



## Start-up description

### for fast biofilm growth on Mutag BioChip 25™ carriers (Mutag MBBR Technology™)

Kindly note that the “virgin” Mutag BioChip 25™ is hydrophobic and its average material density is approx. 0.95 kg/l when it is delivered by Multi Umwelttechnologie AG. Hence, the PE carrier media will initially float at the surface of the water and will not submerge. After the growth of biofilms on the surface of the carrier media, the Mutag BioChip 25™ carriers will have an average density of approx. 1.0 kg/l and become hydrophilic, so the carriers will then submerge under normal MBBR conditions\*.

For an optimal and fast growth of microorganisms on the carrier surface, which can optionally be executed in a separate tank, the following instructions should be adhered to:

1. Fill the tank with water and the desired amount of Mutag BioChip 25™ carriers.
2. For the growth of biofilms, there must be supplied process air into the tank. For more information in this matter, please refer to the related chapter in the detailed Mutag BioChip 25™ operation manual\*.
3. For biofilm growth, the COD concentration in the water should be around 100 mg/l or higher. This can be reached by adding easily biodegradable carbon compounds into the water. For this purpose, we suggest to add a certain quantity of a hard liquor (or any other distilled alcoholic drink) to the water. The COD concentration as well as the pH value must be checked regularly!
4. Moreover, nitrogen and phosphorous (N & P) must be added as nutrients for the microorganisms establishing in the pores of Mutag BioChip 25™. Therefore, we recommend to use floral fertilizer. More information on the appropriate dosing and measuring of N & P can be found in the detailed Mutag BioChip 25™ operation manual\*.

**Please note:** The biological activity of the microorganisms is among others significantly depending on the water temperature which needs to be adapted accordingly, if possible. As optimal temperature range for the biofilm growth, we would recommend approx. 34 – 36°C. If the water temperature should be lower, the biofilm growth will take place at accordingly lower speed.

**Remark:** Instead of liquor and fertilizer, you can also use the beverages beer and coke. In combination with each other, coke and beer contain all components necessary for biofilm growth (easily biodegradable carbon compounds, N & P).



Mutag BioChip 25™ - without biofilm...



...and with biofilm

\*For the detailed Mutag BioChip 25™ operation manual as well as for more information, please contact us at [info@mutag.de](mailto:info@mutag.de).