

Water purification and potential applications using hydrate gel filtration system

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Filtration plays a crucial role for provision of clean drinking water. However, many people still lack access to clean drinkable water and suffer from preventable water-borne diseases. Filtration through a low-cost ultrafiltration-range separation technology using hydrate gel had been developed which enables simple and high flux production of filtered water. This research focuses on the application of this new filtration technology using a gelatinous layer of aluminium hydroxide polyhydrate. Filtration using aluminium hydroxide hydrate gel allows efficient removal of suspended particles and microbial contaminants of 10 nm or larger in size, while small water-soluble molecules remain in the filtrate. The filter can also have potential applications in separate hydrophobic compounds

such as oil, milk proteins and beta carotene effectively. In particular tests are required with the prototype prior to official certification. Flux and microbial testing have been conducted to evaluate the filtration efficiency. Analysis of filtered water with turbidity, UV254 and NPOC/TN analysis demonstrated that the hydrate gel layer worked well when increasing the gel volume and thicknesses. Among different gel types that have been used, autoclaved and aged gel showed highest flux rate and greatest filtration performance. More effort is needed to develop different prototypes and to discover possible applications to enable production of affordable, clean and safe water.

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