



TECHNOLOGY FACT SHEET

Liquid-solid separation

Decanter Centrifuge

A decanter centrifuge consists of a closed cylinder that rotates. Due to centrifugal forces, the heavy, undissolved particles like colloids, organic components and salts are propelled to the outside of the spinning centrifugal bowl, where they are collected on the screw conveyor.

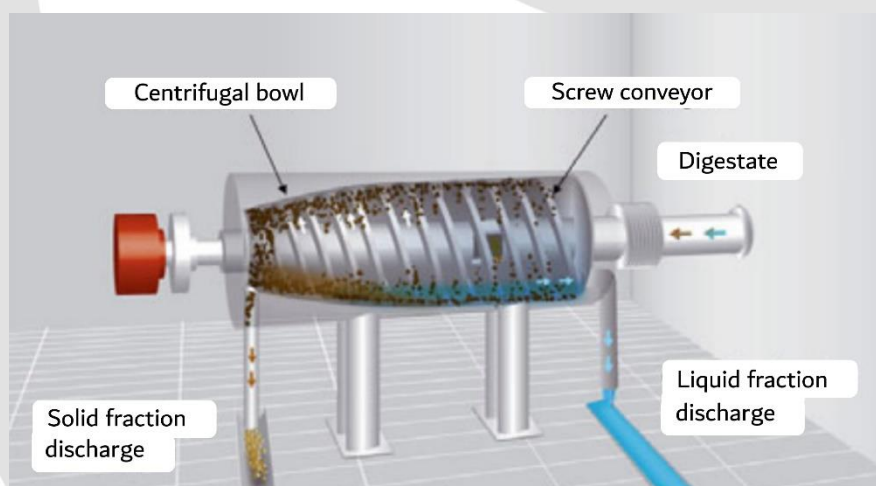
The liquid phase is transported to the other end of the centrifuge by rotating the cylinder at high speed and by simultaneously rotating the conveyor at a speed that differs slightly from the speed of the bowl.

The solid particles and the liquid fraction are collected at separate outlets.



Horizontal decanter centrifuge Source: (Gorissen and Snauwaert 2018)

Centrifuges are available in different capacities. The smallest centrifuges can treat around 1 m³/h but an average centrifuge for digestate treatment is between 8-30 m³/h. To obtain larger capacities, larger centrifuges are available (up to 90m³/h) or multiple centrifuges can be put in parallel (Lemmens et al. 2020).



Scheme of a decanter centrifuge, source: adapted from (Hjorth et al. 2010)

Read more about the separation efficiencies, use of additives, energy requirements and costs in Chapter 2.2.1.1 of D 3.2 [Final report on schemes and scenario's for nutrient recovery and Reuse](#).

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Screw press

A screw press (or screw press filter or press auger) is a machine in which a large screw rotates within a cylindrical screen with 0.1-1 mm holes.

The liquid fraction is physically separated from the rest of the digestate through these perforations and is collected in a container surrounding the screen. Separation is therefore based on particle size.

The screw provides a gradual increase in pressure and at the end of the axle the solid fraction will be pressed against the plate and more liquid is pressed out. The solid fraction is retained by this plate and goes out through an outlet pipe.



Screw press. Source: (Gorissen and Snauwaert 2018)

The separation efficiency can be adapted by the counter pressure of the outlet opening. Typical capacities of screw presses are around 2-15 m³/h (Lemmens et al. 2020; Postma et al. 2012).

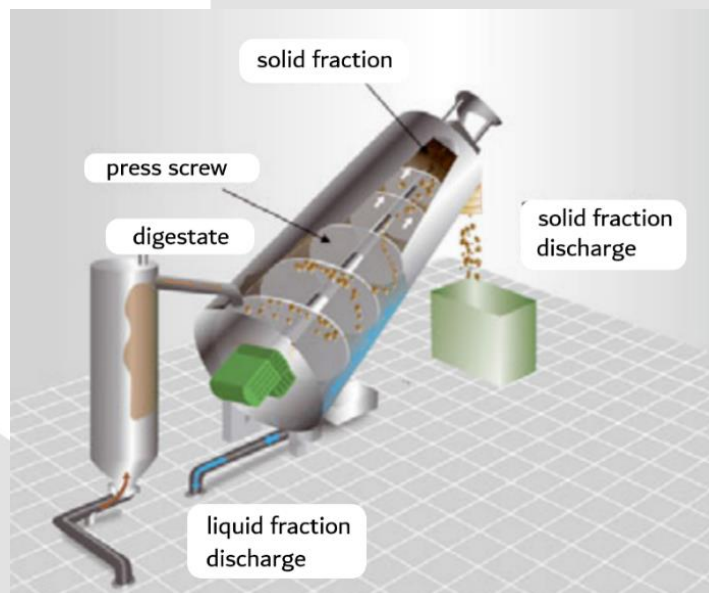


Figure 0-1 Scheme of a screw press, source: adapted from (Hjorth et al. 2010)

Read more about the separation efficiencies, use of additives, energy requirements and costs in Chapter 2.2.1.2 of D 3.2 [Final report on schemes and scenario's for nutrient recovery and Reuse](#).

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Belt press

A belt press consists of two water-permeable belts guided over several rolls. The belts are pressed against each other over a certain length. This way shear forces and mechanical pressure are generated between two belts to de-water the digestate.

The process typically consists of three stages; gravity, low pressure and high pressure.

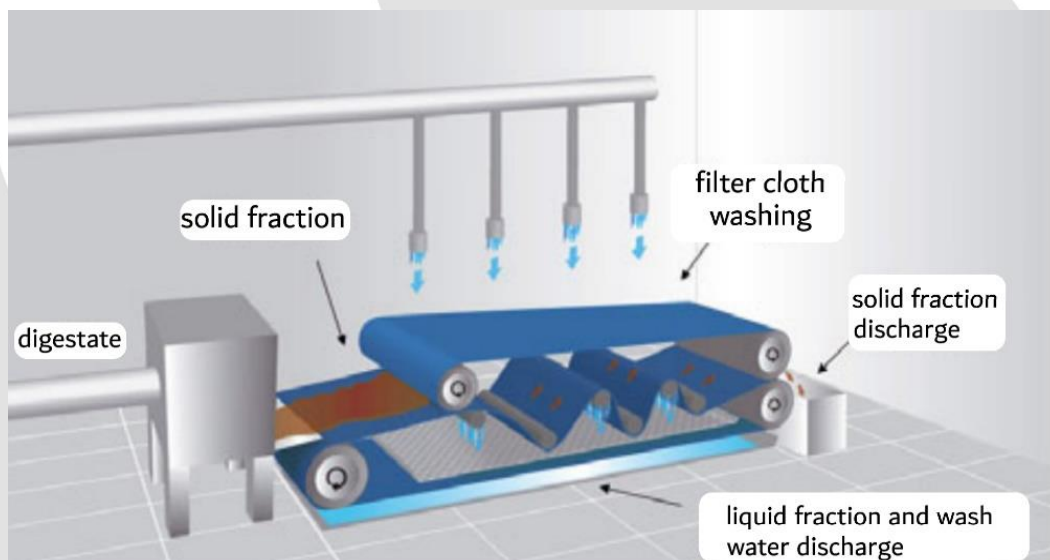
The digestate is fed between the two belts where the water is first removed via gravity.

In the second section, pressure is applied as the belts pass through a series of rollers and the water is pressed out under increasing pressure. The final de-watered solid fraction or "cake" is removed from the belts by scraper blades.

Belt presses can treat on average 2-40 m³/h. (Postma et al. 2012).



Belt press. Source: VP-Hobe, installed at BioStorg Biogas Plant, Houthalen-Helchteren, Belgium, 2019.



Scheme of a belt press, source: adapted from (Hjorth et al. 2010)

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