IMPACT OF BIOFOULING ON POROUS MEDIA TRANSPORT DYNAMICS MEASURED BY MAGNETIC RESONANCE DISPLACEMENT RELAXATION CORRELATION

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Biofilms permeate our everyday lives, particularly in biofouling of porous media used for biomedical and industrial filtration and geological materials relevant to environmental processes. Understanding how these biofilms impact transport processes in porous media is critical to eradicating them in unfavorable situations and promoting their growth in beneficial ones, such as carbon sequestration. Most methods of studying biofilms require the sample to be destroyed for examination. With Magnetic Resonance (MR), the biofilm can be observed during its life cycle without destroying the sample under study. *Bacillus mojavensis* was grown in an MR magnet at 21°C in a 50-mm long, 10-mm I.D. liquid chromatography column filled with 240-µm, monodispersed polystyrene beads and analyzed using MR images and relaxation time measurements. Employing different observation times for both *T2-T2* and propagator-*T2* measurements, the growth and decay of the biofilm is clearly seen as the zero-flow peak increases with biofilm development and decreases with the biofilm sloughing process. This quantifies the amount of biomass present. An outstanding question in the modeling of transport in biofouled porous media is the presence or absence of flow within the biomass. The unique data obtained indicates clearly for the first time that flow does not occur within the biomass.