

Circular Agronomics Tech Study

Application of membranes for acid whey management

Valorization of acid whey

Acid whey treatment before its application to the agricultural field

The activity creates new business potential by valorisation of food waste via its processing into the agricultural field. Acid whey, i.e. waste product from cottage cheese and cream cheese production is processed (mechanical pre-treatment, thickening and conservation) before it is placed into the soil to increase the missing level of carbon there. Farmers could use acid whey to enrich their soil not only by carbon, but also by nutrients (nitrogen, phosphorus and potassium). It can create a win-win scenario between dairy industry producers and farmers to create a market with this commodity.

Electrospun nanofibrous membranes are a proper alternative of recently used flat-sheet, tubular or ceramic membranes in the area of separation processes, e.g. filtration, mechanical pre-treatment, thickening, etc. The unique technology of electro-

spinning production of nanofibrous membranes produces membranes with holes up to 200 - 400 nanometers to ensure efficient separation of media. Membranes can be used as alternative of centrifuge in the acid whey management to remove fats from acid whey before its thickening.

Nanofiltration is a proper technology for acid whey thickening due to membrane pore size. Acid whey is thickened up to 18% TSS to receive concentrated output for farmers to apply it to the agricultural field.

In the scope of Circular Agronomics, a pilot plant with a capacity of 2.5 m³/h has been operated to evaluate its performance. After treatment, the product has the following composition: TSS = 18%, TC = 7.4%, TN = 0.2%, TP = 1.9 g/kg, TK = 1.7 g/kg and N-NH₄ = 200 mg/L

Technological data ENM module

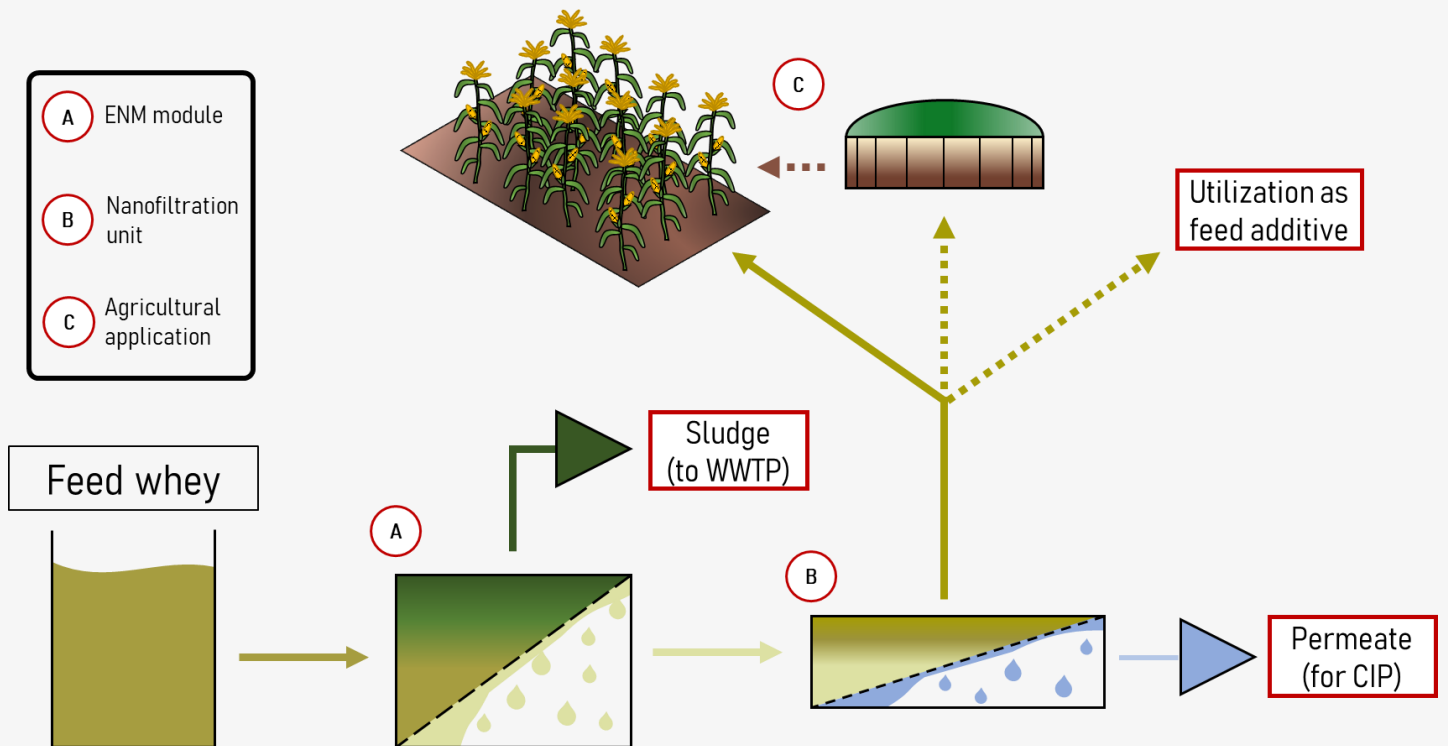
Membrane plates	23 pcs
Membrane area	8 m ²
Nominal flux	15 - 40 LMH
Maximum flux	60 LMH
Membrane material	PVDF
Pore size	200 - 400 nm
Filtration pressure	0.05 - 0.4 bar

Technological data NF module

Membrane plates	1 pcs
Membrane area	7.8 m ²
Maximum pressure	25 bar
Feed flow	0.5 - 2.5 m ³ /h
Operating pH	1.8 - 11.2
Filtration pressure	up to 25 bar
Maximum temperature	50 °C



Acid whey treatment before its application to the agricultural field



Unique Selling Points



- ➡ Valorization of acid whey as soil conditioner
- ➡ Application of membrane treatment train for efficient acid whey management
- ➡ Electrospun nanofibrous membranes applicable also for efficient digestate thickening