VEOS PHARMACEUTICALS

OliQuell™ | Nature-Based Carbon Removal for Soil, Water & Waste Systems

Scalable, field-validated CDR from olive waste

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FROM AGRICULTURAL EMISSIONS TO SOIL-BASED CARBON REMOVAL

THE PROBLEM: EMISSIONS & SOIL HEALTH CRISIS

Smallholder farmers and agri-processors in emerging markets face an emissions crisis without access to scalable, verifiable CDR tools

- ❑ 5.4 $GtCO_2e$/year is emitted globally from agriculture — a major driver of climate change.
- ❑ In Kenya, the East African Rift contributes nearly half of the nation's agri-emissions.
- ❑ CH_4 (84×) and N_2O (264×) are far more potent than CO_2 — amplified by anaerobic soils, waste mismanagement, and poor nutrient cycling.
- ❑ 40–60% of soil organic carbon is lost due to erosion and degradation — driving higher fertilizer use and emissions.
- ❑ Over 5 million hectares in Kenya are severely degraded, with no validated soil-based CDR system currently in use.
- ❑ Current CDR tools cost €100–600/tCO_2e, require infrastructure, and are inaccessible to off-grid or smallholder ecosystems.

THE SOLUTION: OliQuell™ – Decentralized Nature-Based Carbon Removal

A CDR-ready, low-cost, powder-based biocatalyst that enhances carbon storage via microbial soil regeneration — no grid, no infrastructure

- ✓ CH_4 ↓ 84%, H_2S ↓ 81% — in soils, compost, and organic waste systems
- ✓ CO_2 → O_2 conversion ↑ 22% — boosts oxygenation & microbial respiration
- ✓ Net carbon removal: 2.5–4.3 tCO_2e/ha per 3-month cycle
- ✓ Ammonium ↑ 370%, Nitrate ↑ 97%, N_2 ↑ 81.7% — reduces fertilizer needs & N_2O emissions
- ✓ Up to 70% soil carbon retention in field trials — long-term sequestration
- ✓ Delivered as a dispersible powder — no electricity, no equipment
- ✓ Cost: < €20/ha/application — field-ready and scalable for the Global South

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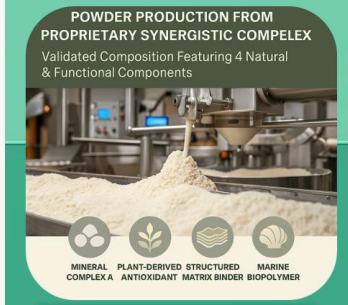
OLIQUELL™: A MULTI-USE, PLUG-AND-PLAY PLATFORM – THE PRE-AOP FRONT-END SOLUTION

COMPARISON WITH COMPETITORS:

PRODUCT	CORE INGREDIENTS	SECTOR	DISADVANTAGES	OPEX/CAPEX	OLIQUELL™ ADVANTAGES
Activated Carbon	Charcoal, synthetic binders	HVAC/Water	Single-function, disposable, limited CO_2 effect	¥50–70/m^3 OPEX	CO_2-to-O_2 conversion, odor & emission suppression, multi-use
Chemical Flocculants	Alum, Ferric chloride	Water Treatment	Harsh pH, non-circular, residue toxicity	Moderate OPEX, waste handling	Natural, pH-neutral, safe for agri reuse
Zeolite/Perlite	Natural silicates	Biogas/Soil	Low bioactivity, no microbial support	Variable	Boosts microbial balance & nitrogen fixation
AOP / Microbubble	**Ozone (O_3), Hydrogen Peroxide (H_2O_2), UV, TiO_2, Iron catalysts**	**PFAS / Pharma Waste**	**High CAPEX (¥12–35M), high OPEX, 6–12 month install, produces toxic by-products**	**CAPEX: ¥12–35M; OPEX: ¥150–200/m^3**	**OliQuell handles bulk load → lowers AOP size, OPEX, CAPEX. Pre-AOP platform**
OliQuell™	**Olive leaf extract, polysaccharides, minerals**	**Multi-sector**	**—**	**CAPEX near zero; OPEX ¥15–25/m^3**	**Circular, GRAS, zero energy, plug-and-play. Validated in wastewater, biogas, HVAC, EV, cosmetics, pharma. Pre-AOP platform for PFAS.**



€500–2,000 / unit | 6–8 weeks deployment | No energy

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PHYSICO-CHEMICAL & FUNCTIONAL PROFILE OF OLIQUELL™

PROPERTY	SPECIFICATION
Source	Olive leaf extract + bioactive biopolymers
Components	Component A (35%), Component B (25%), Component C (25%), Functional Agent D (8%)
Heavy Metals Compliance	Conforms to EU regulatory limits for Pb, Cd, Hg, and As
Appearance	Off-white dispersible fine powder
Water Solubility	Fully dispersible in irrigation and reuse systems
pH Stability	Stable across a broad pH range (acidic to alkaline)
Shelf Life	Minimum 3 years under standard storage conditions
Microbial Safety	Low microbial count in accordance with EU agronomic standards

- Enhances nitrogen fixation
- Reduces CH_4 emissions by 84%
- Stabilizes pH and boosts oxygenation
- Water-dispersible & easy to apply

A multifunctional, MRV-aligned solution for carbon removal, water reuse, and emissions control — ready for global deployment in low-infrastructure settings

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APPLICATION AREAS OF OLIQUELL™

Multi Sector Applications for Enviromental and Industrial Impact

AUTOMOTIVE

CO_2/VOC reduction in EV & truck filters (Volvo, Zeekr pilots)

INDUSTRIAL WATER

COD, turbidity, and heavy metal removal before membrane filtration (IMDEA, Troil)

BIOGAS SYSTEMS

CH_4 and H_2S suppression to reduce corrosion, odors, and emissions

AGRICULTURE

Soil regeneration, nitrogen fixation (+81,7%), and carbon cycling

OliQuell™-Coated Filters Reduce In-Cabin CO_2 by ~22%

TIME POINT	FILTER TYPE	NON-COATED FILTERS CO_2 (PPM)	OLIQUELL (10%- 4g)-COATED FILTERS CO_2 (PPM)	% INHIBITION VS. CONTROL
1h 46m	Particulate Filter	740	634	14.3%
	Carbon Filter	700	634	13.7%
2h 52m	Particulate Filter	740	577	22.0%
	Carbon Filter	700	577	21.9%

- **Non-coated filters:** No meaningful CO_2 adsorption (flat baseline at ~700–740 ppm).
- **OliQuell-coated filters:** Consistently reduced CO_2 vs. controls.
  - ~14% reduction after ~1h45m.
  - ~22% reduction after ~3h.

Veos In-Cabin Airflow Simulator: Optimizing OliQuell™ for CO_2↓ / O_2↑

PURPOSE

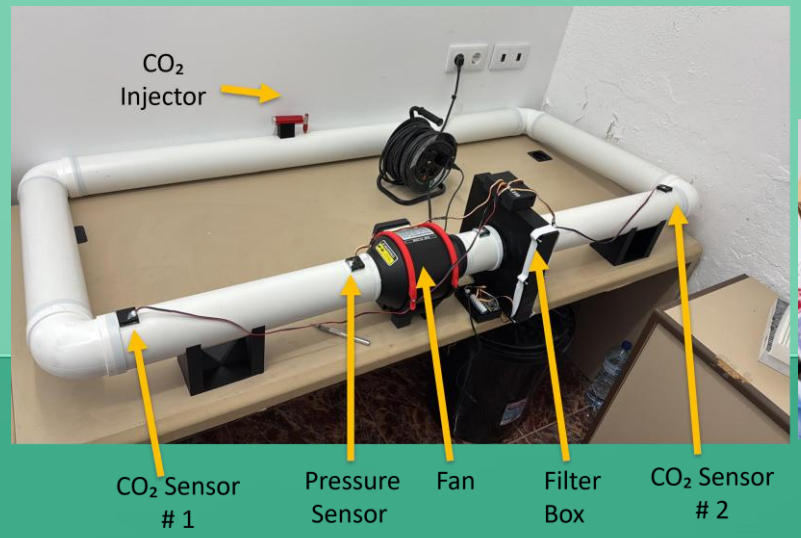
- Rapidly **optimize OliQuell™ concentration and coating method** on carbon cabin filters.
- Quantify effects on **CO_2 reduction, O_2 increase, pressure drop, and durability** before vehicle trials.
- **System Overview (Closed-Loop, Recirculating)**
- **Honeycomb flow straightener** + 100 mm ducting to replicate stable cabin airflow.
- **Variable-speed in-line fan** (up to ~320 m^3/h ≈ 89 L/s) to match OEM blower profiles.
- **Filter test chamber** (fits OEM carbon media; quick-swap cartridge).
- **Gas injection ports** to spike **CO_2** (exhalation proxy) and adjust **O_2** baselines.
- **Sensor array:** dual CO_2 (pre/post), O_2, ΔP taps across filter, T/RH, and blower current.
- **Automated data logging** (1–2 s cadence) for time-to-threshold and breakthrough curves.

OPTIMIZATION PLAN

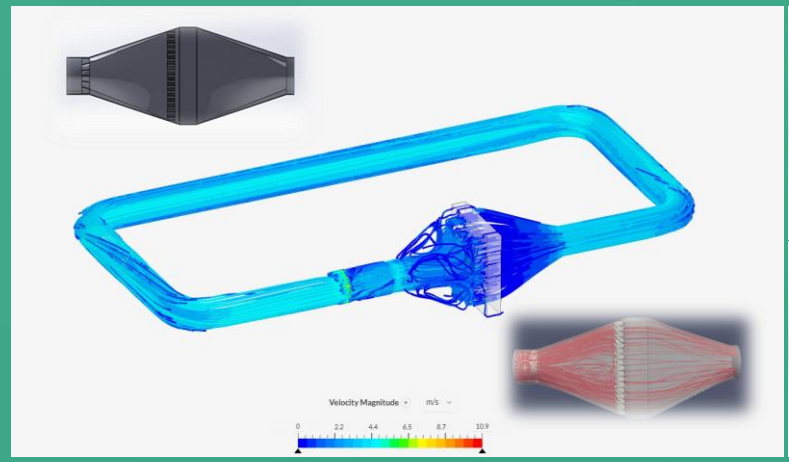
- **Design of Experiments (DoE):**
  - OliQuell™ loading: **0%, 2.5%, 5%, 7.5%, 10%** (by media weight).
  - Airflow setpoints: **40 / 60 / 90 L/s** (idle → max cabin).
  - Humidity: **30% / 60% RH**; Temp: **20–30 °C**.
- KPIs: **CO_2 drop (% vs. control), O_2 delta (ppm), pressure-drop change (Pa), VOC retention**, and **cycle life**.
- Target: **≥20% CO_2 reduction** with **≤5% ΔP penalty** vs. stock carbon filter.

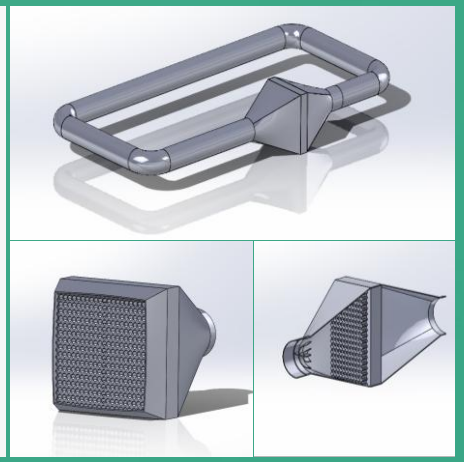
TECH TRANSFER TO VEHICLES

- Pick **best dose** from simulator (performance × ΔP × durability).
- **Install in vehicles** (DENSO/AISIN/TB formats) for **in-cabin trials**.
- On-road logging: **CO_2, O_2, PM2.5, VOCs, ΔP, blower power**, driver alertness proxy.
- **Compare against OEM premium carbon** filters → create **CO_2-active "safety" tier**.



Volvo Filter Coated with 10% OliQuell





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VEOS BIODIGESTER & FARM EMISSIONS SIMULATOR

Purpose

- Optimize OliQuell™ for **livestock effluents** (pig slurry, dairy manure).
- Quantify reduction in **CH_4, H_2S, NH_3**, and stabilization of organic solids.
- Demonstrate suppression of **odor-causing microbial groups** (SRB, methanogens).
- Translate results → **farm lagoons, manure pits, parlor flush** systems.

System Overview (Closed Digesters)

- Sealed 2 L biodigesters, mesophilic 34 °C.
- Inoculum: pig slurry (10^9–10^{10} CFU/mL), representative microbial load.
- Sensors: **CH_4, H_2S, CO_2**, pH, redox.
- Monitoring: gas fluxes + microbial group balance (Desulfovibrio, methanogens, Bacillus, etc.).

Optimization Plan

- OliQuell™ loading: 0%, 0.5%, 1.0%, 2.0% (w/w).
- Duration: 30 days, daily gas sampling.
- KPIs: ≥50% H_2S suppression, ≥20% CH_4 reduction, ≥30% odor reduction.

Farm Tech Transfer

- Apply to **pre-lagoon washwater or manure pits**.
- Target: odor control, reduced aeration demand, lower GHG footprint.
- Value: **odor complaints ↓, sludge hauling ↓, carbon credits ↑**.

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(for CH_4 / H_2S / odor suppression, contaminant stabilization)

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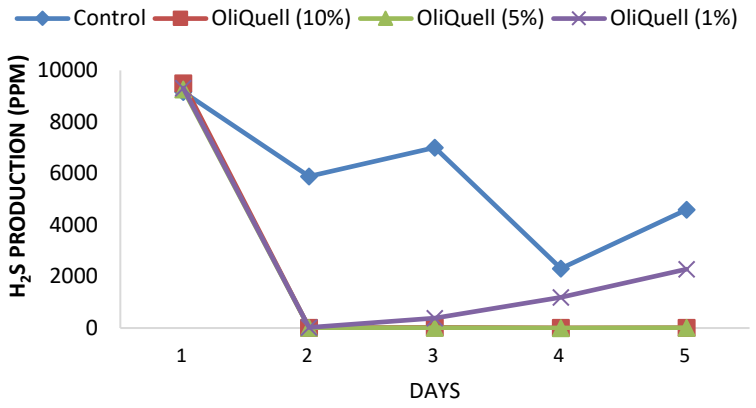
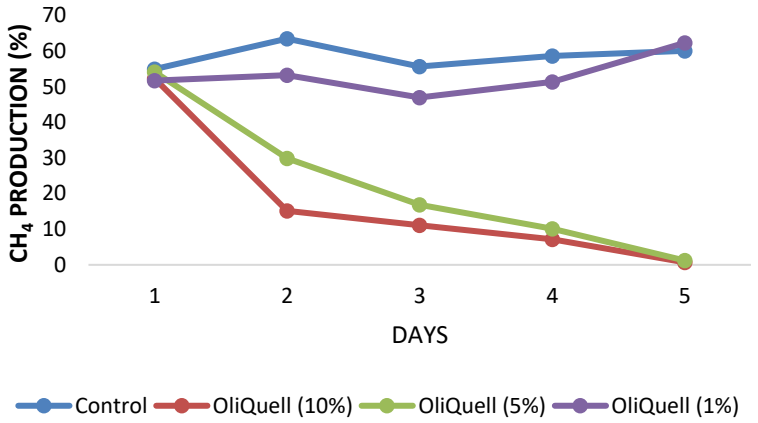
VEOS BIODIGESTER & FARM EMISSIONS SIMULATOR: OLIQUELL™ ACHIEVES COMPLETE INHIBITION OF CH_4 & H_2S

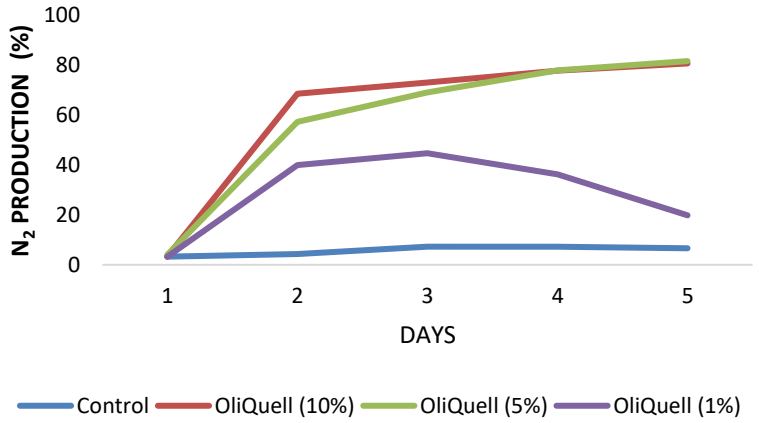
H_2S PRODUCTION (PPM) — FULL INHIBITION AT 10% DOSE



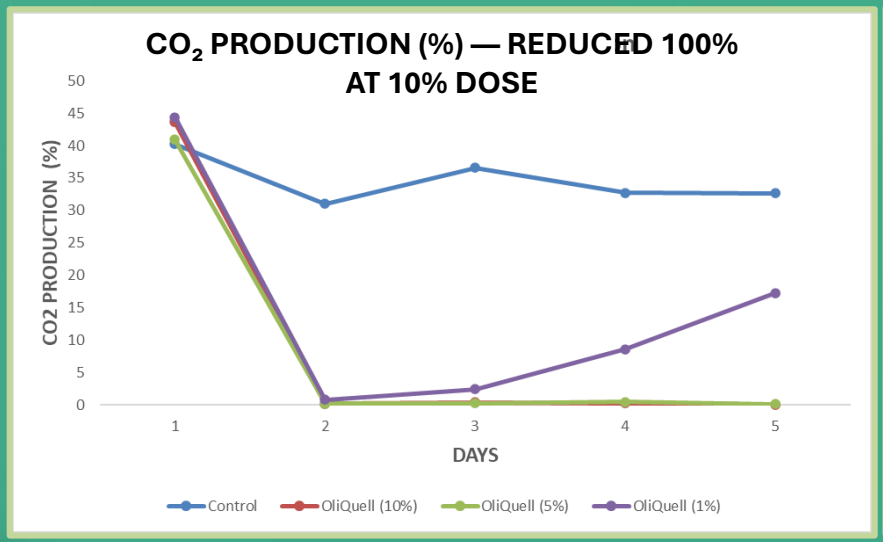
CH_4 PRODUCTION (%) — FULLY SUPPRESSED AT 10% DOSE



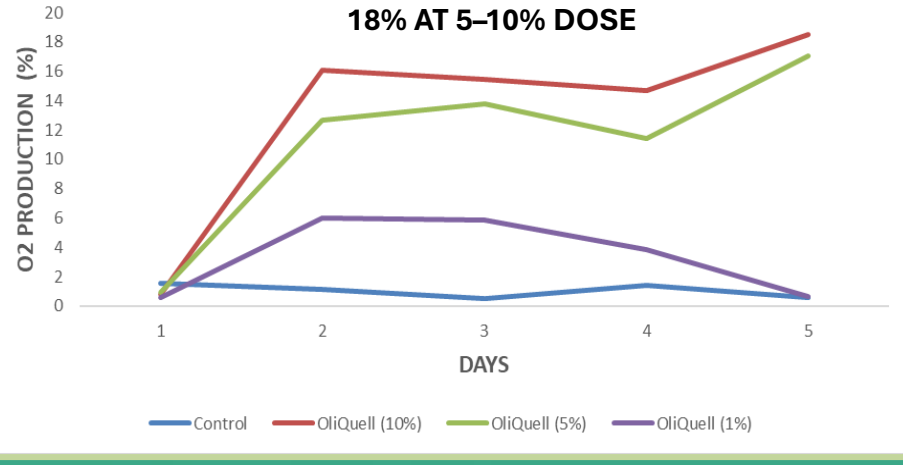
N_2 PRODUCTION (%) — INCREASED UP TO 80% AT HIGHER DOSE



CO_2 PRODUCTION (%) — REDUCED 100% AT 10% DOSE



O_2 PRODUCTION (%) — INCREASED UP TO 18% AT 5–10% DOSE



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- *OliQuell™ fully inhibited methane (CH_4) and hydrogen sulfide (H_2S) generation in sealed pig slurry digesters.*
- *At higher doses, CO_2 production was completely suppressed, while N_2 conversion rose to ~80% and O_2 generation reached 18%.*
- *This demonstrates a breakthrough platform for farm emission control, odor suppression, and improved soil gas balance.*

Veos Water Clarification Platform: Reducing COD, Nutrients & Metals in Agri-Purge Streams

PURPOSE

- Optimize OliQuell™ for greenhouse purge, aquaponics bleed, and dairy wastewater.
- Reduce COD, turbidity, nutrients, heavy metals.
- Lower sewer fees and enable reuse.

SYSTEM OVERVIEW (Inline & Side-Stream)

- Inline bag filtration (greenhouse purge).
- Inline cartridges (aquaponics, irrigation).
- Side-stream polishing (dairy parlor water).
- Monitoring: COD, turbidity, N, P, metals.

OPTIMIZATION PLAN

Dose: 0.05–0.2 g/L.
Validated by jar tests → inline pilots.

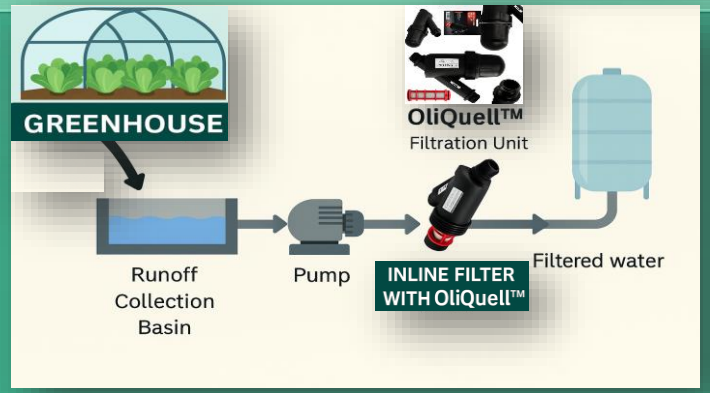
KPIs:

- Turbidity ↓74%
- Metals ↓50% (Cr, Pb, Cd)
- COD ↓41–50%
- Phosphate ↓30–40%
- O_2 ↑18%

TECH TRANSFER TO FARMS

Deployable in 6–8 weeks, no external energy.
Cost: €500–2,000/unit.
Applications:

- Greenhouses → compliance + cost savings.
- Aquaponics → lower purge, clearer water.
- Dairy farms → lower surcharges, sludge disposal savings.



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OliQuell™: Low-cost, plug-and-play water polishing for farms — compliance, reuse, and cost savings.

OLIQUELL™: COVERING >90% OF JAPAN'S WASTEWATER BURDEN VS. AOP'S PFAS NICHE

- **OliQuell covers >90% of Japan's wastewater load (COD, turbidity, metals, gases, APIs).**
- **AOP covers <1% niche (PFAS, lab scale only).**
- **OliQuell is cheap, fast, plug-and-play (6–8 weeks vs 6–12 months).**
- **OPEX is near zero vs very high.**
- **No toxic by-products vs AOP residues.**
- **Hybrid-ready: OliQuell front-end + compact AOP polishing = best of both.**

CATEGORY	OLIQUELL™ (FIELD & LAB DATA)	AOP / MICROBUBBLE (LAB & COMMERCIAL DATA)
COD / Organics	↓41–50% COD (Hydrolab21, IMDEA)	↓80–90% COD removal (UV/O_3/H_2O_2, high energy)
Turbidity / TSS	↓74% (Cajamar, L'Oréal pilots); visible clarification	Not a primary target; requires pre-filtration
Metals	Cr 4.02 mg/g; Cu 3.99 mg/g; Pb/Zn ↓20–54% (Hydrolab21, IMDEA)	Not targeted; metals persist
Dyes / Colorants	↓68% Reactive Black 5 (IMDEA); precipitation of methylene blue	↓90–95% methylene blue (lab-only, controlled feeds)
APIs	100% NSAIDs (Ibuprofen, Diclofenac, Paracetamol); 100% Antibiotics (Amoxicillin, Tetracycline, Ciprofloxacin, Sulfamethoxazole); 100% β-blockers (Atenolol); partial Fluoxetine (25–50%); poor Carbamazepine (10–25%)	Partial oxidation; leaves toxic intermediates; poor for neutral APIs
CH_4 / H_2S	↓84% methane; ↓81% H_2S (biogas, wastewater pilots)	Not applicable; AOP does not address gas suppression
CO_2 / VOCs	↓22% CO_2; +18.5% O_2 in EV/HVAC filters (Volvo, Zeekr pilots)	Not applicable; no effect on CO_2 or VOCs
PFAS	No direct degradation; **hybrid-ready** with Axine (99.99%) / Aclarity (90–99.9%)	PFOA ↓12,000×, PFOS ↓48× (lab data only, no field deployment)
Nutrients	Preserves NO_3^-, PO_4^{3-} (Cajamar agri pilots)	Oxidizes/degrades nutrients — bad for agri reuse
Energy	0 — passive, plug-and-play	High — UV lamps, ozone, cavitation chambers
Deployment	Cartridges, bags, sponges; **6–8 weeks** to deploy	Heavy skid (UV/O_3 reactors); **6–12 months** install, permits needed
CAPEX	€500–2,000/unit (~¥70K–300K)	¥12M–35M ($80K–200K) per skid
OPEX	Near zero; compostable cartridges; no chemicals	High: power, lamp replacement, sludge disposal
By-products	Compostable media; no toxic residues	Residual ozone, H_2O_2; risk of bromate & aldehydes; sludge in some configs

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VEOS PHARMA: LEADERSHIP IN NATURE-BASED INNOVATION WITH EXPERIENCE IN JAPAN

WHO WE ARE

- Spanish biotech-led cleantech company scaling circular water, air & soil purification
- Commercial-scale output (powder, cartridges, sponges) validated in Spain, France, Sweden, Switzerland, USA, China, KenyaTier-1 pilots with USBR (USA), PepsiCo, Nestlé (Switzerland), Zeekr (China), Volvo (Sweden), Tencent CarbonX (Kenya), L'Oréal (France), IMDEA Water (Spain)
- 3,750+ DTC & B2B users across EU, North America & Africa in water reuse, biogas, HVAC/EV filters, cosmetics & agriculture
- Founder-funded, profitable in 2024, delivering 112% YoY CAGR
- Led by biotech entrepreneurs with 3 IPOs, 7 builds, and $1B+ in global partnerships

Dr. Bassam Damaj
President & CO-Founder

- Founded 7 companies, 3 IPOs, $1B+ in partnerships
- Raised $500M+ across US, EU & MENA
- Over 120 publications
- Former leadership at Pfizer, Genentech, Mitsubishi Tanabe

Collaborative history & multi-million dollar deals with respected companies such as Takeda, Novartis Japan, and ANGFA

- Deep expertise in biotech commercialization & climate health

World-Class Team with Deep Expertise in Biotech, Climate Science, Regulatory & Commercialization

Samira Wifak, MA, CB
CFO & CO-Founder

- CEO of R&D Healthcare ($80M+ Revenue)
- Experienced in scaling global biotech ventures
- Oversees Financial Strategy & Expansion

Vicente Oller, Eng.
Design/Materials

Specializing In Design And Material Optimization For Emissions Control

Max Sasanchyn, Eng.
Digital Growth & Sales Expert

- Scaled Veos Pharma's online market presence globally
- Led Amazon & D2C sales expansion strategies
- Expertise in digital GTM and commercialization

Dr. Mona Damaj
Head of Scientific Research

- Plant Biologist & AgriTech Expert
- Ph.D., Agri-Eng. Texas A&M, Université Laval, Canada
- 20+ Years in Biotech & Plant Genomics
- Led R&D for BioPropello™ & Crop Resilience Platform

Ysabell Fernando, RAC
Head of Regulatory Affairs

- 60+ Product Approvals Worldwide
- Regulatory Expert: GRAS, EFSA, Health Canada
- Experienced in environmental & agricultural approvals
- Guides global market entry strategy for Veos Pharma

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