

Potential of Vetiver Grass for Wastewater Treatment

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Abstract Vetiver (*Chrysopogon zizanioides*) is a perennial bunch grass of the Poaceae family which is popularly known as Kush, and which are suitable for the disposal of leachate and effluents generated from landfill and wastewater treatment with super absorbent characteristics. This experimental study was carried out to assess the efficiency of Vetiver plants in the water of Bagmati River, close to Kirtipur's Laboratory School. Data for design parameters- pH, Temperature, Conductivity, BOD₅, Chloride, Nitrate, Phosphate, Hardness and Alkalinity- were collected regularly for a month. Vetiver plants were planted in three buckets with 7.5 liters of sampled water, while another bucket was kept as a control. In each of the three buckets, nine Vetiver plants were planted and physico-chemical parameters analyzed for one month at ten-day intervals. The result showed that on the one month, the overall concentration of BOD₅, Chloride, Nitrate, Phosphate, Hardness and Alkalinity reduced by 71.03%, 42.90%, 93.93%, 88.4%, 46.4% and 22.2% respectively. pH and temperature of wastewater showed slight change while electronic conductivity lowered to normal levels after treatment in the bucket. Vetiver plant seems very effective in treating polluted water having high phosphate and nitrate levels.

Keywords Bagmati, Vetiver, *Chrysopogon zizanioides*, Wastewater Treatment

richest country in water resources in Asia and second richest country in the world after Brazil with respect to the water resource. Being a mountainous country with snow-capped Himalaya Ranges and with large perennial rivers originating from, the water resources of Nepal are very immense. There are about 6,000 rivers with about 45,000Km lengths. The major rivers of Nepal are Mechi, Koshi, Bagmati, Karnali, Narayani, Gandaki and Mahakali.

Currently, the water quality is declining due to the contamination of various pollutants in water, which makes the water unsuitable for consumption and other usages. In simple words, clean water is becoming one of the biggest concerns of the twenty-first century. To solve the problems of water, various waste water treatment methods has been applied, but the existing and traditional wastewater treatment methods like Active Sludge treatment, Microbial treatment, Chemically Enhanced Primary Treatment (CEPT), Advanced Integrated Pond System (AIPS), Aerated and Non-Aerated lagoons, etc. are expensive and in most cases are either impractical or unsuitable for smaller communities and certain industries. Currently, low technique system like phytoremediation is used for the treatment of wastewater.

Phytoremediation use plants for the environmental restoration. It is an emerging clean up technology to exploit plant potentials to remediate soil and water contaminate with a variety of pollutant compound (Lasat [2], 2002). Phytoremediation is environmental friendly, inexpensive and can be carried out in polluted place. Phytoremediation has