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# The kinetics of the polyacrylic superabsorbent polymers swelling in microalgae suspension to concentrate cells density

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## Abstract:

Different from current harvesting methods, the aim of this study was to concentrate microalgae by removing the medium with polyacrylic superabsorbent polymers (PSAPs). This method can concentrate freshwater microalgae *Chlorella sp.* at a relatively high biomass concentration of 90.23 g L<sup>-1</sup>. Without further dewatering, the concentrated microalgae can be directly used to produce biofuels by oil extraction or fermentation. The kinetic characteristics of PSAPs swelling in different solutions were investigated. The results indicate that the negative influence on absorbency caused by ionic strength was greater than microalgae concentration. Compared with the diffusion part, water absorbed by the relaxation of PSAPs was dominant and accounted for over 97%. Equilibrium absorbed water equations under different microalgae concentration were fitted and could provide guide to quantifiably concentrate microalgae. Increasing temperature decreased the absorbency of PSAPs, while, the absorption and desorption rate were increased. Moreover, the absorbency remained at 91.45% after recycling three times.

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