

## Industrial Waste Water Treatment **Shah Maulin P and Hiral Borasiya**

**Received:** February 27, 2017; **Accepted:** February 28, 2017; **Published:** March 06, 2017

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The phrase "vanguard therapy" can be defined in several ways. There is no solitary justification that is universally accepted - except that the term generally implies that a certain level of treatment than conventional secondary processes. A specific definition may vary slightly depending on whether the application deals with research, design and operations. In addition to conventional biological treatment methods, BOD and is commonly used to remove suspended solids. Elimination of nutrients is a growing concern for many municipalities. The problem is mainly associated with excess nutrients discharged from nitrogen and / or phosphorus. The reality is that all of our water bodies need protection because they are current and future sources of drinking water, whether it is fresh water or seawater. We also need to protect our children because they have a recreational use and are a source of food for our country. Many of us like seafood, but if we do not protect the estuaries, then enjoy the seafood that is lost or limited [1]. The good news is that we have the technologies available to provide the solution (s) you need from a municipality to protect water bodies. What is the right solution for each municipality? This is a difficult question and depends on many factors. These factors include the requirement for water quality effluents, the size of the wastewater treatment plant, site constraints, capital and operating costs, operational skill level and Staff, etc. In many cases, phosphorus is necessary for the biological removal of nitrogen may occur, but it may also be a very low phosphorus requirement in the treated water. Having both a nitrogen and phosphorus effluent limit typically requires a balancing act to provide sufficient phosphorus for the biological process but then reducing it to a sufficiently low level which can be easily and economically eliminated in the last step of treatment by a physical chemical process. The removal of nitrogen is carried out biologically by nitrification and denitrification occurring at different stages. Nitrification occurs in an aerobic stage of treatment and denitrification in an anoxic stage of treatment. There are many possible solutions and the process or technology to be used depends on the factors listed above. In many cases, these processes and technologies can be combined to provide a complete solution [2]. Below is a list of processes and technologies used to perform nitrogen removal:

- 1) Oxidation process: This is a loop process that creates zones of aeration and anoxic conditions. The process can be carried out cyclically to obtain nitrification and denitrification.
- 2) Cyclically activated sludge: The ventilation system is

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**Citation:** Maulin PS, Borasiya H. Industrial Waste Water Treatment. J Appl Microbiol Biochem. 2017, 1:1.

programmed to switch off periodically, allowing denitrification and nitrification in the same tank. This can be achieved in existing cyclical facilities with little or no capital expenditure if there is sufficient SRT.

- 3) Modified Ludzack-Ettinger process: This process involves modifying a conventional process of activated sludge in which an anoxic zone is created or added upstream of the aerobic zone. The process uses an internal recycle which carries the nitrates created in the nitrification process in the aerobic zone with the mixing liquor to be mixed in the tributary to the anoxic zone. The amount of nitrates potentially eliminated in the anoxic zone depends on the rate of recycling and the availability of influent BOD.
- 4) Bardenpho process in four steps: This process is similar to the MLE process but has a second anoxic zone after the aerobic zone where an external carbon source is typically added to assist in the denitrification process. This process is suitable for obtaining very low total nitrogen values.
- 5) Biological active filters: These are typically upstream filters that can be used for BOD removal, nitrification and denitrification. Biological Active Filter uses granular or plastic media with a large surface area to allow attached growth, resulting in a compact footprint. Nitrifying biological active filter work with aeration and denitrifying biological active filter work with the

addition of an external carbon source. Unlike other processes, Biological Active Filter does not require downstream units such as secondary clarifiers for liquid-solid separation.

- 6) Downflow denitrification filters: These are descending filters that are used only for denitrification purposes. These granular filters are applied after the secondary clarifiers and are used to remove unremoved nitrates in the conventional process of activated sludge or other secondary biological process upstream.
- 7) Mobile bed biofilm reactor: This is a fluidized fixed film process using a small plastic carrier (carrier) in anoxic or aerobic areas that allows attached growth. The MBBR process works without the presence of suspended phase and is usually readjusted in an existing basin when other conventional processes, such as MLE or Bardenpho, will not be adapted. This process can be used for nitrification and denitrification, in addition to the removal of BOD. The reactor is more compact than a conventional process of activated sludge. These reactors may be used prior to the secondary treatment process, either with the main treatment train or after the secondary treatment. The versatile nature of this process allows great flexibility with the configurations of the reactor.
- 8) Integrated fixed film activated sludge system: This is a fixed film process that combines the advantages of an MBBR process and an activated sludge process. They can be arranged in many configurations, as are many of the conventional activated sludge processes. This system is more compact and has a smaller footprint than conventional process configurations since it combines suspended growth and attached growth phases. Due to the presence of the attached growth phase,

the IFAS process is also more resistant to changes in hydraulic load and/or pollutant [3]. This advantage is also shared by the MBBR method.

- 9) Membrane biological reactors: This is a process that can use many configurations with the biological part of the process and typically includes anoxic and aerobic areas followed by a membrane that acts as a filter to remove solids from the mixed liquor and thus eliminates the need for a secondary clarifier. This process typically provides high concentrations of mother liquor suspended solids to achieve nitrogen removal. These various nitrogen removal solutions, often combined with a combination of options, must be analyzed to determine the most appropriate process for each municipality. Processes for phosphorus removal essentially involve two methods: 1) biological and 2) physico-chemical. The biological removal of the phosphorus is carried out by the following processes:

- (1) Fermentation - in an anaerobic state with VFAs providing carbon sources for microorganisms or
- (2) Anaerobic/oxygen process (A/O)

The processes and technologies described above show that there are many possible solutions to achieve the desired nutrient removal requirements. The choice of the appropriate process depends on the specific conditions of the project. There is no perfect process or technology for each project. An industry must evaluate all key factors before choosing a process, including the capital cost, operating capacity and operation and maintenance costs, to determine the best solution. In many cases, this can be achieved through a screening process where all evaluated costs are considered to determine the best solution.

## References

- 1 Maulin P Shah (2005) Exploitation of *Pseudomonas aeruginosa* ETL-1942 and *Bacillus cereus* ETL-1949 in Decolorization and Degradation of Acid orange. *Internat J of Toxic and Environ Hea*.
- 2 Maulin P Shah (2004) Microbial Removal of Ammonical Nitrogen by Nitrification and Denitrification. *J Bioremed Biodeg* 6: 275-282.
- 3 Maulin P Shah (2001) Exploitation Application of Pyrosequencing in Analysis of Ammonia Oxidizing Bacteria of Industrial Waste Water Treatment Plant. *Water Research*.