NEW GENERATION OF MULTISTAGE BIOREACTORS MSABP

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Abstract

The new generation of multi-stage reactors MSABP is presented as a valid alternative to the conventional wastewater treatment. For its design concept and operation, solve the major problems of implementation and operation of water treatment facilities, especially when it comes to small towns. This communication is to establish the basic operating principles MSABP system and the advantages of small communities.

Introduction

The familiar problems for wastewater treatment in small populations, caused mainly by high energy costs and the need for qualified personnel for operation and maintenance of facilities, call for the emergence of new systems that facilitate these processes. MSABP system is presented as a highly effective alternative for solving these problems because, by its simple treatment process involves a minimum number of electromechanical equipment and does not require the participation of qualified personnel. This means that small towns get a quality effluent cost of operation and maintenance quite bearable. Thus becomes an economically and environmentally sustainable technology.

Technology MSABP

The biological process triggered multi-stage (Multi-Stage Activated Biological Process) is a submerged fixed bed technology and segmented 100% aerated. The segmentation produces biological segregation of different microorganisms and maintains hydraulic continued. The influent previously pre-treated (as for any other system) enters the first chamber where it takes a first purification. The flow-piston makes the water flows between the different cameras without using pumps or other electromechanical elements.

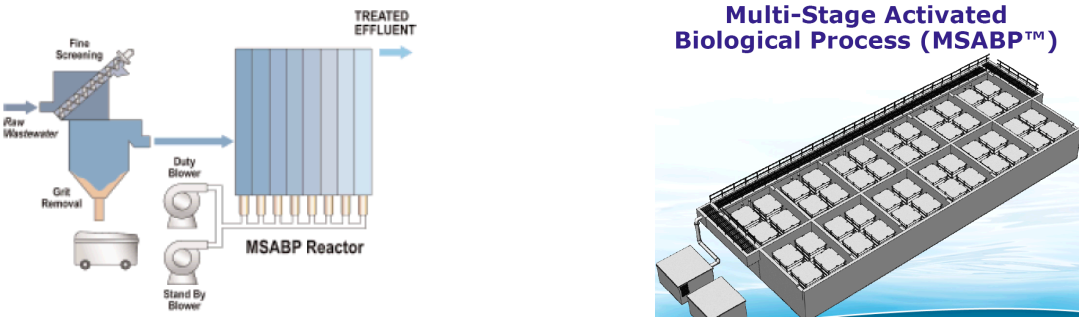

Figure 1.- MSABP General Process

It is based on a spatial micro-organisms sequence and food chains hydrobionts. A food chain organisms provides spatially segregated conditions in which microbes are consumed by primary microorganisms while the latter are consumed by filter-top eaters from different trophic levels.

The basic internal elements for the proper functioning of MSABP, and gives substance to each of the stages proposed above, are the aeration system, which is located at the bottom of the reactor and the fixed bed, which serves as bacterial niche for various microorganisms that act at each stage.

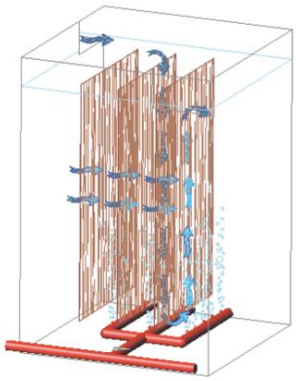

Figure 2. -Details of the arrangement of elements In each stage.

The segmentation of the biomass is a natural pattern, creating a food chain within the reactor. This food chain makes the generated bio film detachment early part of the synthesis process later, so the system requires no purging process excess sludge, as these are consumed by higher organisms such food chain. In turn, thanks to the stability they provide fixed beds, sludge recirculation not required for operation. The number of stages will depend on the load to effluent treatment and expected, but usually between 8 and 16, 12 being the normal number for urban waste water and

discharge into public waterways. The large amount of biofilm on each of the cameras as well as the specialization of the bacteria found in each, makes the clearance rate is very high.

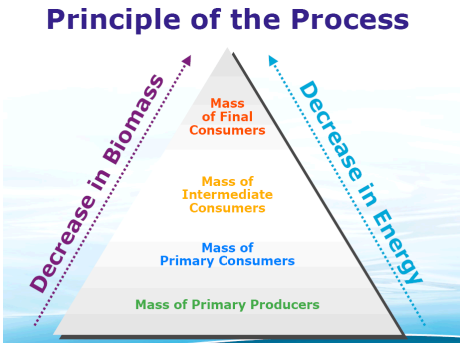

Figure 3.- Biological principle

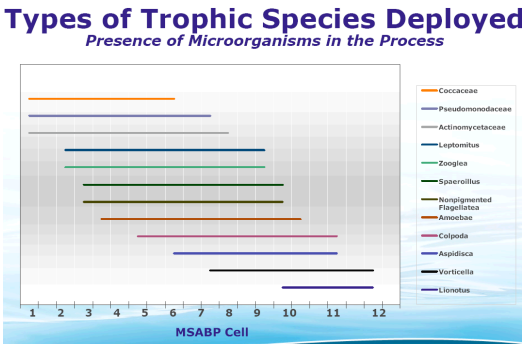

Figure 4.- Bacterial Targeting

The fixed bed is what makes possible the operation of the system without sludge recirculation. The combination of fixed-bed with the microorganism sequencing is what makes possible the emergence of a food chain, which reverses the achievement of a biological treatment system in which no excess sludge is generated. Therefore we can say that we have a technology that has no sludge lines for proper operation.

- **Elimination of excess activated sludge**

  All methods of wastewater treatment known produces in excess activated sludge. Sludge Treatment is a process in itself, independent and expensive, which leads to problems both economic and environmental. The proposed MSABP not produce excess activated sludge, so it avoids all the associated problems, the sludge treatment line and associated costs (man labour, disposal expenses...)

- **Compact Waste-Water Treatment**

  This wastewater treatment is much smaller than the plants used by alternative methods, basing this claim on two basic concepts: non-existence of sludge treatment line and the need fewer hours of retention in the whole process.

- **Low cost of construction**

The MSABP ignores both clarifiers, both primary and secondary, and pumping facilities associated with sludge recirculation, thereby eliminating the cost of capital and energy demand associated with these equipments.

- **Simple and easy maintenance & fully automatic**

MSABP system is completely automated. Simple modifications of the process of operation enable the operator to change the process parameters for optimum operational performance. The installation operation of a wastewater treatment needs minimum maintenance activities and easily. In turn, the plant is continuously monitored remotely, allowing effective control of effluent and its variations.

- **Modular Design**

The MSABP is designed for modular construction, whereby the expansion of the plant can be achieved by adding an additional module.

- **High capacity for rehabilitation and adaptation of biomass**

MSABP has a low sensitivity to changes in hydraulic and organic load. MSABP configuration minimizes the SS output after imbalances after severe waste water quality or operation conditions changes ensuring that the output of sludge does not occur, unlike conventional systems or new technologies that do not solve the appearance of excess sludge. The output of sludge in a conventional system leads to significant control problems which can result in a breach of the permitted discharge.