



Summary of PFAS Reduction in Environmental Water Treated with SORR's Product A

The following summarises the reduction in PFAS levels observed in environmental water samples treated with SORR's Product A, compared to control samples (empty vessel), measured at 0 hours and after 24 hours:

| Compound | Control (ng/L) | Product A (ng/L) | Reduction (%) |
|----------------|----------------------------|----------------------------|--------------------------------|
| PFBA | 160 (0 hrs) / 110 (24 hrs) | 140 (0 hrs) / 110 (24 hrs) | 13% at 0 hrs, stable at 24 hrs |
| PFPeA | 50 (0 hrs) / 40 (24 hrs) | 40 (0 hrs) / 30 (24 hrs) | 20% at 0 hrs, 25% at 24 hrs |
| PFHxA | 330 (0 hrs) / 230 (24 hrs) | 240 (0 hrs) / 160 (24 hrs) | 27% at 0 hrs, 30% at 24 hrs |
| PFHpA | 26 (0 hrs) / 19 (24 hrs) | 117 (0 hrs) / 109 (24 hrs) | Increase observed in Product A |
| PFOA | 25 (0 hrs) / 11 (24 hrs) | 20 (0 hrs) / 9 (24 hrs) | 20% at 0 hrs, 18% at 24 hrs |
| PFHxS | 28 (0 hrs) / 23 (24 hrs) | 20 (0 hrs) / <5 (24 hrs) | 29% at 0 hrs, >78% at 24 hrs |
| PFOS | 54 (0 hrs) / 30 (24 hrs) | 30 (0 hrs) / <5 (24 hrs) | 44% at 0 hrs, >83% at 24 hrs |
| 6:2 FTS | 17 (0 hrs) / 22 (24 hrs) | 14 (0 hrs) / 8 (24 hrs) | 18% at 0 hrs, 64% at 24 hrs |



Key Observations:

- **PFHxS** and **PFOS** demonstrated the highest reduction levels after 24 hours, with reductions exceeding 78% and 83%, respectively, when treated with Product A.
- **PFBA**, **PFPeA**, **PFHxA**, **PFOA**, and **6:2 FTS** also showed significant reductions over the 24-hour period.
- **PFHpA** levels increased in the Product A-treated sample, suggesting that Product A may not be effective at reducing this compound.

These findings indicate that SORR's Product A is particularly effective at targeting certain PFAS compounds, notably **PFHxS** and **PFOS**, in environmental water.

Improving SORR Gyroid Sponge Efficiency with the SORR “PAGE” Process

SORR's proprietary PAGE (Pollutant Adapted Gradient Extraction) process allows customisation of the Gyroid Sponge to enhance its absorption and filtering efficiency for specific PFAS compounds. By modifying the Gyroid Sponge's structure and surface properties through controlled heat, radiation, or chemical treatments, SORR can increase the sponge's affinity for PFAS chemicals, improve retention, and tailor its performance. Here's how each modification works to reduce PFAS levels:

1. Heat Treatment

- **Surface Activation:** Heating increases porosity and modifies surface properties, making the Gyroid Sponge more hydrophobic, which is beneficial since PFAS compounds are often hydrophobic.
- **Enhanced Adsorption:** High-temperature treatments remove impurities and stabilise the sponge structure, enabling stronger binding sites for PFAS compounds like PFOA and PFOS.
- **Controlled Pore Size:** Temperature adjustments help control pore size within the gyroid structure, improving selectivity by matching pore size with the molecular dimensions of specific PFAS compounds.



2. Radiation Treatment

- **Cross-Linking and Structural Reinforcement:** Radiation introduces cross-linking within the polymer matrix, enhancing the sponge's mechanical strength and stability. This ensures durability and effective performance over multiple uses.
- **Functionalisation with Specific Binding Sites:** Radiation adds functional groups as binding sites for PFAS compounds. For example, carboxyl or hydroxyl groups improve selectivity and uptake for compounds like PFBA and PFPeA.
- **Improved Reusability:** Radiation treatment also helps maintain sponge integrity after multiple absorption cycles, allowing for repeated use without loss of efficiency.

3. Chemical Treatment

- **Functional Group Attachment:** Specific reagents can graft functional groups onto the gyroid surface, such as amine or thiol groups, which improve affinity for long-chain PFAS compounds like PFHxA and PFHpA.
- **Selective Ion Exchange:** Chemical treatments introduce ion-exchange sites, fine-tuned to target ionic PFAS compounds (e.g., PFOS and PFHxS), increasing selectivity and binding capacity.
- **Hydrophobic Coatings:** Chemical treatments can add hydrophobic coatings to repel water and attract hydrophobic PFAS compounds, enhancing absorption.

Summary

Through the PAGE process, which includes tailored heat, radiation, and chemical modifications, SORR can fine-tune the Gyroid Sponge to target specific PFAS chemicals more effectively. Each treatment enhances different sponge properties, including surface affinity, structural resilience, and compound selectivity, allowing SORR to optimise the Gyroid Sponge for maximum efficiency in PFAS remediation.