# Phyto- Dewatering Of Sewage Sludge

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**1. Introduction-** A number of different wastewater treatment technologies are employed across the globe, with varying degrees of cost-effectiveness. According to research conducted on pilot and field-scale systems [1], constructed wetlands technologies utilizing aquatic plants have shown to offer a potential-ly beneficial alternative solution for wastewater treatment. This technology is deemed a low-risk investment in terms of simple operations and minimal maintenance costs [2]. In addition, aquatic plants have featured prominently in wetland treatment systems [3]. Although conventional treatment methods comprising trickling filters and activated sludge process are employed for the purpose of treating sewage sludge, they consume vast amounts of energy, cost, and manpower [4]. In contrast, plant-based systems aim to eliminate contaminants found in aquatic environments **[5], [6**] . This research study investigated the potential efficacy of using water hyacinth plant in expediting the process of sludge dewatering in pilot scale drying bed. The study also proposed using aquatic plants for drying bed to improve the efficiency of both existing and newly constructed wastewater treatment plants (WWTPs) while also considering the sludge quality and cost-effective technologies and methods. The experiments were conducted in a pilot scale model. A chemical analysis of the produced sludge was conducted during and at the end of experiment.

**2. Experimental –** Two plastic basins with dimension of 1.5m (W)* 2.5m (L)* 1m (H) were used in the current phase. - Water Hyacinth plants- Perforated plastic pipe- Crushed stones (size 5mm)-Gravel (size 32 mm). Create a land slope was created using a sloped layer of crushed stone. The slope of the crushed stone layer was 0.1 m vertical in 1 m horizontal toward the short side of the basin. After the preparation of the land slope, the plastic basin was installed on top of the crushed stone layer. The slope of the basin was in the direction of the basin length (Towards the short side of the basin). After installation of the basin, the drainage layer was created using gravel. The gravel layer has a thickness of 10 cm as indicated in photo 3.5 then the perforated pipe was installed in the direction of the slop on top of the gravel layer. The pipe was connected at its lowest point with the opening at the bottom of the basin. Then the drainage of water through the perforated pipe and the gravel layer was tested. This was carried out by filling the basin with clean water supplied continuously to the basin (through water lose) and observing the disappearance of water from the gravel layer inside the basin. After that testing of the drainage through the gravel layer and in the perforated pipe, a layer of crushed stones is added on top of the gravel layer and the perforated pipe. The layer of the crushed stone has 10 cm thickness. Finally, a raw liquid sludge was added to each basin in three successive batched. Each batch had a volume of 500 liter. Batches of sludge were added every day till a sludge depth of 30 cm (above the crushed stones layer) was created. Exclusively for the basin with plant cover, water hyacinth, plants were added to the basin and with the completion of this step, the installation is complete and the experiment started. After completing the installation of the system and started of the experiment raw sludge was added frequently. About 500 liters were added to each basin. Batches of raw sludge (500L each per basin) were added every 1 to 3 day to the planted basin; while they were added every week to the unplanted basin.

**3. Results and Discussion** - The results demonstrated that the design model outperformed the conventional model by 70% the quantity of evaporated sludge in half the time. It was found also that the dewatered sludge using phyto-technology more save to deal with compared to sludge dewatered using ordinary drying beds because the ability of water hyacinth to remove the harmful microbial agents from sludge such as total and fecal coliform, Salmonella, Shigella and parasites.

**4. Conclusions –** Water hyacinth plant success in accelerating sludge dewatering process as well as water hyacinth able to remove the harmful microbial agents from sludge such as total and fecal coliform, Salmonella, Shigella and parasites.

## 5. References

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