



**Technical solutions that make
the circular economy possible.**



main target Groups:

Slurry and biomass on biogas plants and agriculture

Reprocessing of organic residues

Separation and treatment of industrial residues

main suppliers



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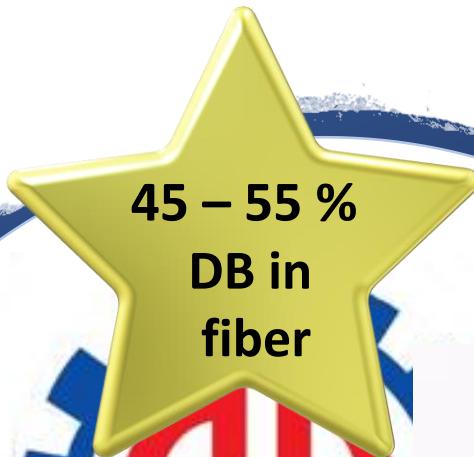


Malaysia based company with > 25 years of experience from the palm oil industry.

Twin Screw Press *presses almost everything*

- Metal and plastic cans / bottles
- Inorganic and organic residues
- Tetrapak
- Grass
- Slurry / biomass



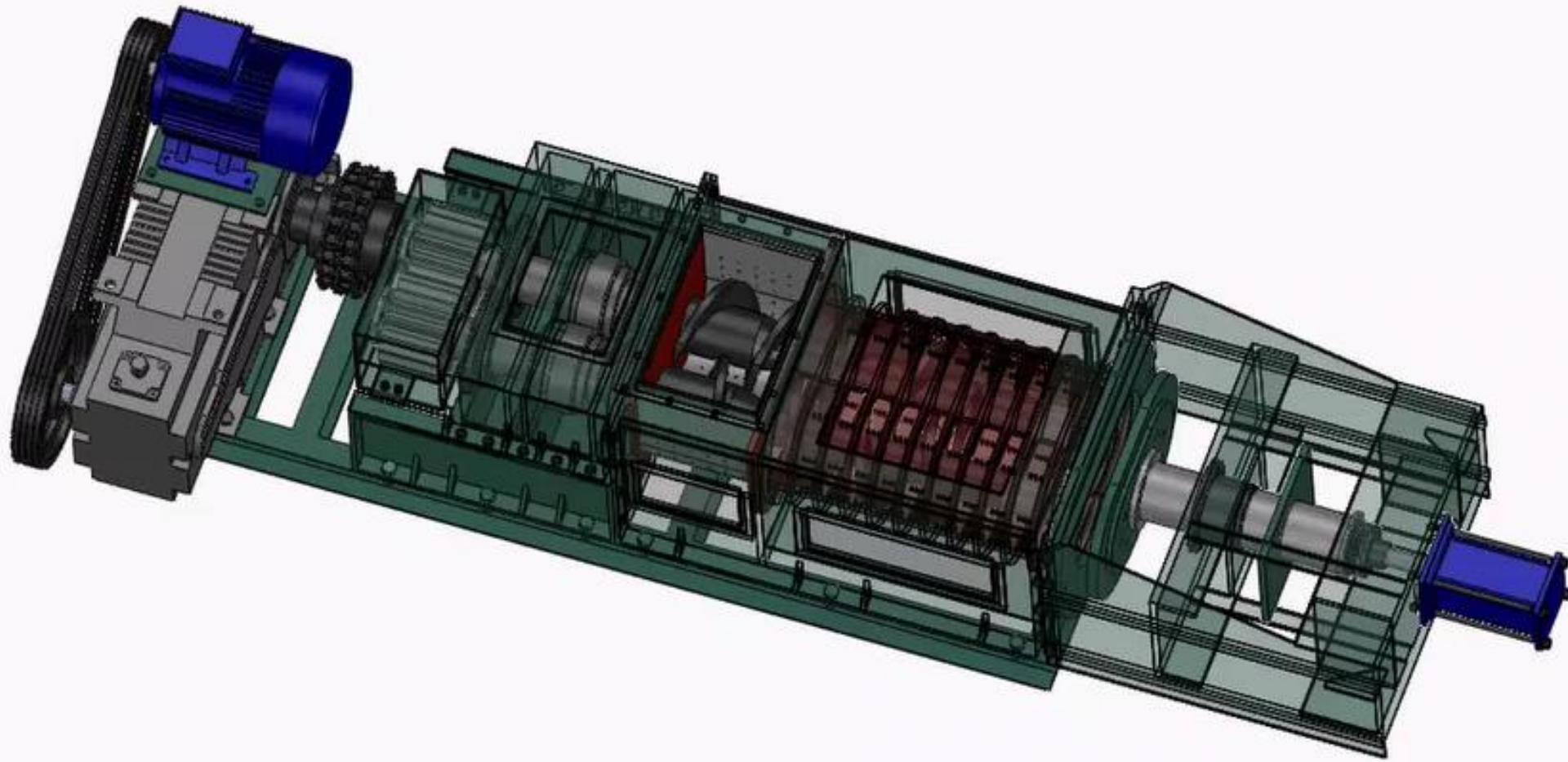


GS Supp

*Malaysia based company
experience from the palm oil*

Twin Screw Press

*2 screws twist, tear and press
the material*





45 – 55 %
DM in
fiber

Twin Screw Press

2 step pressing of biomass



*Malaysia based company
experience from the palm oil*



GS Supply

Malaysia based company with > 25 years of experience from the palm oil industry

Vibro Screen



Circular vibrating screen 100-900 my filter





GS Supply

Malaysia based company with > 25 years experience from the palm oil industry

Vibro Screen

Reject from screw press



Innovative machines For slurry, biomass and waste

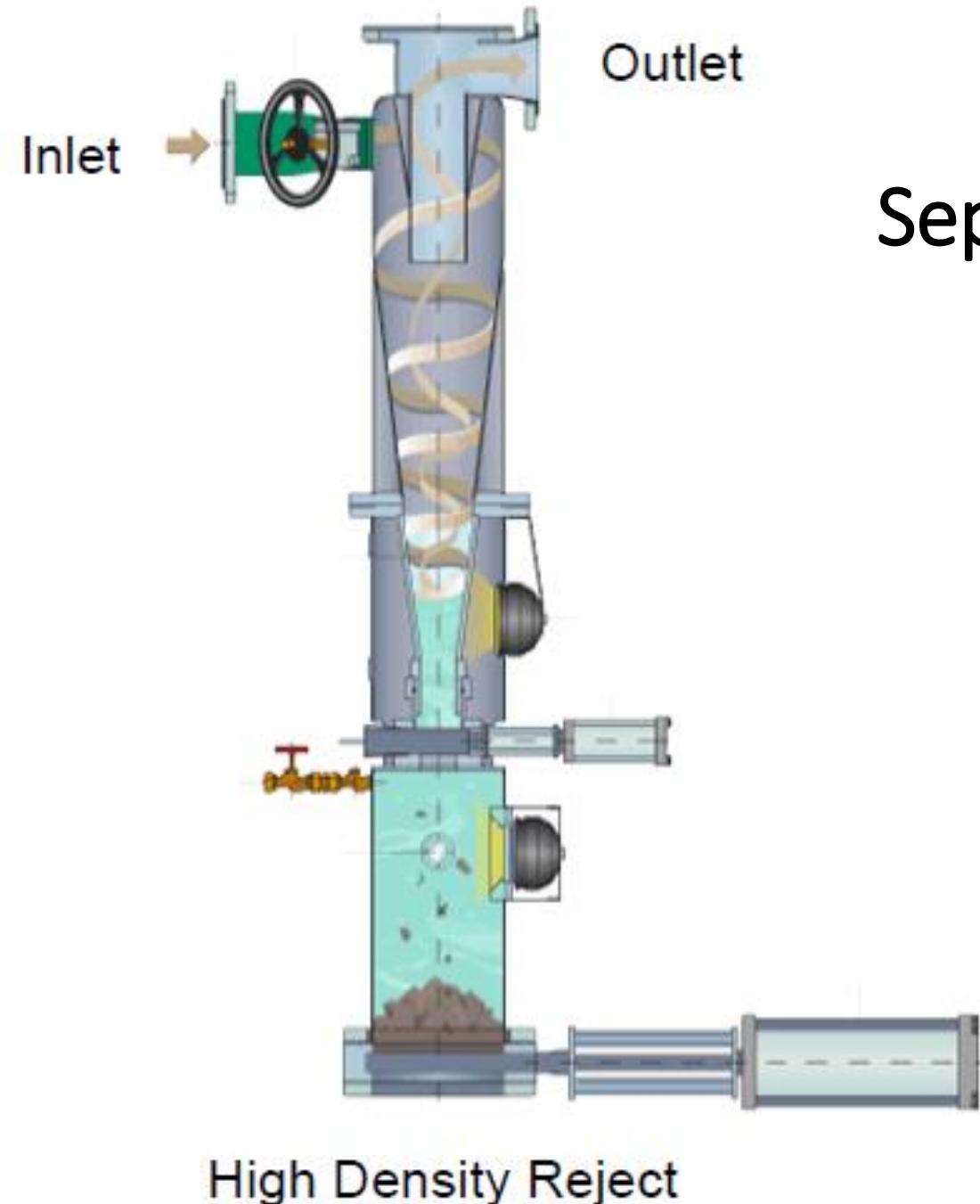
- Hydro cyclone for sand and heavy phase separation, used for slurry, biomass, org. residues
- Deflaker for crushing of the fiber in pumpable media
- Reject separator, for sorting plastic out of biomass
- Pulps, for unpacking and homogenizing organic residues
- **A common feature of these machines is that they work best at 8-14% solids in the media.**



Swedish company with > 100 years of experience primarily from the paper industry.

Separation of sand/ glass

- Hydro cyclone for sand and heavy phase separation, used for slurry, biomass, org. residues
- **Works best at 7-9% dry matter.**



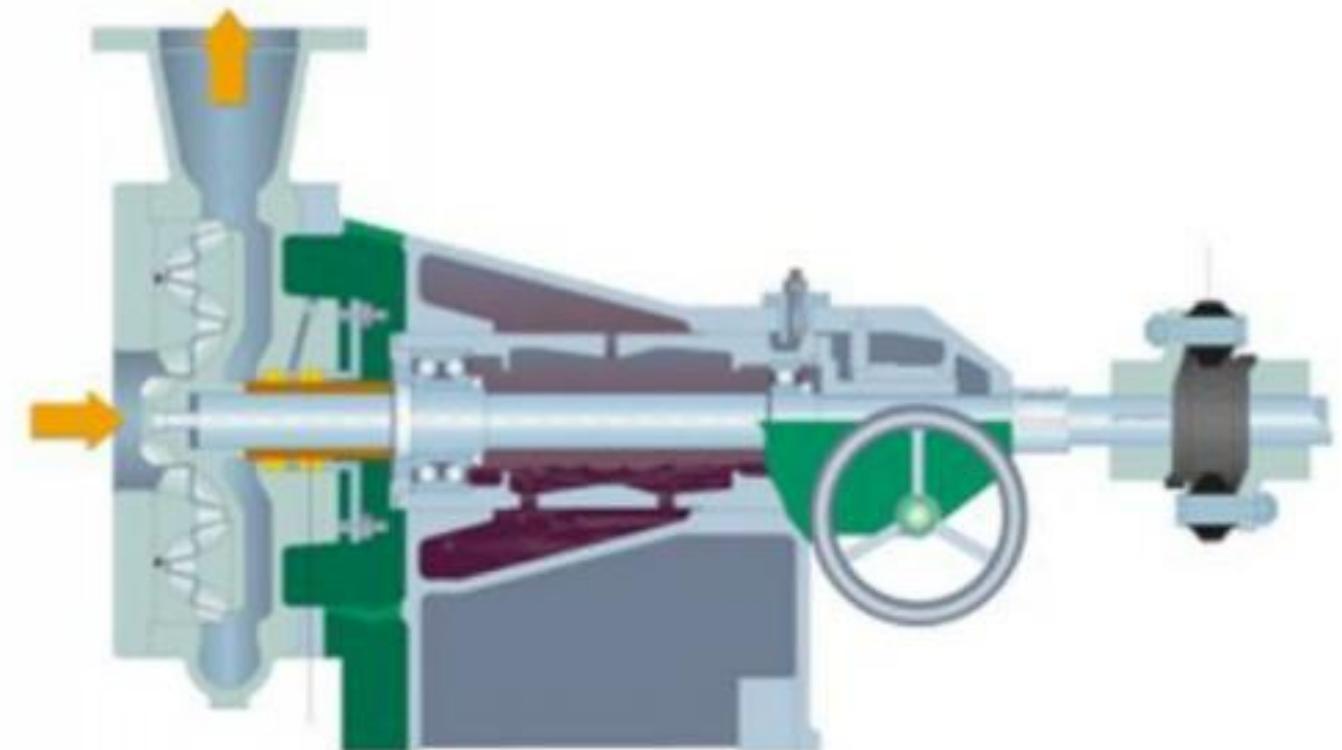


Removal of sand and glass with High Density Cleaner



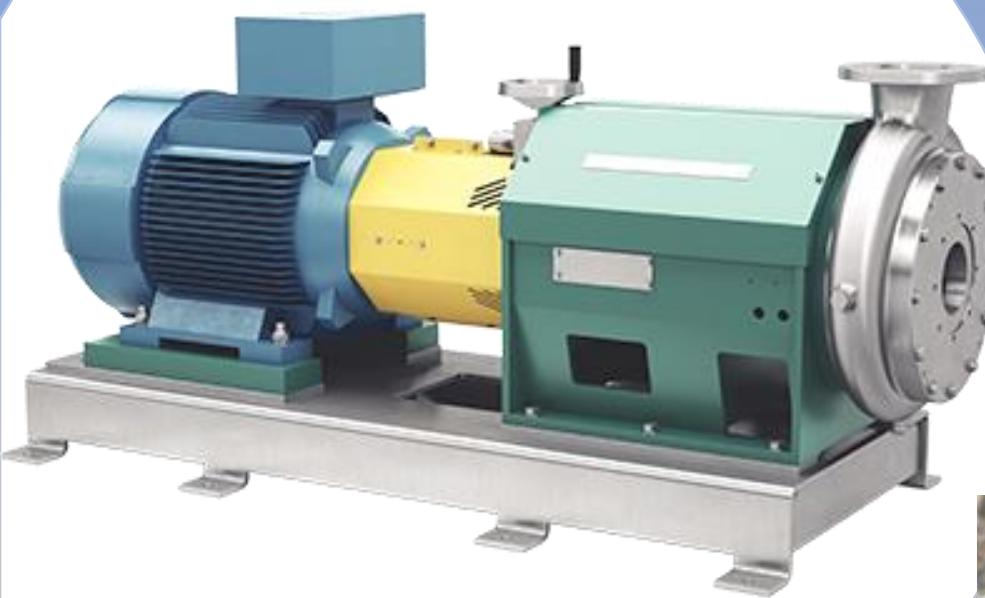
Grubens Deflaker

- For comminuting fibers in liquid biomass
- The fibers are torn apart = larger surface
- Minimizes floating layer problems in the reactor.
- Handles liquid biomass > 50 m³ per hour.



Svensk virksomhed med >100 års erfaring
fra primært papir industrien.

Grubens Deflaker



GL300 ca. 70 m³/h

- After 1 year at Solrød biogas,
16% increased gas yield is achieved

Før behandling



Efter behandling

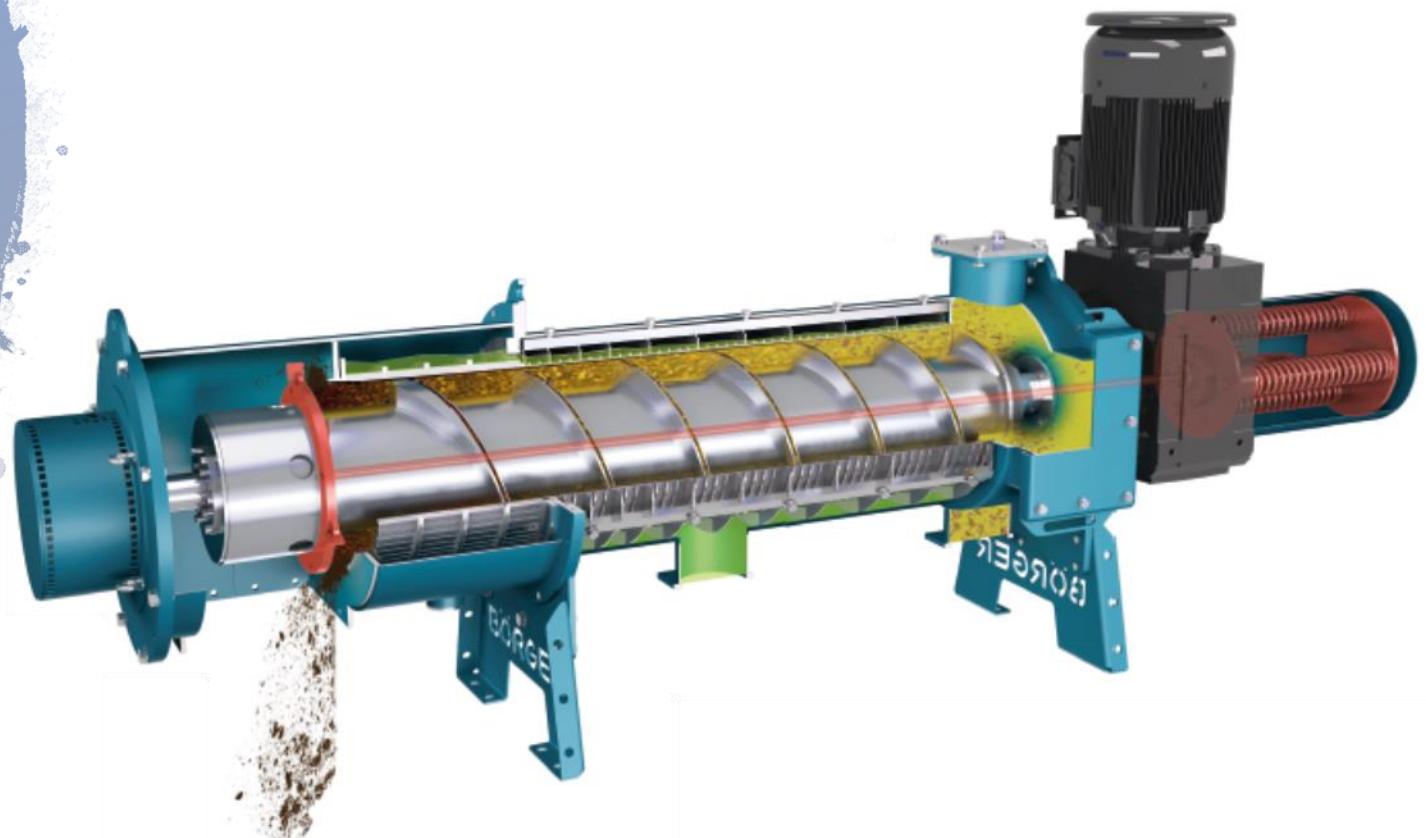


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*German company with > 50 years
experience from Industry, agriculture and
biogas.*

Separation

- Bioselect RC separator 4 sizes 15 - 150 m³ / h
 - up to 35% DM



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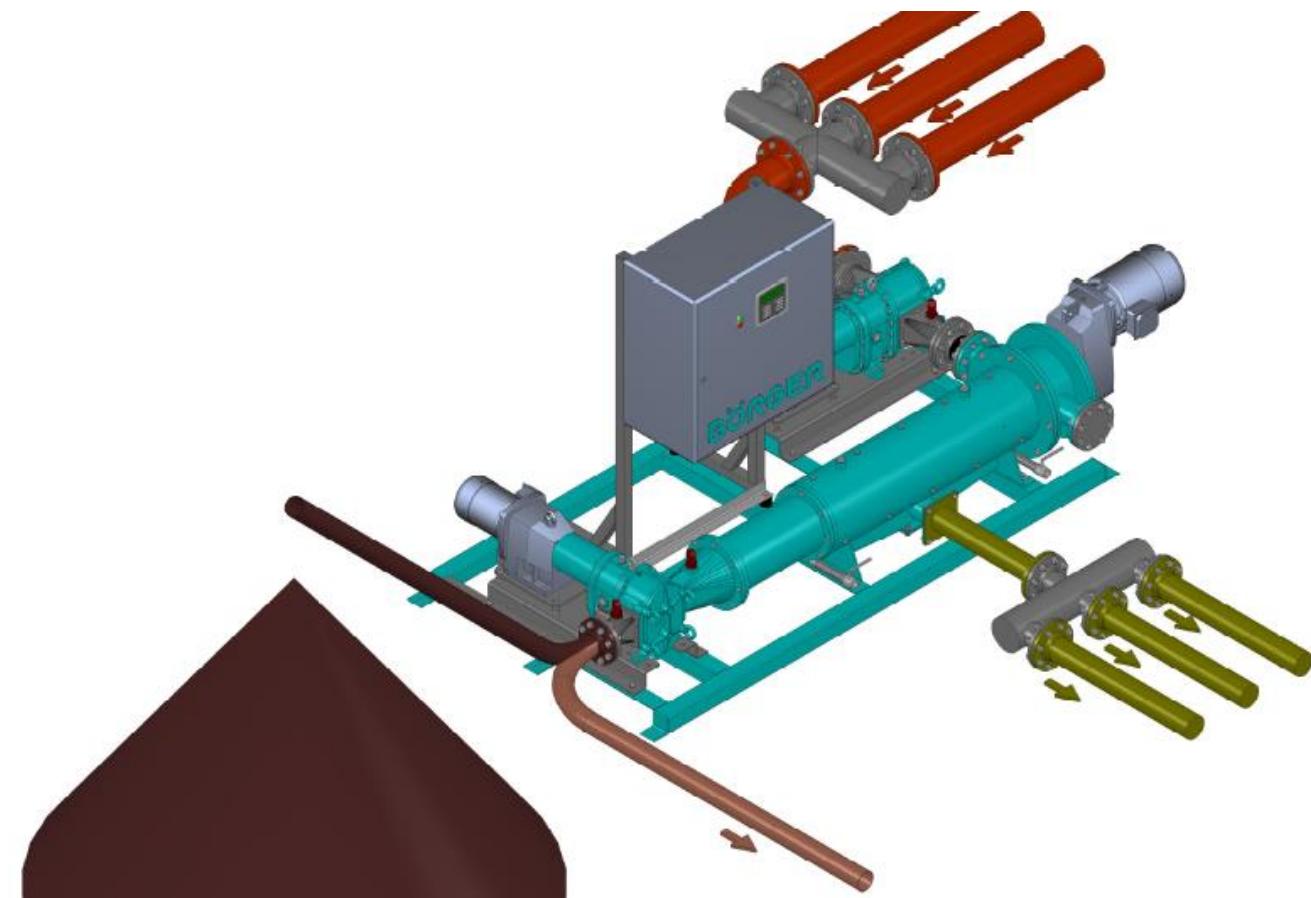
BS Separation

Closed and inline system

Bioselect BS thickens 3 sizes 30 - 120 m³ / h

stepless adjustable dry matter up to 22% pumpable fiber

Increases organic dry matter content in fiber



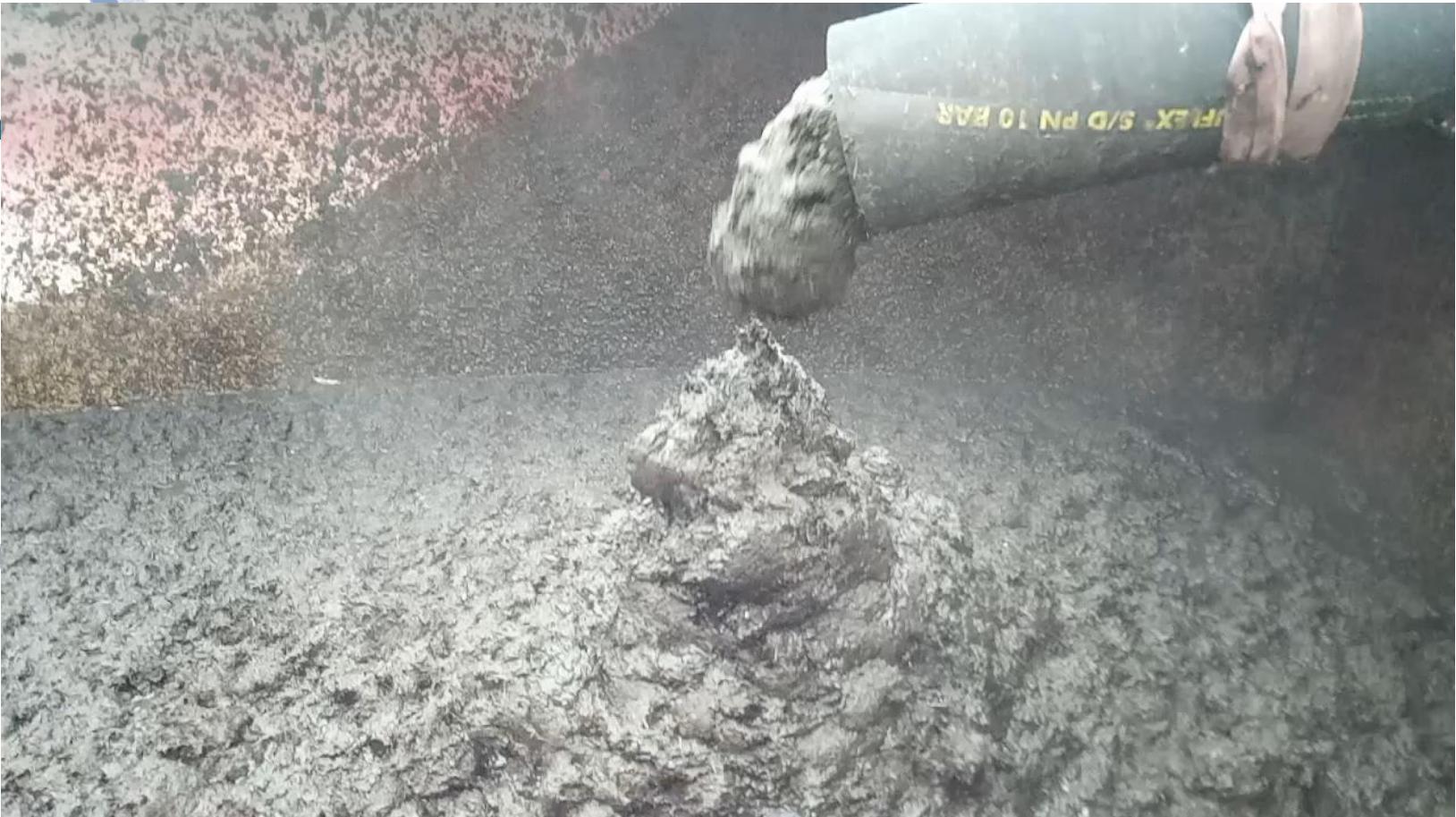
BS thickener



- Degassed biomass is thickened from 6 to 9 - 12 % DM.
- Organic D.M. increases from 50-60 % in the biomass to 90 - 95% in the fiber

BÖRGER

*German company with > 50 years
experience from Industry, agriculture and
biogas.*





*Swedish company with > 30 years
experience from municipal wastewater
treatment plants and industries.*

Dekanter

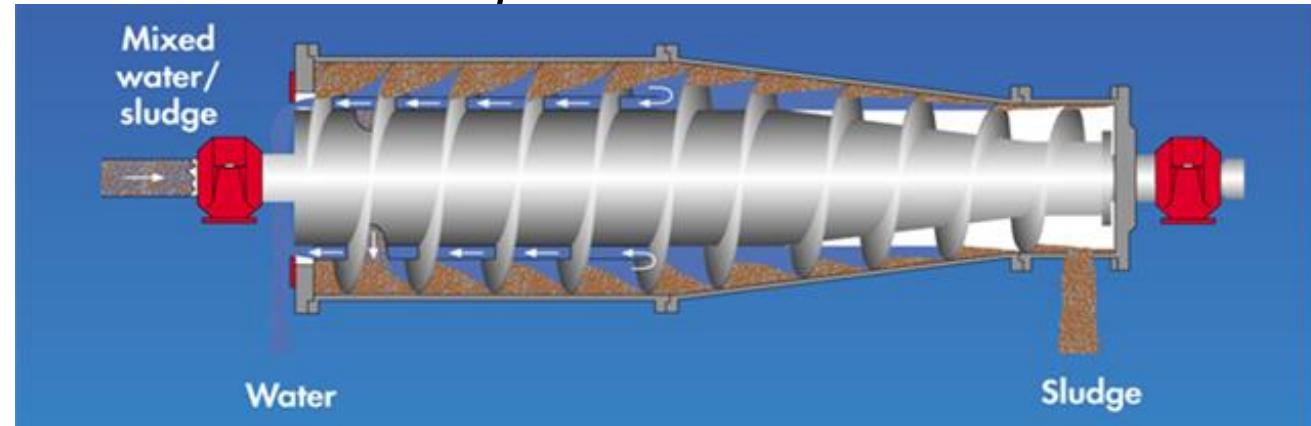
- Capacity 1 - 75 m³ / h
- 10-year service agreement with fixed price



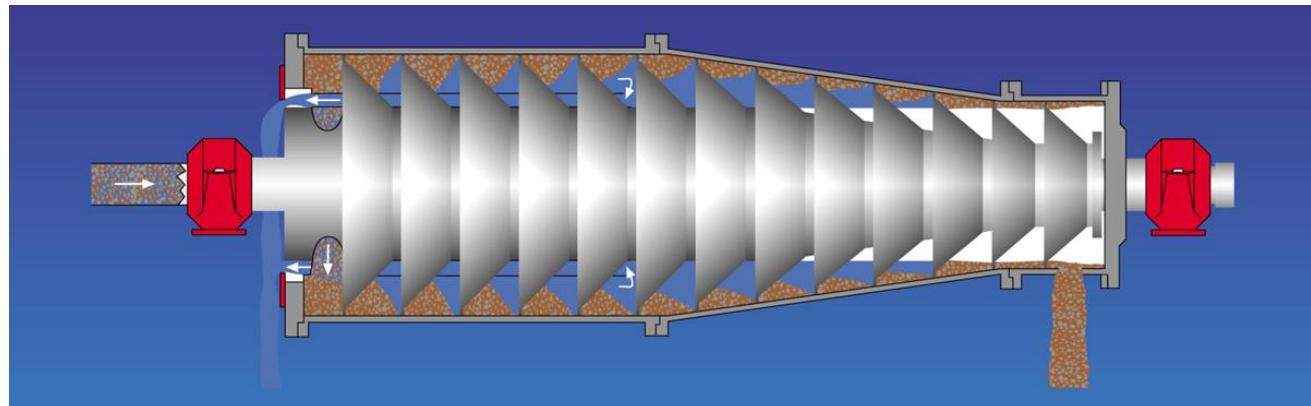
Lamella design



- Larger surface - more efficient separation
- *Traditional built-up screw*



- *Lamella design*



NOXON

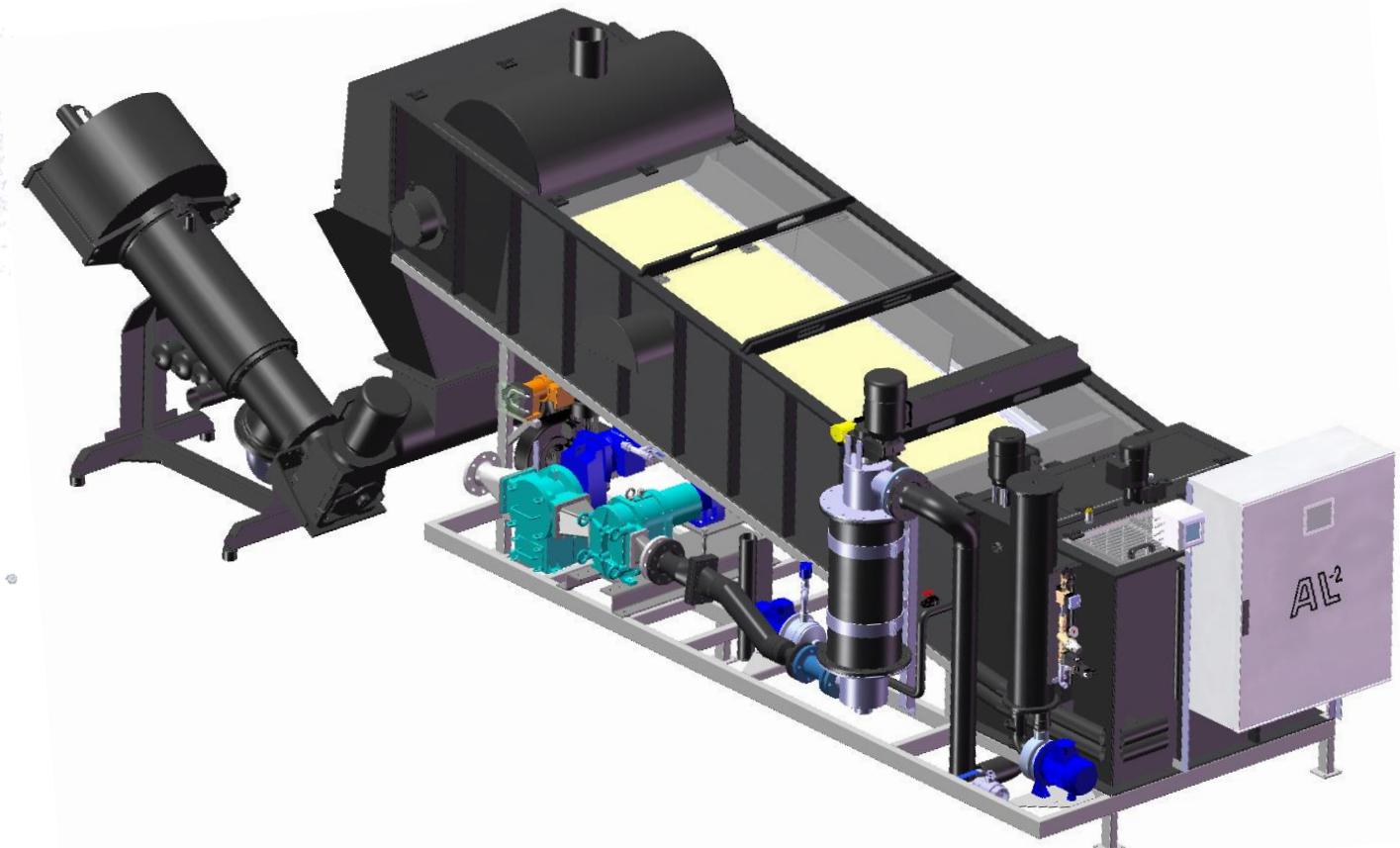
Swedish company with > 30 years
experience from municipal wastewater
treatment plants and industries.



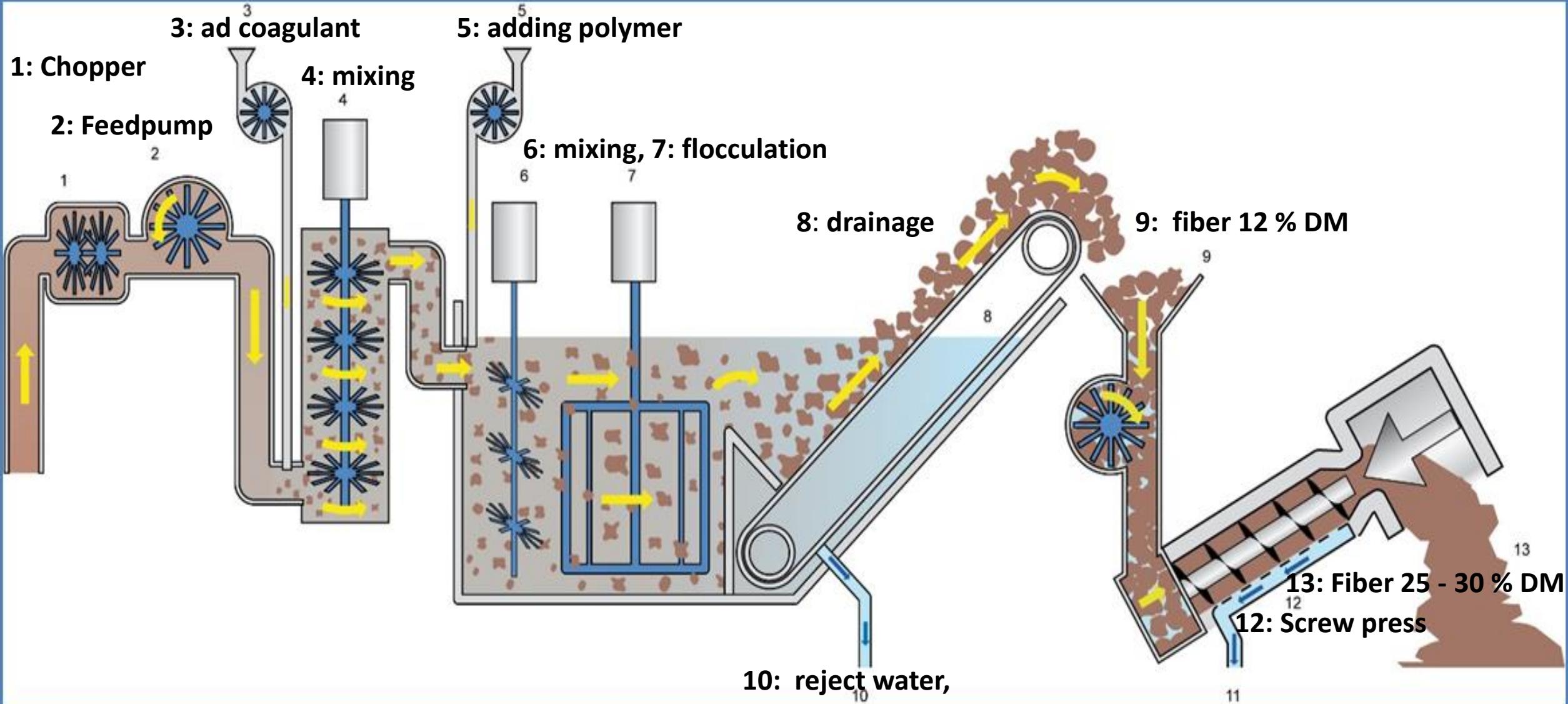
Danish company with > 25 years of experience from municipal wastewater treatment plants and industries.

AL-2 Bandfilter

- Very effective separation of P and org. D.M.
- Particularly suitable for pig manure



Princip AL-2 separation



Polymer lab. tests



Up to 99% of phosphorus in the fiber



Optimization of biogas plants

- Selective retention time
- Increased biogas yield
- Reduction of fiber quantity
- Concentration of phosphorus fraction
- Optimization of N-P ratio

Why Selective retention time

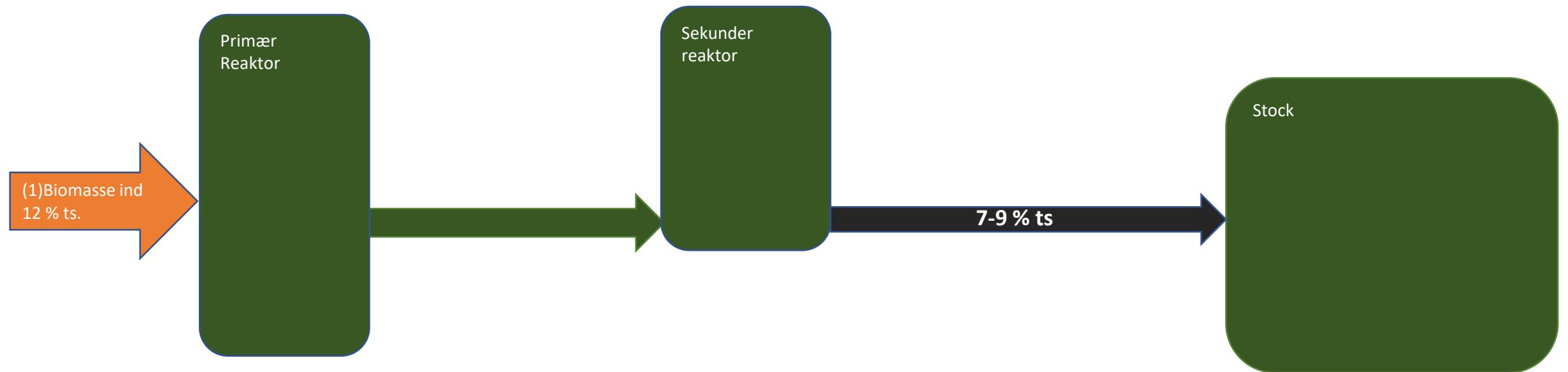
- Much fiber goes undigested through the biogas plant.
- History tells it costs money to get rid of fiber and Phosphors.
- Municipal wastewater treatment plants made for 30 - 40 years ago biogastanks, to reduce the amount of organic matter in the sludge.
 - thereby concentrating phosphorus in a smaller volume.
 - Methane production was a "bonus"

Benefits by Selective retention time

- Better degradation of highly degradable fiber.
- Increased methane production,
- Less fiber fraction with higher phosphorus content.
- More attractive fiber fertilizer, easier to deposit.

common flow in a biogas plants

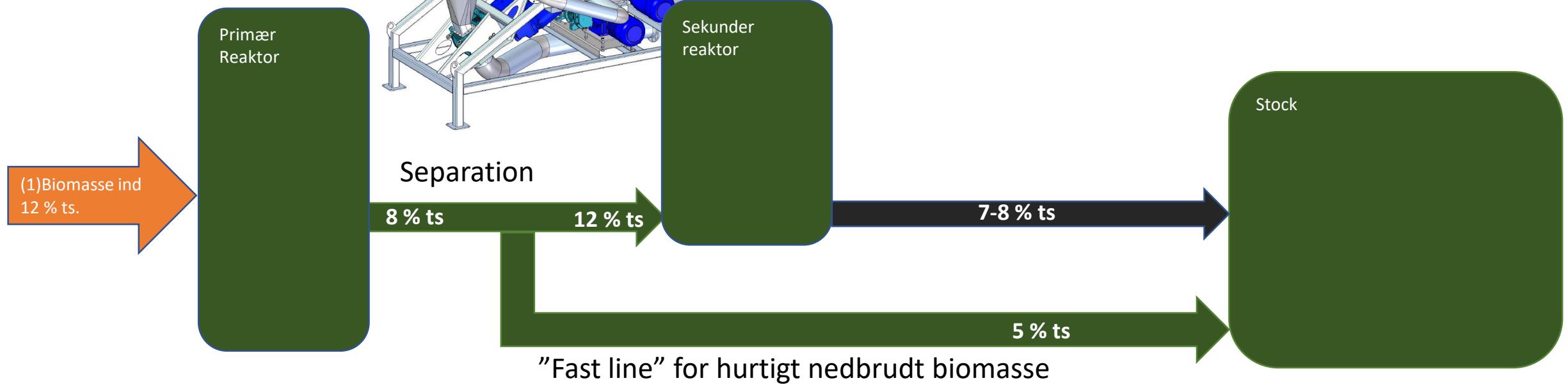
- Highly degradable fiber is not degraded
- Lightly degradable biomass uses second reactor as "stock"



Selective retention time

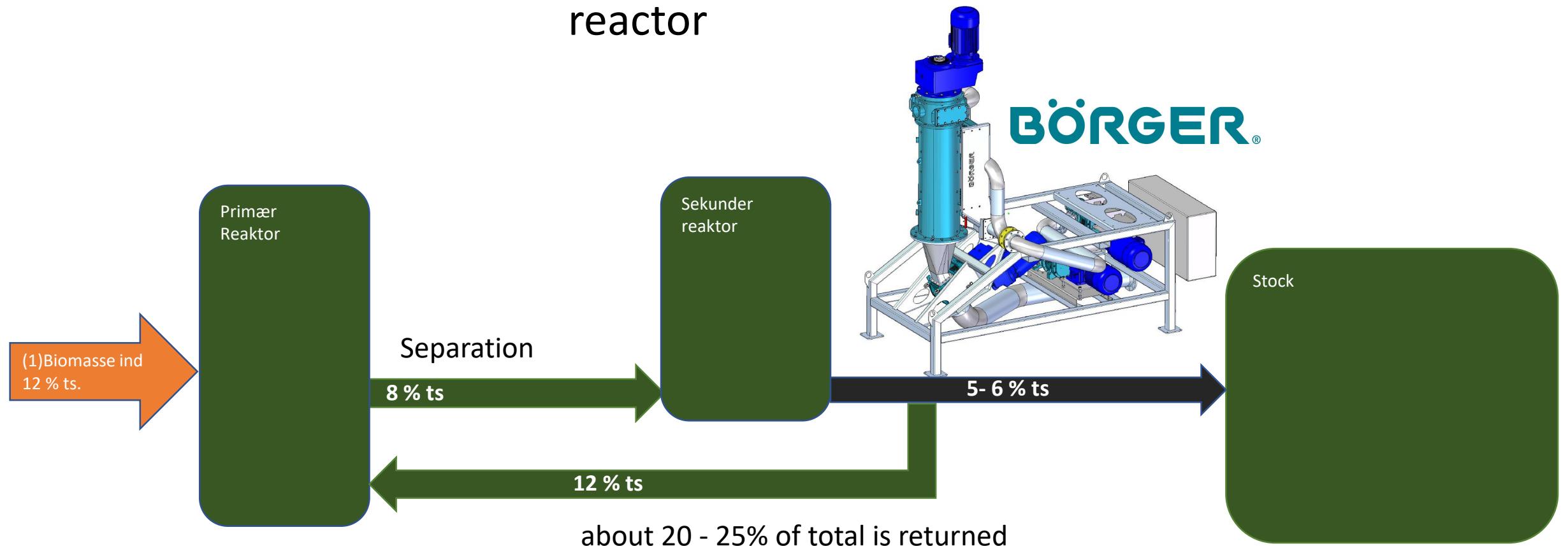
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- Highly degradable fiber increases retention time
- inorganic matter and liquid get fast line to stock

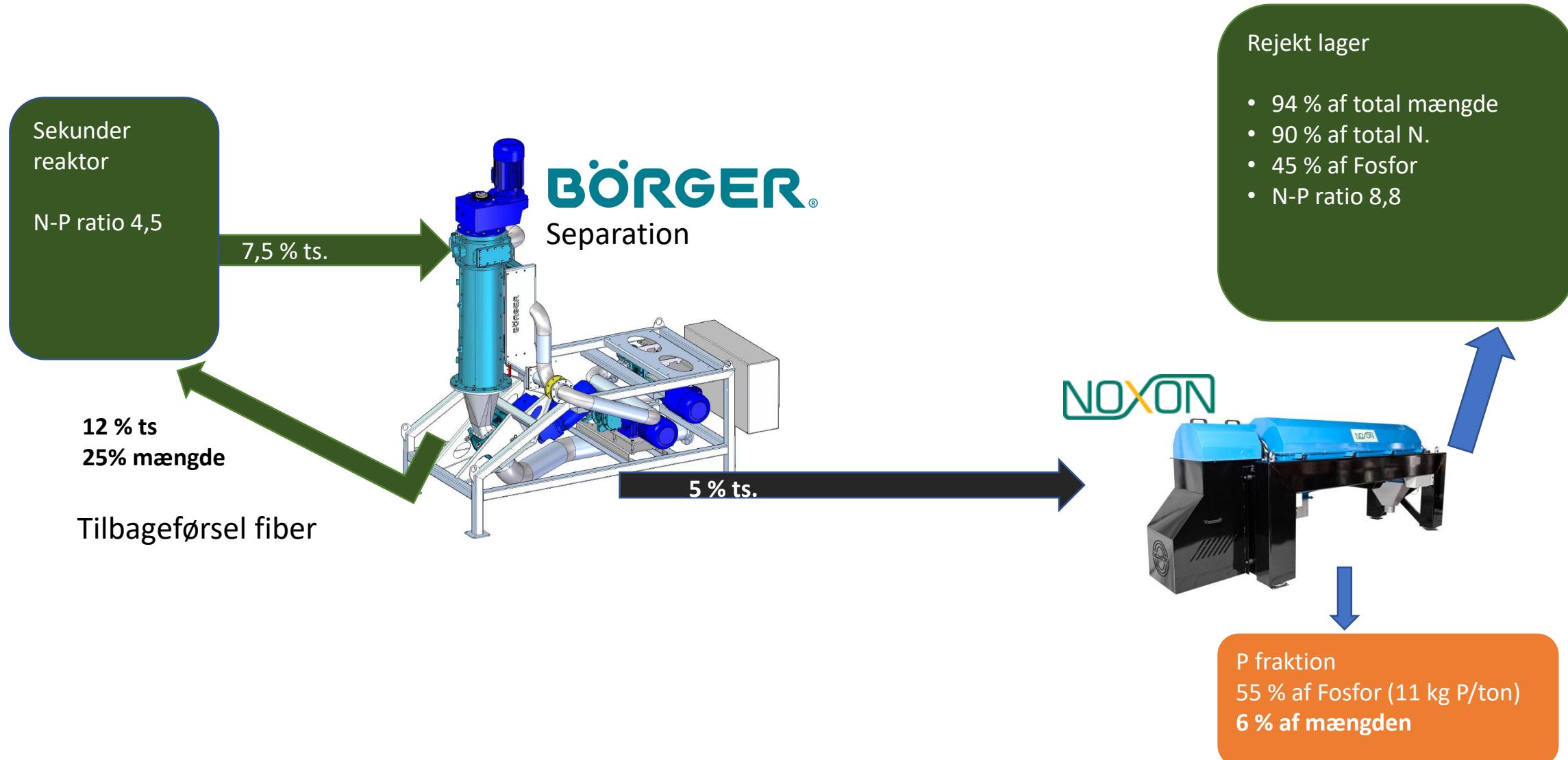


Selective retention time

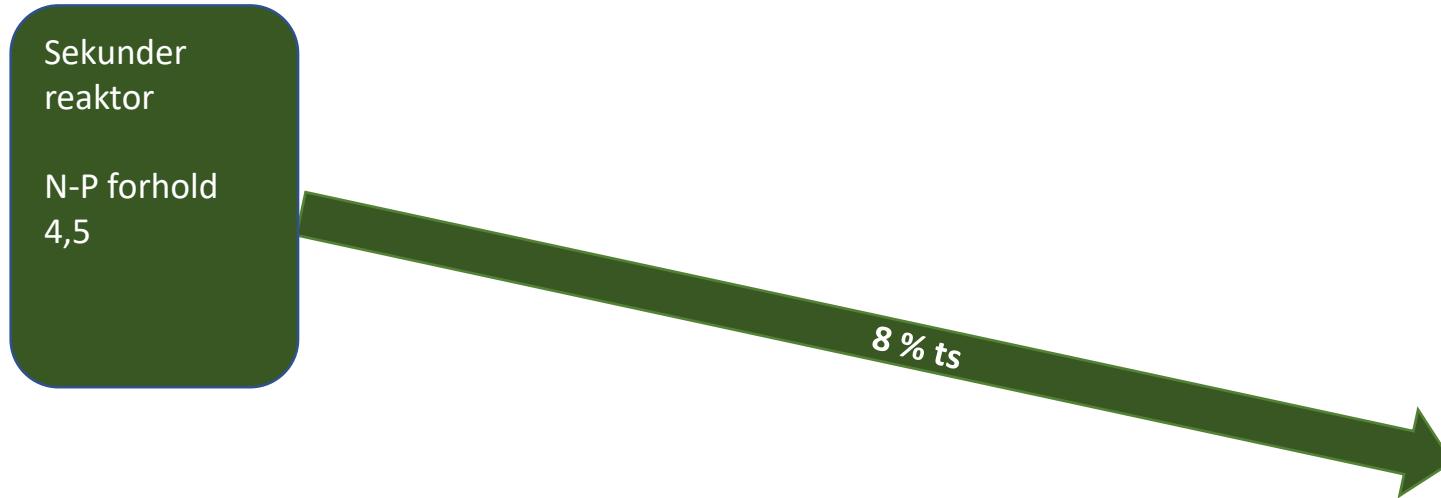
- Highly degradable fiber is returned to the reactor



Separation - adjustment of N-P ratio with Selective retention time



Separation - adjustment of N-P ratio traditional operation!



Separation with Noxon lamella dekanter

Reduction of the fiber quantity 35 – 59 %

- Biogas 1

Traditionel operation

Biogas 1	Tørstof %	Total N	NH4-N	Fosfor	N-P forhold	mængde
Biomasse til separation	7,3	5,2	3,3	1,2	4,3	100
Rejekt fra Noxon	4,8	4,8	3,3	0,7	6,9	89
Fiber fra Noxon	27,5	6,6	3,1	6,0	1,1	11

With Selective retention time

Biogas 1 Fiber retur	Tørstof %	Total N	NH4-N	Fosfor	N-P forhold	mængde
Biomasse til separation	5,1	4,8	3,3	1,1	4,4	100
Rejekt fra Noxon	4,1	4,8	3,3	0,5	9,6	95,5
Fiber fra Noxon	22,7	8,4	3,1	8,0	1,1	4,5

Reduction of fiber quantity with 59 %

- Biogas 2

Traditionel operation

Biogas 2 Traditionel	Tørstof %	Total N	NH4-N	Fosfor	N-P forhold	mængde
Biomasse til separation	9,5	6,0	3,8	1,3	4,6	100
Rejekt fra Noxon	5,5	5,4	3,6	0,6	9,0	83
Fiber fra Noxon	29,0	8,9	4,8	4,0	2,2	17

With Selective retention time

Biogas 2 Fiber retur	Tørstof %	Total N	NH4-N	Fosfor	N-P forhold	mængde
Biomasse til separation	6,6	5,9	3,8	1,2	4,9	100
Rejekt fra Noxon	4,9	5,4	3,6	0,5	10,8	89
Fiber fra Noxon	20,0	8,2	3,9	5,0	1,6	11

Reduction of fiber quantity with 35 %

Option på udtagning af tørt fiber eller findeling af fiber inden retunering

