



Irene Gonzalez Salgado : PhD

[www.linkedin.com/in/irenegsalgado](http://www.linkedin.com/in/irenegsalgado)

## Recovery of nitrogen and phosphorus from high strength effluents: urine and digestate.

Years: 2019-2021

### Background

Nowadays, technologies for nutrient recovery from wastewater bring the world's attention. A sustainable approach of wastewater management would be converting nitrogen and phosphorus into fertilizers for the agricultural sector and transform wastewater treatment plants into resource recovery units. Processes for phosphorus recovery as struvite have been largely studied by several authors. However, process with low energy demand for nitrogen recovery still needs to be developed.

Transmembrane chemisorption process (TMCS) is a new attractive technique for ammonia recovery. In this process, free ammonia gas ( $\text{NH}_3$ ) passes through a gas hydrophobic permeable membrane from the liquid stream to an acid solution in which ammonia is captured to produce an ammonium salt solution. TMCS process coupled to a crystallization step for phosphorus recovery will be study in the treatment and valorization of urine and the supernatants of the digestates from anaerobic digestion, effluents rich in ammonia and phosphorus.

### Objectives

The aim of this doctoral project is the experimental optimization of a process for the treatment and recovery of phosphorus and nitrogen to produce fertilizers. This work will make it possible to:

- Give insight the potential of transmembrane chemisorption process.
- Experimental optimization of processes for upgrading nitrogen and phosphorus based on the coupling of crystallization and membrane extraction (TMCS), applied either to urine or to digestates from anaerobic digestion.

### Methodology

- Management and analysis of the recovery of nitrogen and phosphorus on a laboratory and pilot scale.
- Application to the treatment of urine and digestate.
- Characterization of the composition of the fertilizers.

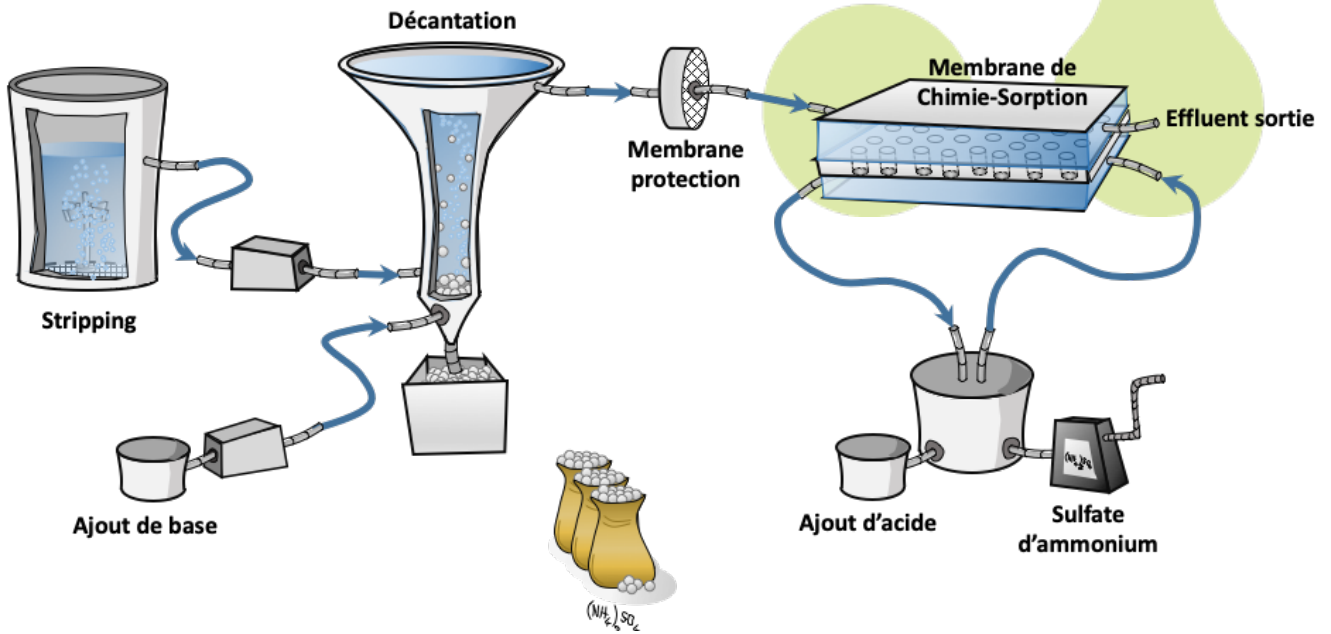
### Keywords

Recovery of nutrients, urine, digestate, transmembrane chemisorption

### Doctoral project integrated into projects:

- OMIX funded by ADEME
  - Partners: TBI, NEREUS and CLER VERTS
- DESIGN funded by the National Research Agency (ANR) ([www.design.cnrs.fr](http://www.design.cnrs.fr)) Project n ° 17-CE22-0017
  - Academic partners: TBI and LEESU (Water Environment and Urban Systems Laboratory)
  - Industrial partners: SOLAGRO, JPCoste, POLYMEM, Le Sommer Environnement

TMCS – Schéma détaillé



Source : *Matthieu Peyre-Lavigne*