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ORIGINAL PAPER



Effects of Wastewater on Soil Properties

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INTRODUCTION

Waste materials that includes sewage waste and industrial liquid that is collected in urban and town areas and treated at urban waste water treatment plants. Waste water is generally divided into two categories *i.e.* grey water and black water. Grey water refers to remaining waste water from sinks, showers, laundry and black water refers to toilet waste. Waste water is not safe to drink and if waste water discharge directly onto the ground or into a water body can pose health problems. This water must be properly managed to protect environmental and human health and safety. Untreated waste water contained biological contamination known to cause disease.

A process to convert wastewater which is water no longer needed or suitable for its most recent use into an effluent that can be either returned to the water cycle with minimum environment issues or reused is known as wastewater treatment.

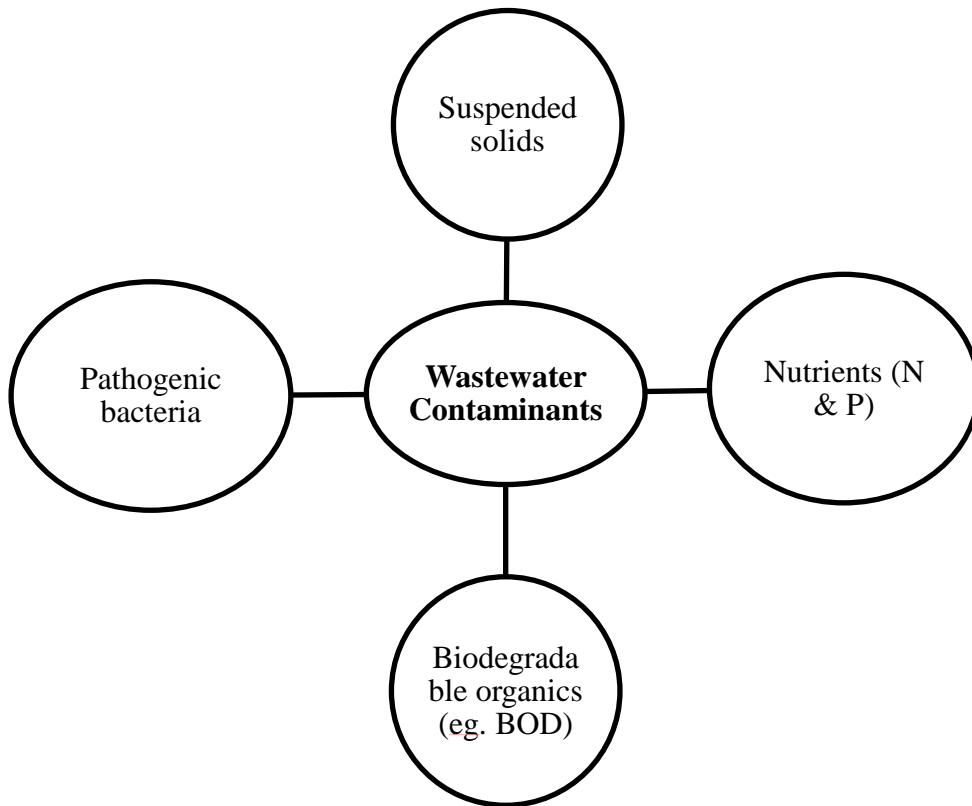
CHARACTERISTICS OF WASTEWATER

Odor – Foul odor and bubbling gas indicates industrial wastes, anaerobic conditions. Domestic wastewater have a musty odor.

Temperature – The temperature of waste water becomes very important in certain waste water operation has recirculating filter and sedimentation tanks. Change in wastewater temperature affect the settling rate, biological actions and dissolved oxygen levels.

Color – The color of wastewater containing Dissolved Oxygen is normally grey. Black color waste usually accompanied by foul odors, containing little or no Dissolved Oxygen, is said to be septic.

Color	Problem indicated
Grey	-
Red	Blood or other industrial wastes
Green, Yellow	Industrial wastes not pretreated (paints etc.)
Brown or other soil color	Surface runoff into effluent, also industrial flows
Black	Septic conditions or industrial flows



TYPES OF TREATMENTS

- **Mechanical treatment**
 - Influx (Influent)
 - Primary sedimentation
 - Removal of sand and grit
 - Removal of large objects
- **Biological treatment**
 - Activated sludge
 - Trickling bed filter
- **Chemical treatment**
 - Disinfection

EFFECTS OF WASTEWATER ON SOIL PHYSICAL PROPERTIES

Organic Matter

Soil organic matter improve the soil structural properties by binding together soil particles into aggregates and creating large (non-capillary) pores through which air and water more. Where organic matter is lacking, the less stable soil aggregates are loos easily fall apart in the presence of rain or percolating water; in spite of cultivation, the larger soil pores are lost, soil air decreases, water movement is restricted, the soil becomes more closely packed, and the bulk density increases.

Structure and Aggregation

Sludge, like other organic materials, is less dense than the mineral fraction of soil and can improve the structure of soil by reducing bulk density and promoting soil aggregation. Higher amounts (80 metric tons per ha) were required to significantly change soil physical properties and low annual application rates (22.5 and 45 metric tons per ha) of municipal sludge compost improved agronomic performance, even at lower annual rates of sludge application (27 metric tons per ha) the bulk density of soils of various textural classes, including fine-textured soils, are reduced.

Effects of Wastewater on Soil Chemical Properties

Biologically stabilized sewage sludge contains an average of approximately 50 percent organic matter on a dry weight basis. Following addition to soil, the sludge undergoes decomposition to carbon dioxide, residual organic matter, low molecular weight soluble organic acids, water and inorganic constituents. Although most of the organic fraction of the sludge is converted to water and carbon dioxide, some becomes part of the stable soil humus layers and serves to increase the soil's net negative charge and its cation exchange capacity (CEC). A high CEC is desirable because it lessens or prevents essential nutrient loss by leaching.