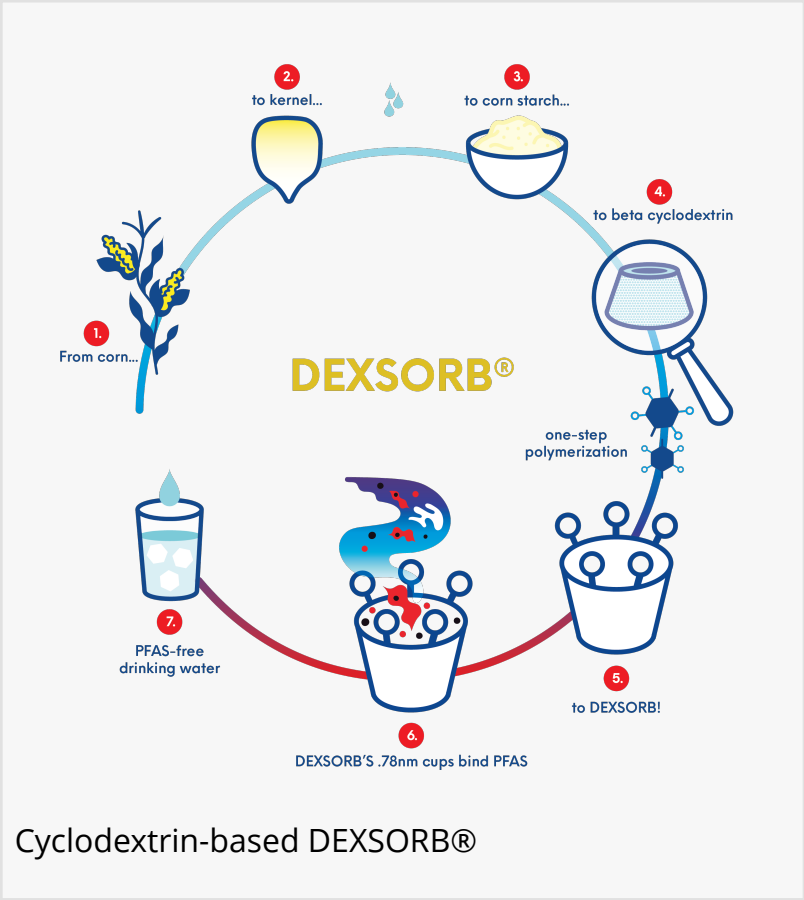
Cyclopure’s DEXSORB® Adsorbents outperform Ion Exchange in New Study

Confirms PFAS Removal in Varied Water Matrices



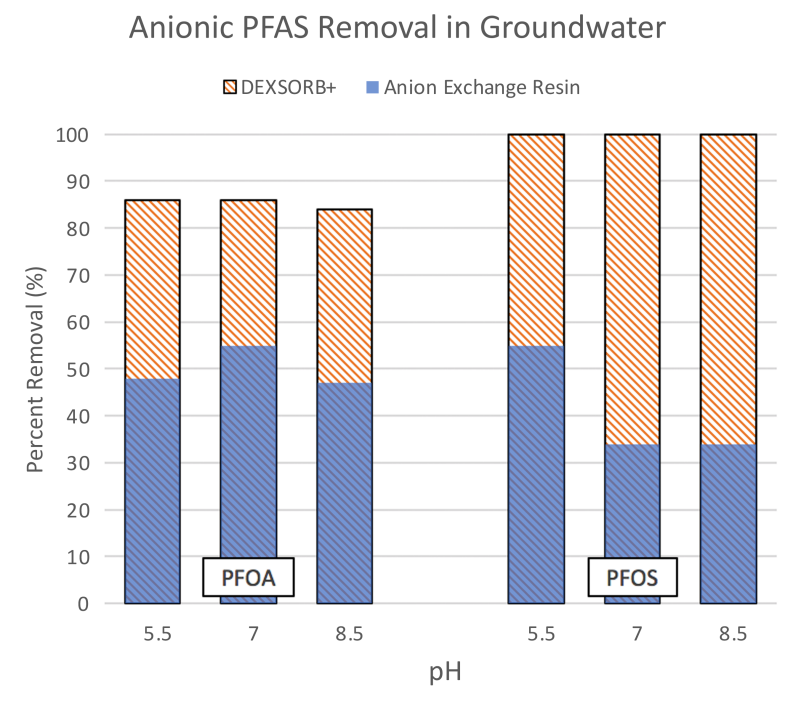
Cyclodextrin-based DEXSORB®

SKOKIE, ILLINOIS, UNITED STATES, October 13, 2020 /EINPresswire.com/ -- Cyclopure, Inc. is pleased to announce that its cyclodextrin-based adsorbents, DEXSORB® and DEXSORB+®, outperformed the leading cation and anion exchange resins in the removal of PFAS from water in a new head-to-head study. The superior performance of the company’s polymer formulation was reported on September 14, 2020 in Environmental Science & Technology.

Concern over PFAS in drinking water and their associated health effects are widespread and well-known. Most attention has been focused on PFOA, PFOS and other anionic (negatively charged) PFAS compounds. Nearly 20 States have adopted or are adopting their own maximum contaminant levels, some as low as 8ppt for PFOA and 10ppt for PFOS, and others with limits of 20ppt for combinations of up to six PFAS compounds. But, many of the industrial processes and products that contain PFOA and PFOS also include a variety of other PFAS classes made up of cationic, zwitterionic and nonionic compounds, which are also finding their way into drinking water.

The new study was led by water expert Damian Helbling of Cornell University, and is the first systematic exploration of the performance of emerging adsorbent technologies, including cyclodextrin polymer adsorbents and ion-exchange resins, for the removal of different classes of PFAS from water. Under environmentally relevant conditions with varying water qualities, the performance of DEXSORB® and DEXSORB+® were evaluated against PFC100E and PFA694E for the removal of PFAS compounds of concern, including anionic PFAS (PFOA and PFOS), non-ionic

PFAS (FBSA and FOSA), and zwitterionic PFAS (AmPr-FHxSA and 6:2 FTSA-PrB).



DEXSORB Removal of Anionic PFAS

DEXSORB® and DEXSORB+® are commercially available polymer adsorbents developed by Cyclopure using its proprietary cyclodextrin-polymerization technology. Both adsorbents rely on the formation of host-guest complexes within 0.78 nm β-cyclodextrin cups to bind PFAS and other organic micropollutants. (Figure 1) DEXSORB® carries a negative charge, favoring positively charged (cationic) compounds, and has weak affinity for negatively charged (anionic) compounds. DEXSORB+® is a positively charged material that was designed to target anionic PFAS by combining both hydrophobic and electrostatic adsorption to β-cyclodextrin cups and cationic quaternary ammonium sites. Dual binding allows DEXSORB+ to uniquely address the structural variances of chain length, functional groups, and isomer structures among PFAS.

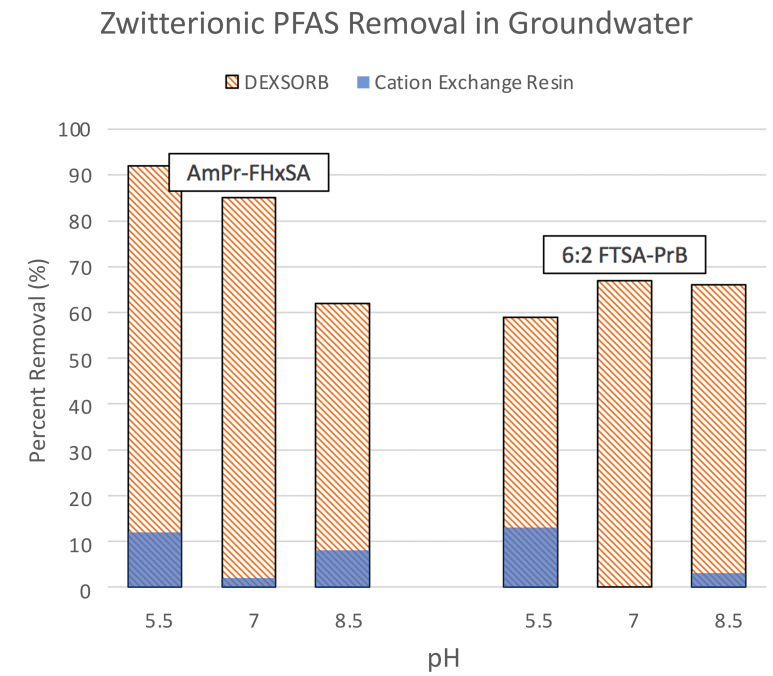
> Removing cationic and zwitterionic compounds extends DEXSORB®'s value proposition to treat PFAS in drinking water, making DEXSORB® an adsorbent that can meet changing requirements in the future."
>
> *Frank Cassou*

The new study is an important demonstration of DEXSORB®'s consistent performance against a diverse group of PFAS in complex water conditions, a key requirement of a viable adsorbent. At PFAS concentrations of one part per billion (1 ppb, 1 µg/L), DEXSORB® and DEXSORB+® showed superior removal to ion exchange resins in each category of measure for different water matrices and varied pH values. Both DEXSORB® adsorbents exhibited quick uptake speeds for all classes of PFAS relative to the tested ion exchange resins. Cyclopure Director of Environmental Engineering, Dr. Yuhan Ling, stated "It is good to see this study confirm DEXSORB®'s superior removal of different classes of PFAS in real waters, consistent with prior studies showing DEXSORB® outperforms activated carbon in complex water environments."

For removal of anionic PFAS, DEXSORB+® significantly outperformed the ion exchange resins with superior efficacy against PFOA (i.e., >80% removal) and PFOS (i.e., ~100% removal) in different water matrices with varying pH. (Figure 2) Notably, nonionic PFAS (e.g., FBSA and FOSA) are effectively removed by DEXSORB® and DEXSORB+® to varying degrees but are not removed

by ion exchange resins.

For zwitterionic PFAS, DEXSORB® significantly outperformed both cation and anion exchange resins in all tests, with water matrices changing from pure water to groundwater and pH varying between 5.5 and 8.5. In groundwater particularly, the cation exchange resin stopped functioning against AmPr-FHxSA and 6:2 FTSA-PrB, while DEXSORB® remained highly effective for the removal of both PFAS. (Figure 3)



DEXSORB Removal of Zwitterionic PFAS

“Removing cationic and zwitterionic compounds extends DEXSORB®’s value proposition to treat PFAS in drinking water” said company CEO, Frank Cassou. "Combining high capacity with multiple cycles of re-use from regeneration translates into lower costs of treated water and positions DEXSORB® as an adsorbent that can meet changing requirements in the future.”

About Cyclopure (www.cyclopure.com) Cyclopure is a materials science company and a leader in water purification technologies. The company's line of DEXSORB® adsorbents are based on breakthrough technology that converts renewable, corn-based cyclodextrins into highly adsorbent materials engineered to remove micropollutants, including perfluorinated compounds (PFOA and PFOS), from drinking water. Cyclopure's DEXSORB adsorbents are produced in varying formats, allowing for use in analytical, household and municipal water treatment applications. Cyclopure is working with global partners to bring DEXSORB to market in analytical applications, household filtration and municipal drinking water and wastewater treatments.

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