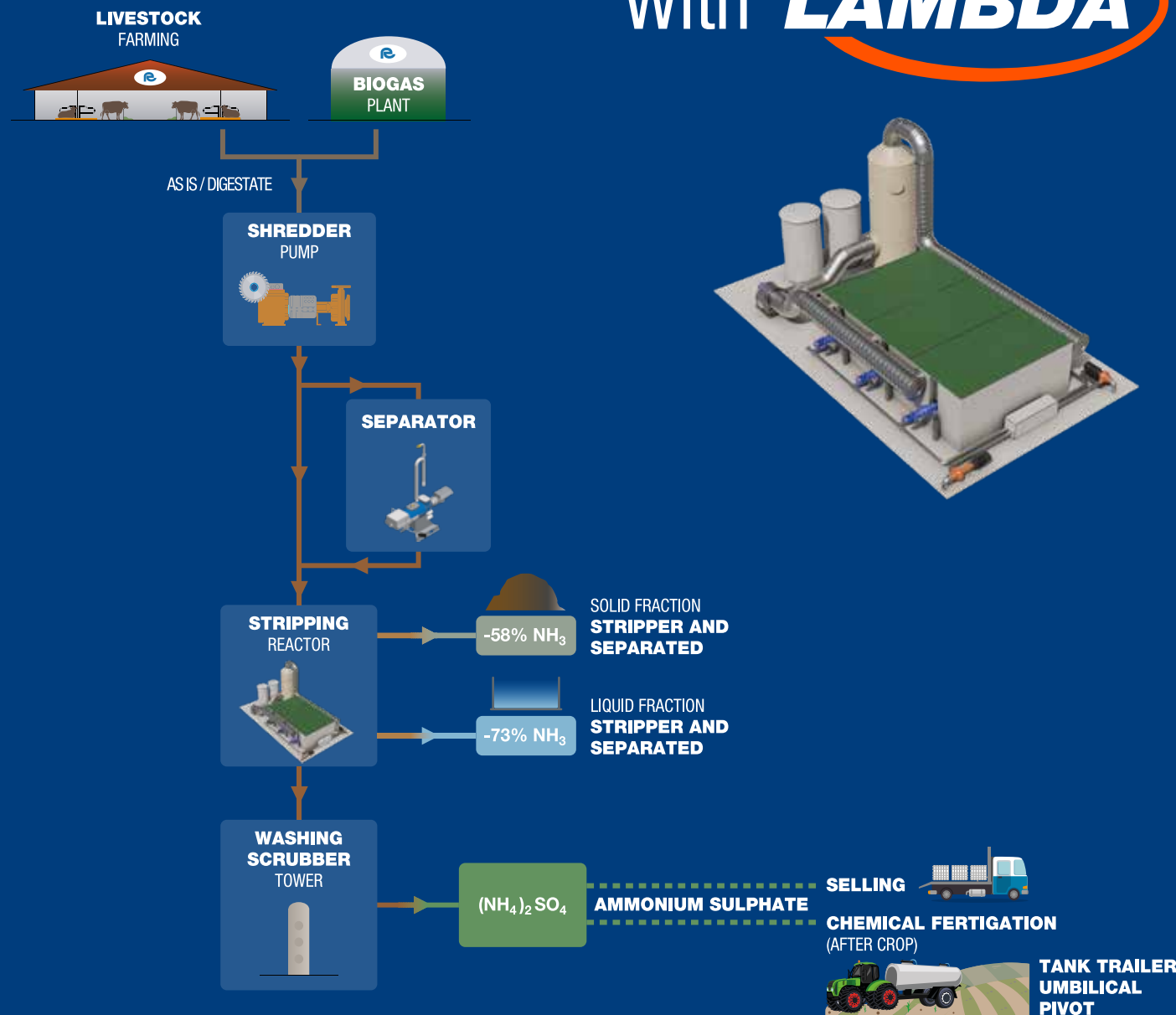


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With **LAMBDA**



Because the **EARTH** can worth more.

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Here's the **solution** to **NITROGEN**

An Efficient And Innovative Cycle For The Sustainable Management Of Livestock Manure And Biogas/biomethane Digestate!



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NITROGEN extraction and recovery plant

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NITROGEN extraction and recovery plant

LAMBDA

In sewage, nitrogen is primarily present in the forms of ammonia (NH_3) and ammonium ion (NH_4), which are in equilibrium with each other along with organic nitrogen, including proteins and nitrogen and carbon-based compounds, which are biologically degraded into the more reduced forms of nitrogen (NH_3 and NH_4). The sum of organic nitrogen, the ammonium ion and ammonia determines the total nitrogen (N_{tot}).

Ammonia is a gaseous compound at room temperature which becomes ammonium ion in water; the equilibrium between the two forms is unstable and they are in continuous transformation.

Stripping is a method to remove nitrogen from an aqueous solution through various measures that volatilize nitrogen in the form of ammonia and separate it.

The stripping process is enhanced by temperature, the pH of the solution and the contact surface between lap air flow and the liquid. The higher these values, the greater the nitrogen stripping will be.

HOW DOES IT WORK?

The digestate as is or the separated slurry are placed in a reactor in strict contact (through surface lamination) with the recycled air process.

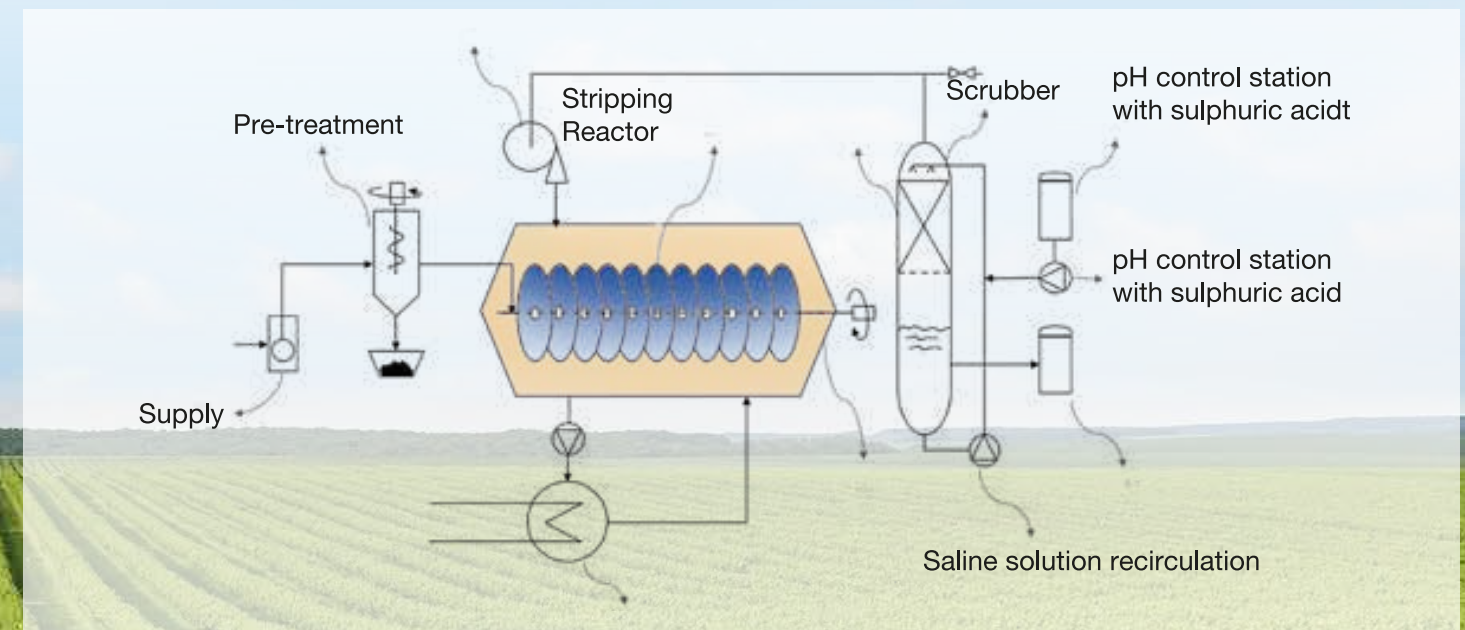
Ammonia is captured by the air stream and is released from the digestate. The air then passes through a countercurrent salification column with an acidic solution forming a recoverable ammonium salt.

PLANT STRUCTURE

The described stripping plant aims to **reduce the amount of nitrogen (N)** in the sewage without altering its chemical composition. It is **economically sustainable** because it primarily uses sulfuric acid to convert ammonia (NH_3) into ammonium sulphate, as well as electrical energy to power various components such as pumps, reducers and an air blower. The blower generates an air flow that passes over wet surfaces, thanks to heated sewage, volatilizing the ammonia. The ammonia-laden air is then 'scrubbed' in a washing tower where the ammonia is converted into ammonium sulphate. **The plant produces no waste**: the treated sewage is suitable for agricultural use and **the ammonium sulphate produced can be used for fertigation**. Finally, the plant is user-friendly, controlled by a PLC and equipped with various sensors and thermostats to automatically monitor and control processes.

"LAMBDA" PLANT ADVANTAGES

The plant operates with minimal consumption: both in terms of reduced electricity consumption and the exclusive use of sulfuric acid. The produced ammonium sulphate solution is of high purity, free from impurities and contaminants, making it suitable for agricultural applications or for market sale. The plant's interface, managed via a PLC, allows an intuitive and precise programming, enabling adjustments to retention times and treatment temperatures. Moreover, the plant ensures effective management and reduction of emissions.



Ntot removal data from digestate

TO mg/kg tq		24h T1 mg/kg tq	% removal
NH_4	2.300	610	73,48%

