Effect of Disc Filtration with and without Addition of Flocculent on Nano- and Micro-Particles and Their Associated Polycyclic Aromatic Hydrocarbons in Stormwater

Many municipalities in Denmark and around Europe currently work towards separating stormwater and sewage. In existing urban areas this may imply disconnecting stormwater from the old combined sewer systems suffering from hydraulic overloading and discharging directly to nearby surface waters. Stormwater runoff may, however, be heavily polluted and Best Available Technologies (BAT) are therefore needed to treat the stormwater before discharge. The aim here was to determine the sizes of particles found in stormwater from roads and to evaluate the use of a cationic organic flocculant to increase the size of the particles and thereby increase the removal efficiency of a 10 µm woven polyester disc filter. The samples were collected in connection with a project testing a pilot scale disc filter for treating stormwater runoff. The micro-sized particles were found to be mainly below 10 µm (6.9–19 µm) and nano-sized particles were also observed (ca. 76–228 nm). The flocculent increased the observed particle micrometer sizes by 46% and the removal of particle-associated Polycyclic Aromatic Hydrocarbons (PAHs) was confirmed. The majority of the particles were, however, still below 10 µm after addition of flocculant, which shows that application of flocculants with the woven disc filter technology for stormwater treatment needs further refinement.

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