



1 Examination of glycoconjugate, bacterial and viral distribution in riverine aggregates by Confocal Laser Scanning Microscopy

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In this study we examined the architecture of aquatic aggregates from the River Danube (Vienna, Austria) and the River Elbe (Magdeburg, Germany). The assessment of the aggregate structure and volume was carried out using Confocal Laser Scanning Microscopy (CLSM). River aggregates were examined in the reflection and fluorescence mode in order to record mineral content and autofluorescence signals. Distributions of bacterial cells and virus-like particles were determined with the nucleic acid specific stain SYBR Gold. Glycoconjugates of extracellular polymeric substances (EPS) were examined with 63 commercially available lectins. Of the lectins tested on riverine aggregates almost all had a binding pattern useful for analysis. However, only the lectins from *Aleuria aurantia* and *Phaseolus vulgaris* showed a strong binding to the EPS glycoconjugates of the aggregates from the River Danube. In comparison, the EPS glycoconjugates of aggregates from the River Elbe were strongly stained by the lectin from *Phaseolus vulgaris* only. Finally, digital image analysis was employed for visualization and quantification of three-dimensional CLSM data sets. The volumes of the polymeric and cellular constituents of the aggregates were quantified in order to compare the aggregates from the two rivers in different seasons. These elaborate techniques may have a significant potential for studies on particle-related aspects of biogeochemical cycling in freshwater systems.