TECHNICAL TUESDAYS

EFFLUENT TREATMENT – PART IV

REF: TT/ APRIL 2021/ WK 3

Effluent Treatment Plant (ETP) (Continued…)

Description of some processes carried out in different levels of treatment

A) **Sedimentation –** Sedimentation is the process of settling the fine suspended matters. The settled solids are called sediments. The sediments or settled sludge is removed from the sedimentation tanks in the effluent. This process is mainly useful for treatment of effluents which contains high volume of settable solids. The settled sludge or sediments is settled in the bottom of the vessel or Sedimentation tank which is transferred to sludge tank for sludge treatment and disposal. This operation is carried out in preliminary or primary level of treatment.

B) **Coagulation and Flocculation –** In wastewater treatment plant, coagulation and flocculation processes are used to separate suspended solids from water. In flocculation, the textile wastewater is passed through a tank under gentle stirring. Coagulation refers to collecting the minute solid particles dispersed in a liquid into a larger mass. As a result, the particles collide to form larger particles or flocks. Coagulation is thus formation of smaller compact aggregates. Rapid mixing is required to disperse the coagulant throughout the liquid. Process of coagulation and flocculation are done in sequence and are a combination of physical and chemical procedures. Chemicals are mixed with wastewater to promote the aggregation of the suspended solids in to large particles, so that these can be settled or be removed. Various types of coagulants are being used to. The most widely used coagulants are:

- Aluminum Sulphate (Alum)
- Poly aluminum chloride (PAC)
- Ferrous sulphate
- Sodium Aluminate
- Silicon Derivatives
- Lime
- Synthetic Organic Polymers

Currently Alum and PAC are most extensively used. This operation is carried out in primary level of treatment.

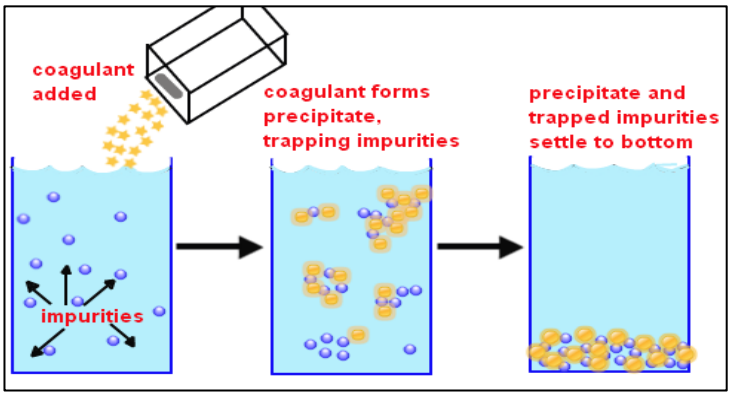

Fig 1.1 Mechanism of Coagulation

Ref: intechopen.com

C) **Aerated Lagoon** - This operation is carried out in secondary level of treatment. An aerated lagoon or aerated pond in a wastewater treatment system consisting of a pond with artificial aeration to promote the biological oxidation of wastewaters. The effluents are collected in a tank from primary treatment processes. Air is blown in the form of bubble and sludge is formed which brings about oxidation of the dissolved organic matter.

D) **Activated sludge process** - It is a process for treating wastewater using bacteria to degrade the biodegradable organics and air. Activated sludge refers to a mixture of microorganisms and suspended solids. This is the biological oxidation method employed for the treatment of waste water containing dissolved solids, colloids and coarse solid organic matter. In this process, the waste water is aerated in a reaction tank in which some microbial floc is suspended. The aerobic bacterial flora bring about biological degradation of the waste into carbon dioxide and water molecule, while consuming some organic matter for synthesizing bacteria. The bacteria flora grows and remains suspended in the form of a floc, which is called Activated Sludge. The effluent from the reaction tank is separated from the sludge by settling and discharged. A part of the sludge is recycled to the same tank to provide an effective microbial population for a fresh treatment cycle. The surplus sludge is digested in a sludge digester, along with the primary sludge obtained from primary sedimentation. An efficient aeration for 5 to 24 hours is required and BOD removal to the extent of 90-95% can be achieved in this process.

References:

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.....To be continued.....

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Last week`s Answers: 1) SEDIMENTATION 2) COAGULATION 3) FILTRATION 4) TERTIARY

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