View this email in your browser

Welcome to our second newsletter!

We want to share our knowledge with you to help you improve your rendering business for better products and yields.

Each newsletter will be themed around a machine or system.
The theme of this newsletter is the slurry evaporator process.
We will cover:

- What is a slurry evaporator process?
- How does it work?
- What are the main benefits and disadvantages of using a slurry evaporator process?

If you have any questions, please reach out to us ***here***.

Henrik F. Sørensen,
CEO

Oestergaard A/S
Customized Rendering Technology

What is a slurry evaporator process?

A slurry evaporator cooking process is used as an alternative continuous rendering process to the below:

- A conventional cooking process using a disc or tube bundle cooker with a final cook temperature typically in the range of 131- 140° C (268-285° F) with an approximate 40-65 min. retention time.

- A conventional cooking process with waste heat dewatering upstream of a disc or tube bundle cooker, where the raw material is preheated and dewatered in a low pressure press, and the press water is concentrated in a waste heat evaporator, then added with the press cake being fed into a cooker with a final cooking temperature typically in the range of 131-137° C (268-280° F) with an approximate 30-45 min. retention time.

- A conventional low temperature process (sometimes referred to as the fishmeal process), where the raw material is preheated and dewatered in a low pressure press, 2-phase or 3-phase decanter, the press water is concentrated in a waste heat evaporator and added with the press cake before being fed into a disc dryer (versus a cooker) with a final drying temperature typically in the range of 107-110° C (225-230° F) with an approximate 75-150 min. retention time (in this process, there are no expeller presses).

Learn more

How does a slurry evaporator process work?

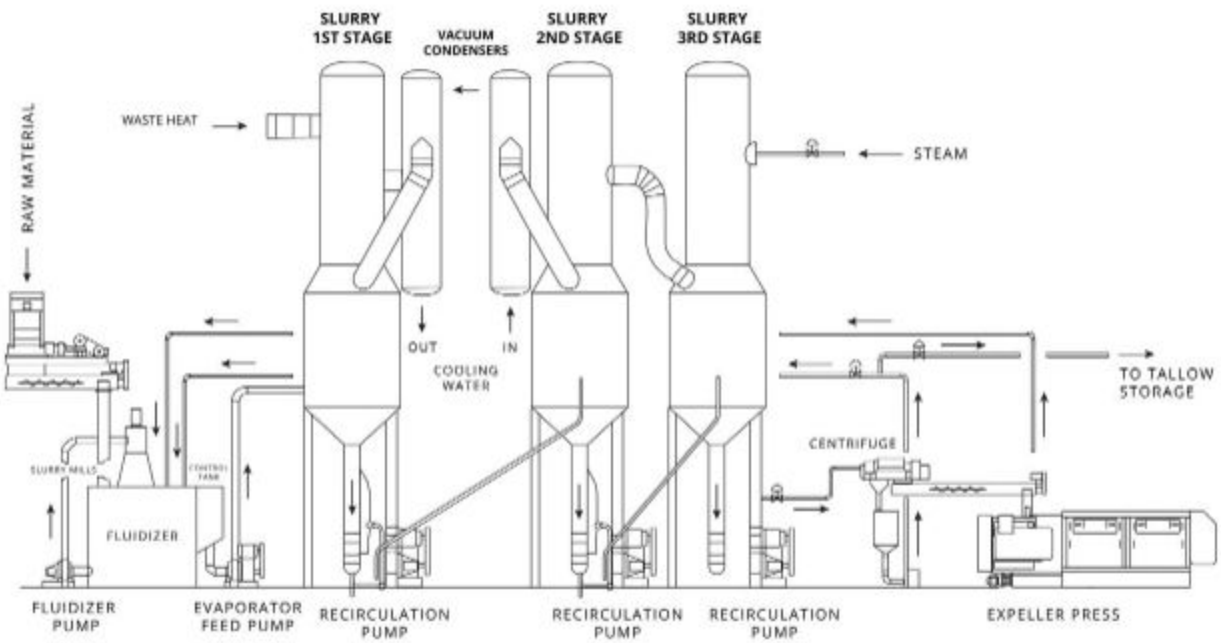
The slurry evaporator process can be manufactured and installed as a 2-stage system, or as a 3-stage system if a waste heat vapor stream is available from a feather line or other cook line.

The key components of the slurry evaporator process are:

- **The slurry evaporators,** which are falling film design type consisting of a vertical shell and tube heat exchanger, mounted directly on top of the vapor body (top cone vapor separator and cone sump).
- **The vacuum condenser system**, which consists of a shell and tube condenser and either a vacuum pump requiring seal water, or steam ejectors, used to evacuate the vessel of air at startup and non-condensable gases during operation from the system.

2-stage system:
The boiler steam is used to heat stage 2 evaporator with the boil-off of stage-2 being used to heat stage-1 under vacuum conditions allowing boil-off to occur at a temperature less than 100° C (212° F) with condensing of the stage-1 boil-off being accomplished by the stage-1 vacuum condenser system.

- Flow of slurry enters stage-1 and exits stage-2 at final cooking temperature in the range of 124°-133° C (255-272° F) with an approximate 15-20 min. retention time per stage.



3-stage system: 2-stage system is combined with an upstream waste heat stage.

- Boiler steam is used to heat stage-3 evaporator with the boil-off of stage-3 being used to heat stage-2 under vacuum conditions allowing boil-off to occur at a temperature less than 100° C (212° F) with condensing of the stage-2 boil-off being accomplished by the stage-2 vacuum condenser system.

Waste heat vapor from an existing feather line or separate cook line is used to heat stage-1 under vacuum conditions allowing boil-off to occur at a temperature less than 100° C (212° F) with condensing of the stage-1 boil-off being accomplished by the stage-1 vacuum condenser system.

- Flow of slurry enters stage-1, is transferred to stage-2, and exits stage-3 at final cook temperature in the range of 124-133° C (255-272° F).

The two main differences between a slurry process and conventional disc or tube bundle cooking process happens upstream and downstream of the slurry evaporator (which is in fact the cooker):

1. The infeed is prepared upstream of the evaporators by the fluidizing system. The fluidizing system takes pre-ground raw material and mixes it in an agitated tank with hot recycled fat/tallow. Then it is pumped through a slurry hammermill to produce a pumpable fluidized slurry mixture with a maximum particle size of 9.5 mm (3/8").

2. The cooked (dewatered) slurry mixture discharged from the final steam heated evaporator stage is pumped to fat/tallow separating equipment similar to the equipment used for a conventional disc or tube bundle cooking process, but scaled up in size due to the amount of recycle fat/tallow being used to produce the pumpable slurry mixture.

Learn more

Benefits of using a slurry evaporator process

Very consistent and easily controlled process operations.
...which means very consistent high quality of meal and fat/tallow with very consistent moisture content with ability to fine-tune the process to meet varying customer's finished product demands.

Reduced steam energy savings.

- The 2-stage slurry process will typically require around 0.39 kg (0.85 pounds) per hour of steam to evaporate 0.5 kg (1 pound) per hour of water
- The 3-stage slurry process will typically require around 0.34 kg (0.75 pounds) per hour of steam to evaporate 0.5 kg (1 pound) per hour of water.

Raw material exposed to shorter retention time and lower temperatures producing a ***better quality of meal and fat/tallow.***

Cleaner and more sanitary process due to the raw material and cooked material being transported via pumps and pipelines from raw receiving bin(s) up to expeller pressing versus screw conveyors.

Ability to pump down and empty out the system at shutdown in around 30 minutes versus 2-5 hours for other rendering processes.

Ability to better handle degraded and/or high moisture raw materials compared to a conventional cooking process.

- Foaming issues during the cooking process are reduced, especially in the hot summer months.
- A lower fat content meal is produced, especially in the hot summer months, typically preventing downstream problems in meal milling, storage and selling compared to the conventional cooking process.
- Sending decanter fines to landfill because they cannot be pressed in hot summer months is avoided.

Want to know more? Contact us

Disadvantages of using a slurry evaporator process

Additional grinding and fluidizing equipment required to size the particle down to 9.5 mm (3/8") and add recycle fat/tallow to ensure the slurry infeed mixture is pumpable through the entire process.

- Not all, but some of the additional cost for maintaining the raw material grinding equipment referenced above is offset by less wear at the expeller presses due to already smaller particle size, and the consistency of expeller press infeed having little to no free fat minimizing slippage and a very consistent moisture.
- The fluidizing preparation in large part is what makes the process operation and finished meal quality so consistent, and provides the additional advantage of a metal dropout tank preventing tramp metal damage to downstream equipment.

Additional electrical energy costs due to more raw material grinding and fat/tallow separation equipment (2-phase decanter(s), and 2-phase or 3-phase polisher(s)).

- The additional electrical energy referenced above can sometimes partially be offset by having no screw conveyors from raw receiving bin(s) up to expeller pressing.

Higher level more experienced personnel for troubleshooting and operating the process.

- New processes installed in today's modern plants have PLC/HMI or Scada systems. These systems provide real-time process information available to troubleshoot and operate the system. In addition, and as mentioned above, operations are much easier due to the very consistent nature of the process making controlling it one of the easiest.

Higher capital cost compared to conventional cooking process with disc or tube bundle cooker, but similar with the other processes referenced above.

- The higher capital costs can sometimes be offset by the benefits referenced above (i.e., lower fat, no landfill charges, more saleable meal, shorter and easier processing, etc.).

Learn more

We are happy to help you.

Have any questions or requests? Find your local office ***here.***

Phone: +45 38 42 40 10 - E-mail: info@oestergaard-as.dk

OESTERGAARD

The address of our Danish headquarters is:

Want to change how you receive these emails?
You can update your preferences or unsubscribe