



Trickling Filters, TF/SC, Integrated Fixed Film (IFAS) and Moving Bed Biofilm Reactor (MBBR) Technology

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Here's What You Need to Know About Fixed Film Systems:

- Fixed Film System Capacities are Limited by Mass Transfer, Not Kinetics
- Aerobic Fixed Film Processes (Trickling Filters, IFAS, etc) are Controlled by Oxygen Transfer
- Carbon Oxidation (BOD_5 removal) Occurs First, Then Nitrification
- Nitrifiers Can Seed Suspended Growth if They Grow on Media

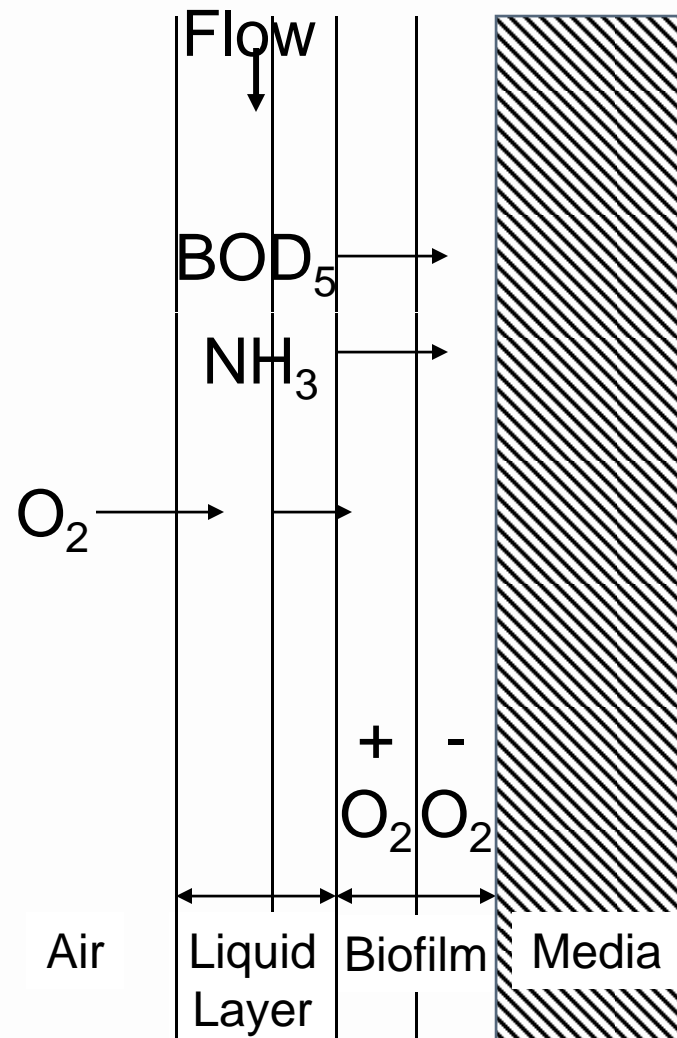


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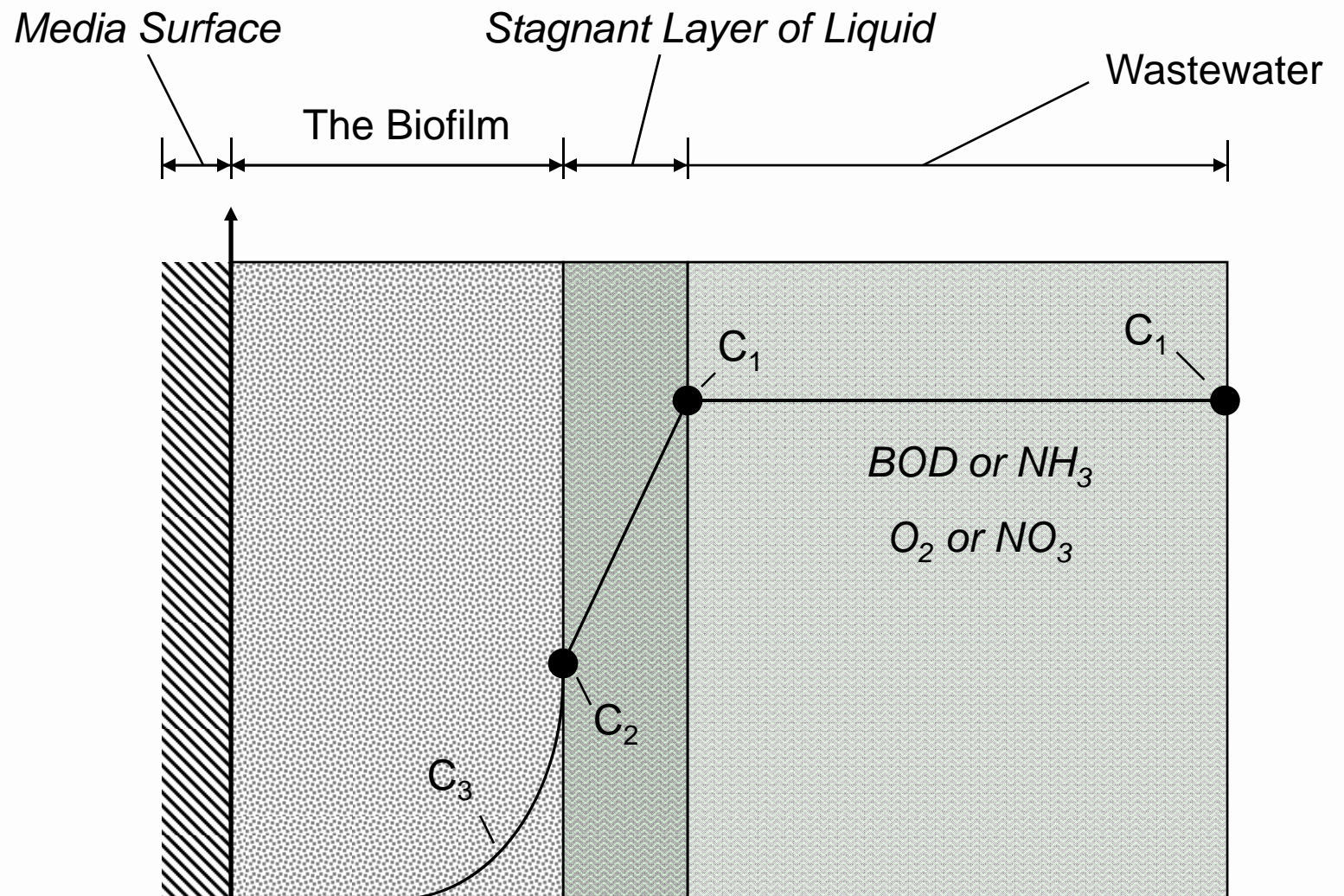
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Oxygen is Transferred Into Biofilm, Which Then Consumes It



Biofilm Concentrations Significantly Less Than in Wastewater





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 - Means That They are Less Temperature Sensitive
 - Performance Determined by Specific Surface Area Loading
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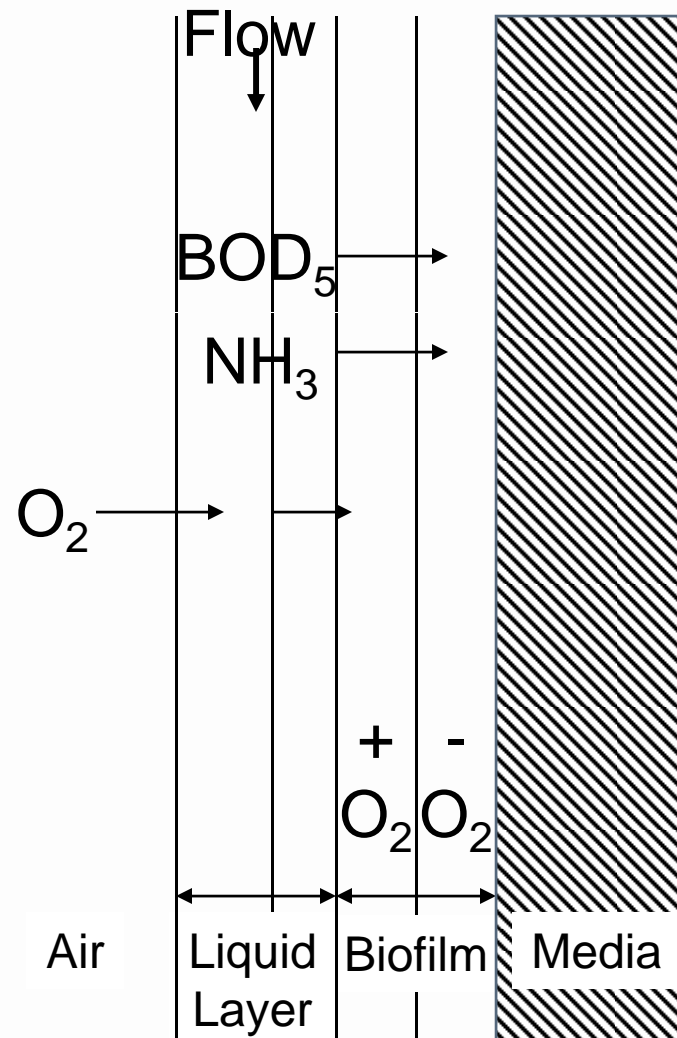


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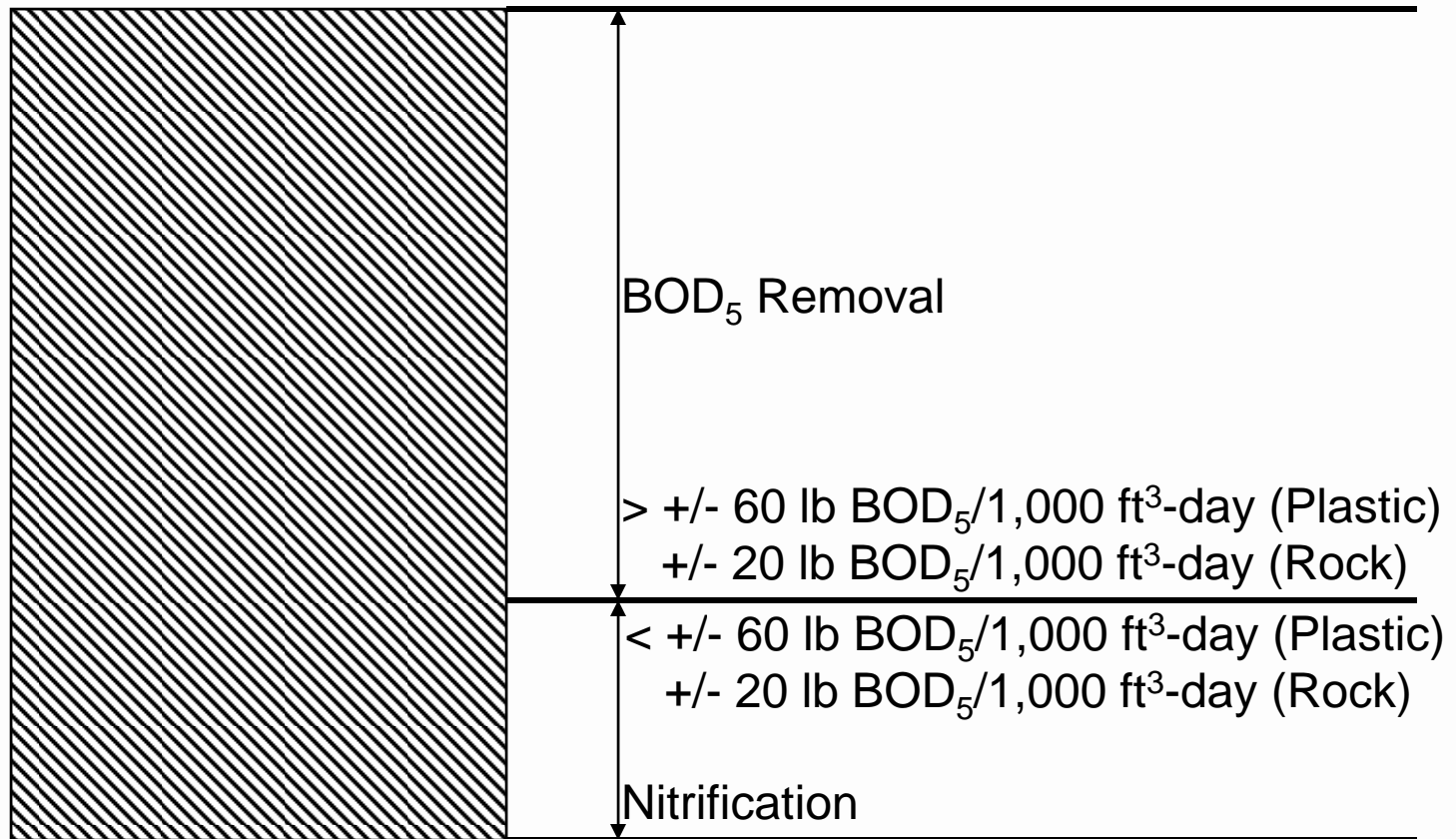


This Occurs Because of Competition for Oxygen in the Aerobic Biofilm





So, Organic Loading Determines Whether Nitrification Will Occur





Why Are There Different Values for Plastic and Rock Media?

- Plastic Media Specific Surface Area:
 - 30 ft²/ft³
- Rock Media Specific Surface Area:
 - +/- 10 ft²/ft³



Thus, Nitrification Can Be Estimated As:

$$\begin{aligned} \text{Nitrification (lb NO}_3\text{-N/1,000 ft}^3\text{-day)} &= \\ &\left\{ \begin{array}{l} 60 \text{ lb BOD}_5\text{/1,000 ft}^3\text{-day (Plastic) or} \\ 20 \text{ lb BOD}_5\text{/1,000 ft}^3\text{-day (Rock)} \end{array} \right\} \\ &\quad - \text{ lb BOD}_5\text{/1,000 ft}^3\text{-day} \\ \hline &4.6 \text{ lb O}_2\text{/lb N} \end{aligned}$$

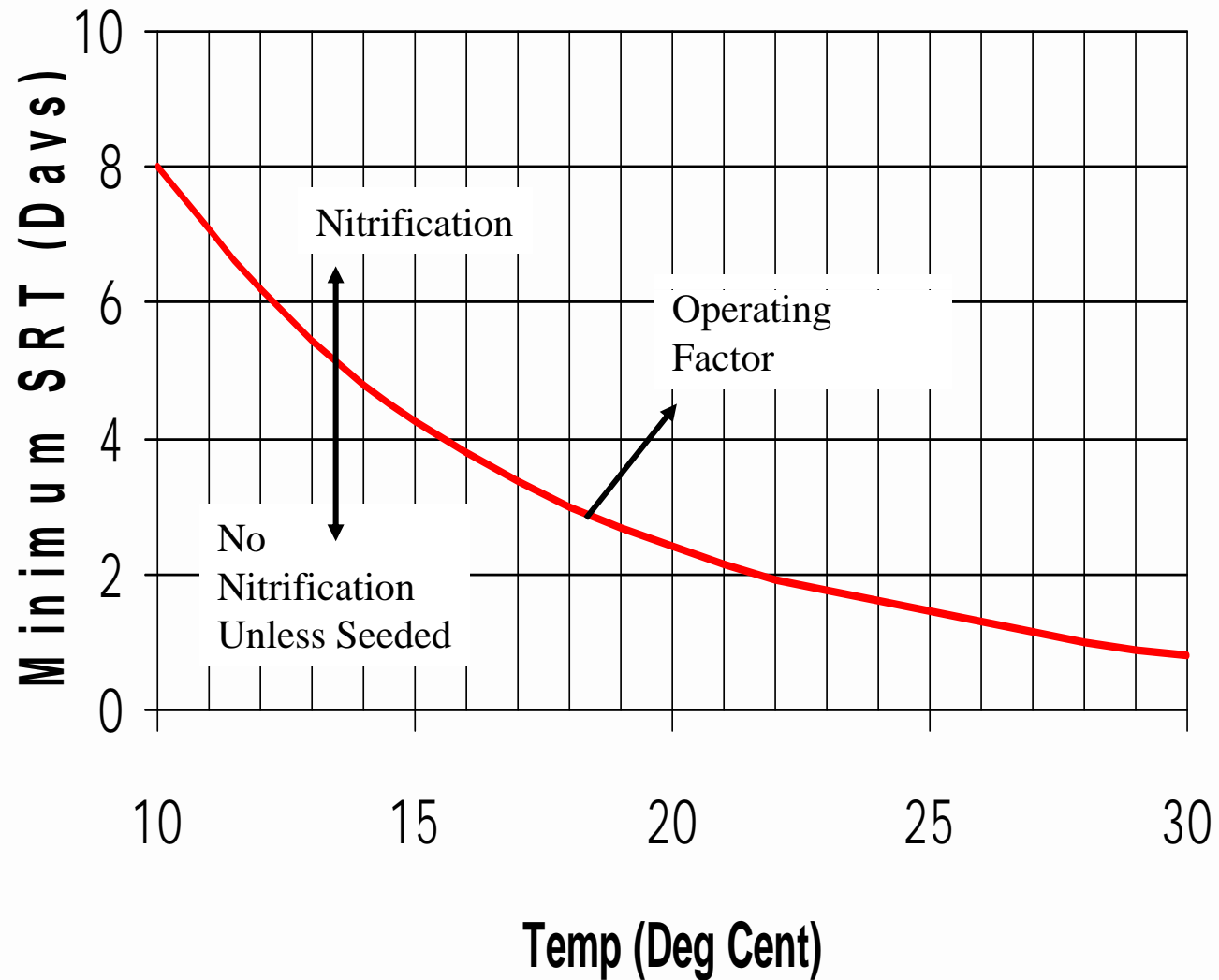


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Seeding Allows Nitrification at SRT Less Than Minimum

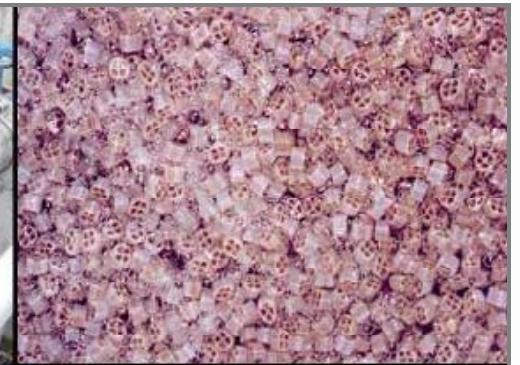




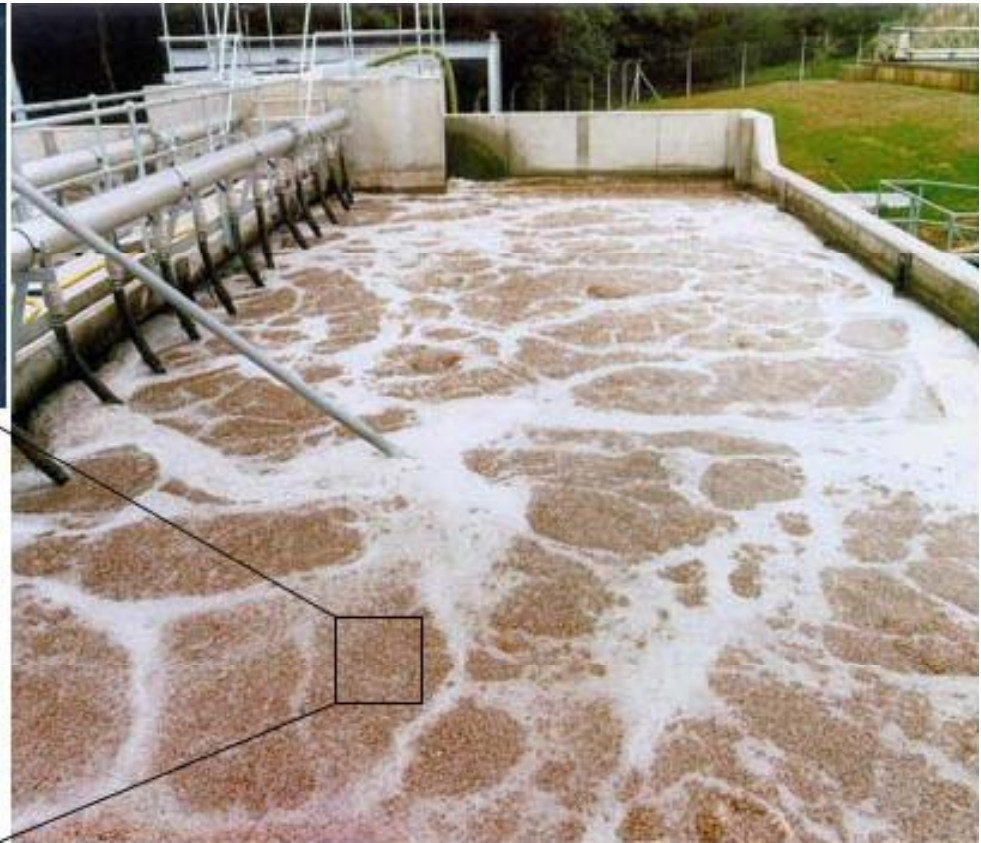
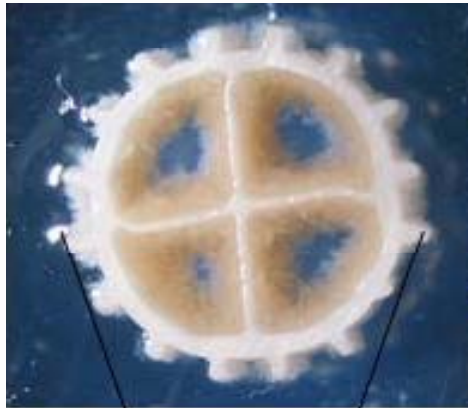
New Media Offers Added Fixed Film Opportunities

- Integrated Fixed Film Activated Sludge (IFAS)
- Moving Bed Biofilm Reactor (MBBR)

Systems Use Floating and Fixed Media



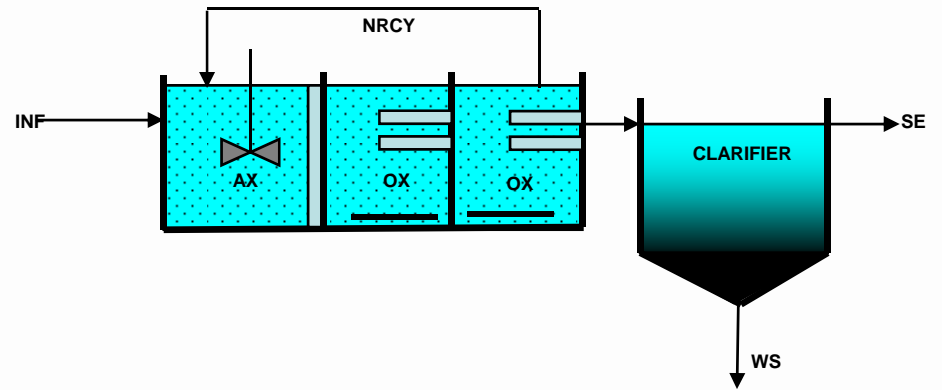
Another View of the Technology



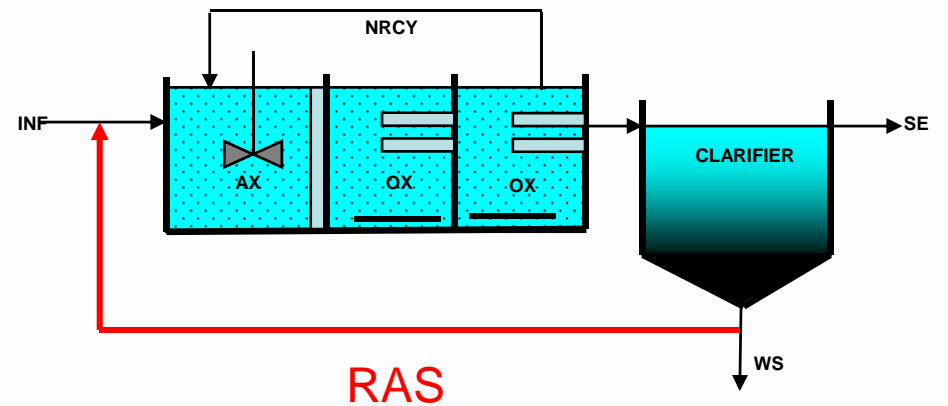


What's the Difference Between IFAS and MBBR?

MBBR



IFAS





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