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Characterization of municipal sewage sludge and reprocess as fertilizer at Jijiga University sewage treatment plant

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ABSTRACT

Jigjiga University is one of the new universities in Ethiopia, which is established from 2009. The total area of this campus is 350 hectares and the total population is 21374 students and 2155 teaching as well as non-teaching staffs. The maximum quantity of sewage flow in the campus is 882337 lit/day approximately. University constructed a treatment plant in the campus and the following treatment process is followed like Screening, sedimentation (primary and secondary), coagulation, oxidation ditch, sludge digestion and oxidation pond. But here they are focusing only on the sewage treatment process. But here I am focusing to use sewage sludge as a fertilizer after the treatment process. The profitable indicators selected were money, process and administration, and user costs because they resolve the profitable affordability of a particular technology to society. Environmental indicators include energy use because it in some way measures resource utilization, and performance of the technology. Find the treated sewage sludge nutrients such as potassium, ammonia, nitrogen, phosphorus, and other compost. These indicators also determine the reuse possibilities of the treated wastewater sludge as fertilizer. Community indicators detain educational recognition of the technology through public participation and also measure whether there is an improvement in the community from the specific technology. The overall results of this study prove that sewage sludge having fertility content and we can use sewage sludge as a fertilizer by sewage treatment technology.

Keywords— *Municipal sewage sludge, Screening, Fertilizer, Nutrients, Community, Treatment technology*

1. INTRODUCTION

Jigjiga University is one of the biggest universities in Ethiopia. More quantity of sewage is produced from different places like student hostels, staff quarters, students food yard, students cafeteria, teachers cafeteria and bathrooms etc. In Jigjiga University, the sewage is not treated and disposed properly of the last few years. This year 2017 only sewage treatment plant was constructed and sewage is treated by Screening, sedimentation (primary and secondary), coagulation, oxidation ditch, sludge digestion and oxidation pond treatment process. But here the treated sewage sludge is disposed directly to the land. I collected the treated sewage sludge from the treatment plant and I have been found the nutrients from the treated sewage sludge by laboratory analysis.

2. MATERIALS AND METHODS

The treated sewage sludge is collected from the treatment plant in a bottle. I have collected two samples each of one litre. Then the treated sewage sludge is analysed in a laboratory as per the procedure. The nutrients like potassium, ammonia, nitrogen, phosphorus, and other compost are found properly and clearly mentioned below in result and discussion.

3. RESULTS AND DISCUSSION

The nutrients values are listed below the table. Two samples are analyzed and the results are mentioned clearly in table 1 and 2. Here I have been mentioned an important nutrients values like potassium, ammonia, nitrogen, phosphorus, and other compost.

Table 1. Nutrient value of sample 1

S. no	Chemical Parameters	Content
1	pH	7.36
2	Salt EC(dSm^{-1})	42mg/l
3	Nitrogen(N)	44mg/l
4	Phosphorous(P)	25.7mg/l
5	Potassium(K)	11.33mg/l

From table 1, we come to know, the treated sewage sludge have enough nutrients (fertility content). So we can use this sample or sludge as a fertilizer.

Table 2. Nutrient value of sample 2

S. no	Chemical Parameters	Content
1	pH	7.89
2	Salt EC(dSm^{-1})	38mg/l
3	Nitrogen(N)	92mg/l
4	Phosphorous(P)	35mg/l
5	Potassium(K)	10.2mg/l

From table 2, we come to know, the treated sewage sludge have enough nutrients (fertility content). So we can use this sample or sludge as a fertilizer.

Other parameters also determined in this study, the value of turbidity is 116 mg/l, iron is 2.86mg/l, zinc is 0.115mg/l, copper is 0.019mg/l, chloride is 113mg/l, BOD is 1.3mg/l and DO is 7.2mg/l.

4. CONCLUSION

In Jigjiga University, after the treatment, the treated sewage sludge is disposed to the land without any use. So the sewage sludge is analyzed properly and the sewage sludge having enough nutrient content from the analysis. So we can use this treated sewage sludge as a fertilizer. And also we can earn money from this process. This region people also get benefit from this process. Mainly an environment is protected from pollution.

5. REFERENCES

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