TREATMENT OF LIQUID EFFLUENTS AND RECOVERY OF POLLUTANTS

SERVICES OFFERING

Access services to a wide range of pre-feasibility laboratory tools and industrial feasibility pilot tools for:

- Analysis and characterization of effluents and pollutants
- Treatment of liquid effluents, recovery of pollutants by biological and / or physicochemical means
- The characterization and treatment of solids and sludge associated with these treatments

Scale: from 0.1L to 1m³

EXPERTISES

Since 2020, in partnership with the SOLVAY group, AXEL'ONE has built the AdChem4 platform (Advanced Chemistry Pilot Plant) which enables the pooling of resources, pilot lines and skills in the fields of the characterization, treatment and recovery of pollutants. These resources, combined with expertise in the field of analysis and treatment of industrial effluents, make it possible to meet the challenges of the circular economy:

- Evaluate the feasibility of treatment and / or recovery of pollutants by laboratory tests (biological, physico-chemical treatments)
- Determine the industrial feasibility and the pre-sizing of the treatment processes

EQUIPMENTS

Biological treatment of effluents

- Biodegradability & Toxicity batch test for influent & sludge characterization (aerobic, anoxic, methanization)
- Wastewater treatment continuous tests (biological, chemical oxidation / biological) for COD, N, P & micropolluants removal
- Continuous laboratory feasibility pilots of biological treatments from qlq L to 10L with free and / or fixed biomass for different processes:

  Aerobic / Anoxic

  Activated sludge (reactor <5L; Flow <10 L / d)

  Membrane bioreactor (reactor <5L; Flow rate <10 L / d; membrane 100 cm2)

  MBBR (Moving Bed Bioreactor)

  Anaerobes: free biomass

Evapo-concentration

- Glass lab tool v.2L, 5 to 120 ° C, vacuum evaporation, batch operations

Adsorption of pollutants on carbon or other adsorbent material / Ion exchange

- Screening tests for adsorbents / resins and laboratory prefeasibility 250 mL
- Adsorption feasibility studies on columns (100mL - 10L), batch or continuous operation; temp 5 to 40 ° C
- Modeling of industrial technologies (Example: Simulated Moving Bed SMB)

Precipitation / Coagulation / Flocculation / Settling / Flotation:

- Jar tests from 0.3 to 1L; 5 to 40 ° C, Flottatest 200 mL 5 to 40 ° C in glass.
- Continuous pilots: reactor + decanter with sludge recirculation up to 5L / h, 200L, Reactor = 3.5 m x 1.55 m x 2.5 m (L x w x h) Decanter = 0.62 m x 0.62 m x 1.6 m (L x l x h)

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EQUIPMENTS

Advanced oxidation (AOP)

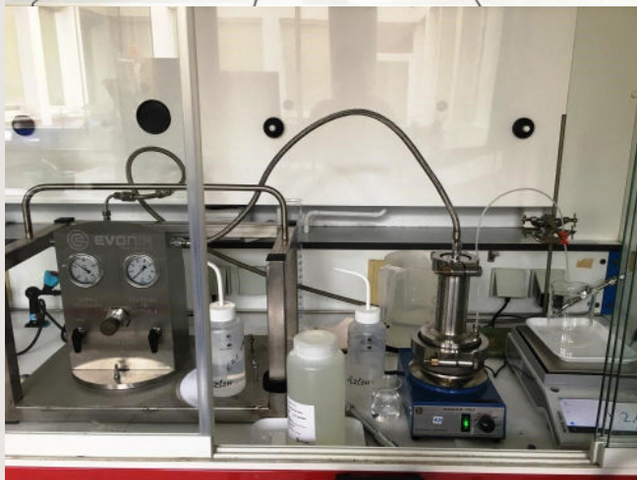
- Laboratory glass reactors from 1 to a few liters; 5 to 60 ° C: ozonation (O3), Fenton reaction (H2O2 / Fe), photo-oxidation (H2O2 / UV) and other advanced oxidations (H2O2 / O3 ...)

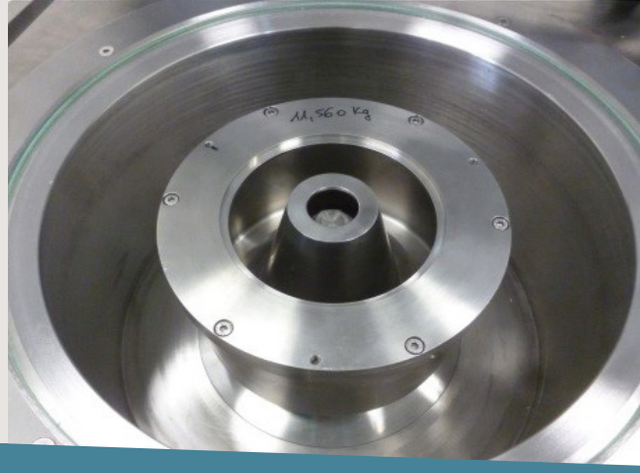
Filtrations :

- ***Screening tools:*** laboratory batch membrane filtration cells 200 to 350 mL (Amicon, Evonik cell: Ultrafiltration / nanofiltration / Reverse osmosis high pressure 30 bars)
- ***Laboratory pilots:*** Micro (MF), Ultra (UF), Nanofiltration (NF) Reverse osmosis
- ***Low Pressure*** (15 bars); v.15L; Temp 5-40 ° C; Tangential filtration Spiral membrane; batch or continuous (10 to 100 L / h)
- ***High Pressure*** (60 bars); v.20L; Temp 5-40 ° C; Spiral membrane, tubular, disctubes;
- Ultrafiltration / Reverse Osmosis with VSEP vibrating membranes; continuous operation from 5 to 150 L / h; 40 bars
- Conventional or bipolar membrane electrodialysis (Volume 2.5L; batch operation)
- Sand filter: 10l / h column; continuous operation

Conditioning / Dehydration of solids and sludge

- Sludge compressibility cell
- Lumisizer LS611 12 tubes of 2 mL, per sedimentation rate (up to 2300 G; 4300 rpm)
- Zetasizer NS 90 zetameter to determine particle size (DLS), zeta potential (M3 PALS) and molecular weight (SLS)
- Filter Choquenet type laboratory press, three 0.2 m2 trays; total 1 m2
- Siebtechnik 316L stainless steel Batch / Continuous Centrifugal Decanter, Bowl diameter 200mm, Maximum acceleration ~ 3200G (6000rpm), Nitrogen inerting





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NEW TOOLS AVAILABLE IN 2023

Pilot hall for effluent treatment

150m² pilot hall allowing the use of existing pilots for the study of toxic / unstable / odorous effluents

Technical characteristics :

- Management of large volumes and flows: Flow rates up to 50l / h, inlet volume 1m³
- Management on these volumes of CMR / odorous / stored effluents at Temp <5 ° C
- online analysis instrumentation for monitoring

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