

CASE STUDY TUBULAR MBR OF A PLANT IN ITALY

FOR DIGESTATE TREATMENT

- LOCATION: **NORTH ITALY**
- YEAR: **2018**
- GOAL: **WASTEWATER TO BE DISCHARGED TO SURFACE WATER**

- WATER'S QUALITY REQUESTED:
 - **COD < 80PPM**
 - **TOTAL NITROGEN < 15,0 PPM**
 - **AMMONIA < 5,0 PPM**

- TYPES OF MEMBRANES
TUBULAR PVDF ULTRAFILTRATION MEMBRANE

- WATER INPUT: **150 TON/DAY**
- WATER OUTPUT: **126.5 TON/DAY**
- TO DATE:
 - **NO MAINTENANCE AND NO SPARE PARTS**
 - **LOW MANAGEMENT COSTS**

The case study addresses the digestate treatment process in a biogas plant located in north Italy, where the MBR process is applied. Figure 3 below details the flow sheet and mass balance applied on this site.

The solid-liquid separation

is performed in a decanter: 75-80% of the phosphorus and 15-20% of the nitrogen are recovered in the solid fraction. The liquid fraction is a clarified solution with an average of 0.5% suspended solids (SS) and 1.0-1.5% total solids (TS) concentrations.

This stream is fed to the MBR where the liquid fraction is pre-treated generating only a UF permeate stream and a surplus sludge stream that can be recirculated at the AD inlet or the sludge dewatering unit. The UF permeate does not contain suspended solids and it has a modified chemical characterization: this allows a subsequent membrane concentration stage with minimized chemicals and energy consumption and with a high recovery.



FIGURE 2. EXTERNAL MBR: UF SYSTEM WITH BERGHOF MEMBRANES MODULES

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The aerobic-anoxic bioreactor has also the advantage to operate with a biological mixed liquor with stable characteristics and with a better filterability than the raw digestate

(lower energy costs for the separation process). If useful, a further membrane-based super-concentration stage can also be applied. In the end, with this process approach the customer can

obtain the goal to have only a minimized solid fraction obtained with a minimum or nil evaporation process - so with a very low energy cost - and a purified reusable or dischargeable water stream.

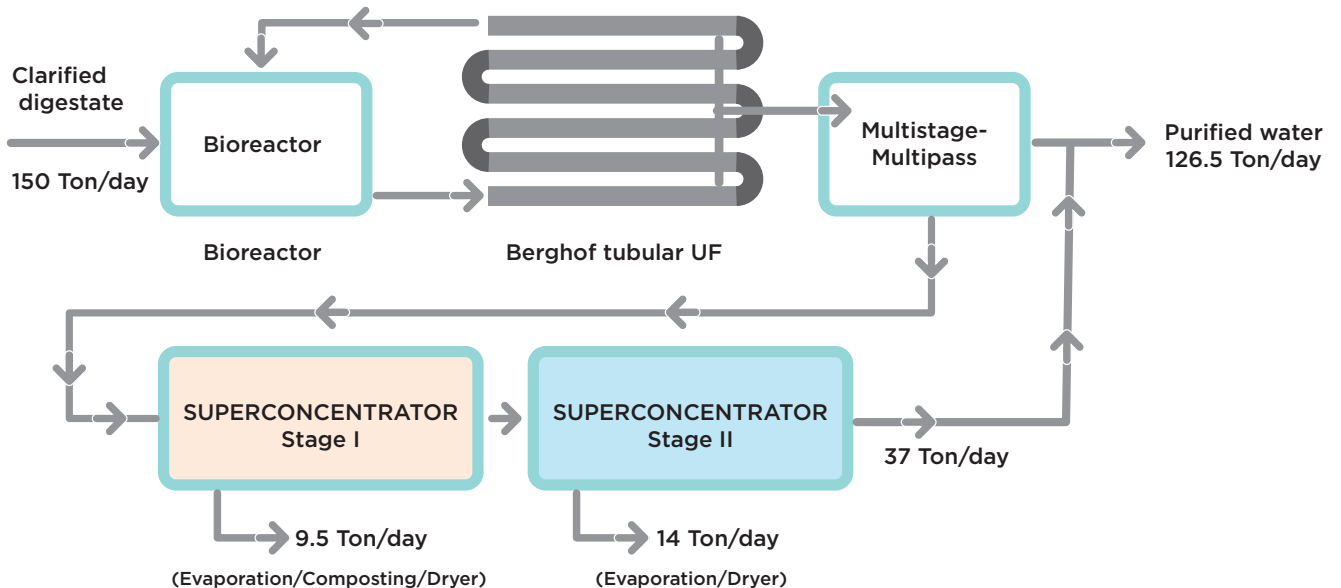


FIGURE 3. FLOW SHEET AND MASS BALANCES OF THE DIGESTATE TREATMENT PROCESS.



Hydrotech Engineering would like to thank Berghof Membranes for being a trusted partner for this project and for sharing information for this white paper.



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Hydrotech Engineering realizes turn-key water treatment plants for the treatment of process and waste waters utilizing the most advanced semi-permeable membrane and biological technologies for water recycling and reuse.

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