Can mussel feces reduce turbidity in coastal areas?

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The installation of offshore structures, such as wind farms and floating solar panels, introduces large amounts of artificial hard substrate into previously soft sediment-dominated areas. These substrates are rapidly colonized by filter-feeding organisms, such as mussels, which have high filtration capacities and extract significant quantities of phytoplankton and suspended particulate matter (SPM). The mussels then egest undigested material as biodeposits (fecal pellets or pseudofeces). In recent decades, the Belgian part of the North Sea has experienced significant changes in SPM dynamics that are poorly understood. Our study hypothesizes that biodeposits from blue mussels (*Mytilus edulis*) contribute to reduced turbidity by promoting particle aggregation and altering floc structure, density, and settling velocity. To test this, we conducted a laboratory experiment to assess the impact of biodeposits on SPM flocculation. Using a custom-made flocculation chamber, we monitored turbidity and particle size distribution in two treatments: (1) kaolinite and seawater, and (2) biodeposits, kaolinite, and seawater. Initially, both treatments were subjected to high turbulent shear (75 s^{-1}) to homogenize the mixture, followed by lower shear (20 s^{-1}) for 120 minutes to promote aggregation. Results showed that flocs formed with kaolinite and biodeposits were larger than those formed with kaolinite alone, though the rate of floc size change was similar across treatments. Additionally, turbidity reduction was more pronounced in the treatment with both biodeposits and kaolinite compared to kaolinite alone. These findings suggest that, despite the low stickiness of biodeposits at the tested concentrations, they may contribute to larger floc sizes and a reduction in water turbidity.

Keywords
Turbidity; Flocculation; Mussel; Fecal Pellet