Respirometry

SURCIS

All treatment plant efficiencies are geared to the waste that they receive. The microorganisms found in the waste need food and oxygen to survive, the food is provided as soluble organic carbon in the waste stream and the oxygen is obtained through the aeration process in the treatment plant.

Once a treatment plant has been built the factors that will affect the biomass growth rate, such as flow and aeration rate, have already been established and therefore the only changing factor that remains that can affect the process is the incoming waste stream.

It is therefore important for the plant operator to be able to assess the impact of any changes in the influent waste flow, characteristics, and concentrations on the plant performance.

This is of particular importance when industrial wastewaters contribute significantly to the loadings of a municipal wastewater treatment plant.

BM-Advance BM-T+ BM-EVO

BM respirometry eystems

A Respirometer device employ a reaction vessel that in certain mode **replicate the actions that occur at a treatment plant** and asses the process through fundamental measurements, such as oxygen uptake rate (OUR), consumed oxygen (CO), biodegradable fraction of COD (bCOD), rate at which the COD is being eliminated in the process (U, q) and others.

Respirometry is **crucial in the design, research and management of a wastewater treatment plant**.

The results obtained can be used to **assess the exact requirements for the plant in order to optimize the efficiency at the lowest capital and operating costs**.

In communities where the population is steadily increasing there is an increased demands on the local wastewater treatment plant, respirometry can be used to **assess the amount of urban growth that the current operating plant can support**.

This process can also be used in the evaluation of current wastewater treatment plants for an overall assessment of the productivity of the plant, which can **lead to a route to improved plant performance**.

It can also be used to **estimate the amount of industrial effluent that can be treated** at a municipal plant.

Respirometry can be an advisory tool for industry, for example the petroleum, pharmaceutical and pulp and paper industries, to **assess their pre-treatment processes, effluent toxicity and biodegradation potential of waste streams**.

While industries can opt to treat their industrial wastewater internally or discharge it to a municipal wastewater treatment plant with or without pre-treatment, respirometry is an indispensable tool for **assessing the biological treatability of industrial wastes separately and in combination with municipal wastewaters**.

Respirometry can also **assess the impact of various inhibitory wastes** on the performance of the municipal wastewater treatment and also the **impact of the industrial effluents**, where a precise determination of inhibitory biokinetics and subsequent delineation of the maximum endurable industrial contribution could only be determined by respirometry.

BM respirometry from Surcis analysers have demonstrated that, in a very fast and practical manner, by making use of the actual genuine activated sludge of the aeration tank, can provide the treatment plants operator the essential information to help determine the ways to protect and control the biological process of the plant

In summary we can say that BM respirometry is taking advantage of the following points:

- Sludge is more active when it respires faster.
- The more substrate to oxidize the more oxygen to consume.
- Oxygen uptake rate is proportional to sludge activity.
- The oxygen consumed by the activated sludge for organic substrate oxidation, is proportional to the eliminated biodegradable fraction of COD.
- It exist a specific oxygen uptake rate for the Nitrification process.
- The operational parameters of the biological treatment process are direct or indirectly related with the bacteria respiration.
- Under standard conditions, the reduction or absence of oxygen consumption by the bacteria may signify the presence of a toxicity or inhibition compound specifically approached to the bacteria of the sludge: just the bacteria we want to protect and control.

In a biological treatment plant we may utilise the own reactor activated sludge, in order to perform a representative respirometry that will directly reflect the actual activity of the treatment process.

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