



Experimental investigation of acoustically enhanced colloid transport in water-saturated packed columns

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The effects of acoustic wave propagation on the transport of colloids in saturated porous media were investigated by injecting Uranine (conservative tracer) as well as blue and red polystyrene microspheres (colloids of different diameters; 0.10 and 0.028 μm , respectively) into a column packed with glass beads. Experiments were conducted by maintaining the acoustic pressure at the influent at 23.0 kPa with acoustic frequencies ranging from 30 to 150 Hz. The experimental results suggested that colloid size did not affect the forward and reverse attachment rate coefficients. The acoustic pressure caused an increase in the effective interstitial velocity at all frequencies for the conservative tracer and colloids of both sizes, with maximum increase at 30 Hz. Furthermore, acoustics enhanced the dispersion process at all frequencies, with a maximum at 30 Hz.