seedlings.

Ma. Del Mar DELGADO ARROYO, Miguel Ángel PORCEL COTS, Rosario MIRALLES DE IMPERIAL HORNEDO, Eulalia Ma. BELTRÁN RODRÍGUEZ, Luisa BERINGOLA BERINGOLA and José Valero MARTÍN SÁNCHEZ [3]; Studies were conducted to determine the use of an organic residue (sewage sludge compost) for four years (1996-1999), to study effects of sewage compost on crop yield and chemical properties of soil under field condition. Productivity studies showed that the greatest growth is obtained in mixed II treatment (12000 kg/ha sewage sludge compost plus 350 kg/ha urea) with 20 % more than mineral fertilization, followed by mixed I (8000 kg/ha sewage sludge compost plus 350 kg/ha urea) with 10 % more than mineral fertilization. No toxic effects arising from the heavy metals in the plant were observed. Moreover, the concentration of heavy metals in the soil is below Spanish and European legal limits.

Khalid Usman<sup>1\*</sup>, Sarfaraz Khan<sup>2</sup>, Said Ghulam<sup>3</sup>, Muhammad Umar Khan<sup>4</sup>, Niamatullah Khan<sup>1</sup>, Muhammad Anwar Khan<sup>1</sup>, Shad Khan Khalil<sup>5</sup> [4]; Sewage Sludge: An Important Biological Resource for Sustainable Agriculture and Its Environmental Implications ; Intensive farming generally needs large addition of organic matter to maintain fertility and enhance crop yields. Sewage sludge/biosolids are by-products of municipal and industrial wastewater treatment and a rich source of organic nutrients. Sewage sludge having high content of organic matter, macro- and micro-nutrients,

can be used as fertilizer/soil conditioner for food, vegetable crop, horticultural plants and pasture, which in most cases can be beneficially recycled. In the past sewage sludge was regarded as a waste product due to expected high level of contaminants such as pathogens, pollutants and synthetic materials discharged in sewer from homes and industries, which were often incinerated, dumped in occasion or land fill. As a result of rapidly increasing population, urbanization and industrialization, wastewater production and sewage sludge generation have increased manifold. Due to high cost of mineral fertilizers and escalating trends in their prices, there is an increasing trend of using sewage sludge in agriculture, especially under intensive cropping in arid and semi arid regions of the country. Therefore, application of sewage sludge to agricultural soils may be sustainable and economical due to nutrient cycling and disposal of sewage sludge. However, there may be a risk in use of sewage sludge due to potentially harmful contents present in the sludge such as heavy metals and pathogens. This paper, therefore, presents a review on various aspects of sewage sludge used in agriculture.

Joseph S. Mtshali<sup>1</sup>, Ababu T. Tiruneh<sup>1,\*</sup>, Amos O. Fadiran<sup>2</sup> [5]; Characterization of Sewage Sludge Generated from Wastewater Treatment Plants in Swaziland in Relation to Agricultural Uses Sewage sludge generated from wastewater treatment plants are being merited greater attention in light of their potential for improving soil properties and for providing important nutrient and trace element supplements that are essential for plant growth. Because of the differences in sludge characteristics among sludges that undergo different levels of treatment as well as the extensive and variable nature of pollutant inputs to wastewater, the fertilizer potential and pollutant risk of sewage sludge intended for agricultural application has to be specifically evaluated for each sludge. Sewage sludge generated from seven wastewater treatment plants in Swaziland were analysed for a range of physico-chemical characteristics including organic matter, nutrients, cation exchange capacity, pH and trace elements. Despite the differences in sludge processing and sludge storage ages, the sludge samples generally show high levels of organic matter, nutrients and trace elements needed for plant growth. The potential risk of heavy metal toxicity was evaluated by comparing the levels of heavy metals in the sludge samples with widely quoted and well known regulatory limits of a number of countries and the levels were found to be within acceptable risk level with respect to agricultural application. The research results indicate a positive outcome for the wastewater treatment plants in Swaziland that currently keep large piles of unused dried sludge within their premises.

Rocío VACA<sup>1</sup>, Jorge LUGO<sup>1</sup>, Ricardo MARTÍNEZ<sup>1</sup>, María V. ESTELLER<sup>2</sup> and Hilda ZAVALTA<sup>3</sup> [6]; EFFECTS OF SEWAGE SLUDGE AND SEWAGE SLUDGE COMPOST AMENDMENT ON SOIL PROPERTIES AND Zea mays L. PLANTS (HEAVY METALS, QUALITY AND PRODUCTIVITY) The use of organic wastes in agriculture can improve the soil's productive capacity, and physical and chemical characteristics. This study evaluated the effects of sewage sludge, sewage sludge compost and inorganic fertilizer applications on nickel, copper and zinc contents in soil and corn grains (*Zea mays* L); maize productivity, and grain nutritional quality. Sewage sludge and sewage sludge compost at 18 Mg ha<sup>-1</sup> and a mineral fertilizer (N-P-K) with

a formulation of 150-75-30 were applied. Significant differences were observed in organic matter, phosphorus and zinc content between sewage sludge-soil and compost-soil, and inorganic fertilizer-soil ( $P < 0.05$ ). Copper concentration was significantly high in compost-soil ( $P < 0.05$ ). Productivity in compost-soil and sewage sludge-soil mixtures was higher than in inorganic fertilizersoil. Grain quality, measured by relative percentage of starch, total nitrogen, protein, acid detergent fiber and neutral detergent fiber were adequate for human consumption. Application of sewage sludge or compost did not increase heavy metal concentrations in grain with respect to inorganic fertilizer-soil.

### 3. CONCLUSION

Sewage sludge potentially contains nutrients which can be used as fertilizers in order to enhance the plant growth. Major nutrients contain in sewage sludge is nitrogen, phosphorous, potassium and sulfur and might contains some micro nutrients.

Though the utilization of sewage sludge will solve the problem for the disposal of STP sludge and it can be reused for developing green belts in the premises and nearby areas of STP.

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