

Development of 3D architecture of uropathogenic *Proteus mirabilis* batch culture biofilms-A quantitative confocal microscopy approach

Schlapp, G.

Scavone, P.

Zunino, P.

Härtel, S.

This work studies the development of the 3D architecture of batch culture *P. mirabilis* biofilms on the basis of morpho-topological descriptors calculated from confocal laser scanning microscopy (CLSM) stacks with image processing routines. A precise architectonical understanding of biofilm organization on a morpho-topological level is necessary to understand emergent interactions with the environment and the appearance of functionally different progeny swarmer cells. *P. mirabilis* biofilms were grown on glass coverslips for seven days on LB broth and subjected to in situ immunofluorescence. Confocal image stacks were deconvolved prior to segmentation of regions of interest (ROI) that identify individual bacteria and extracellular material, followed by 3D reconstruction and calculation of different morpho-topological key descriptors. Results showed that *P. mirabilis* biofilm formation followed a five stage process: (i) reversible adhesion to the surface characterized by slow growth, presen