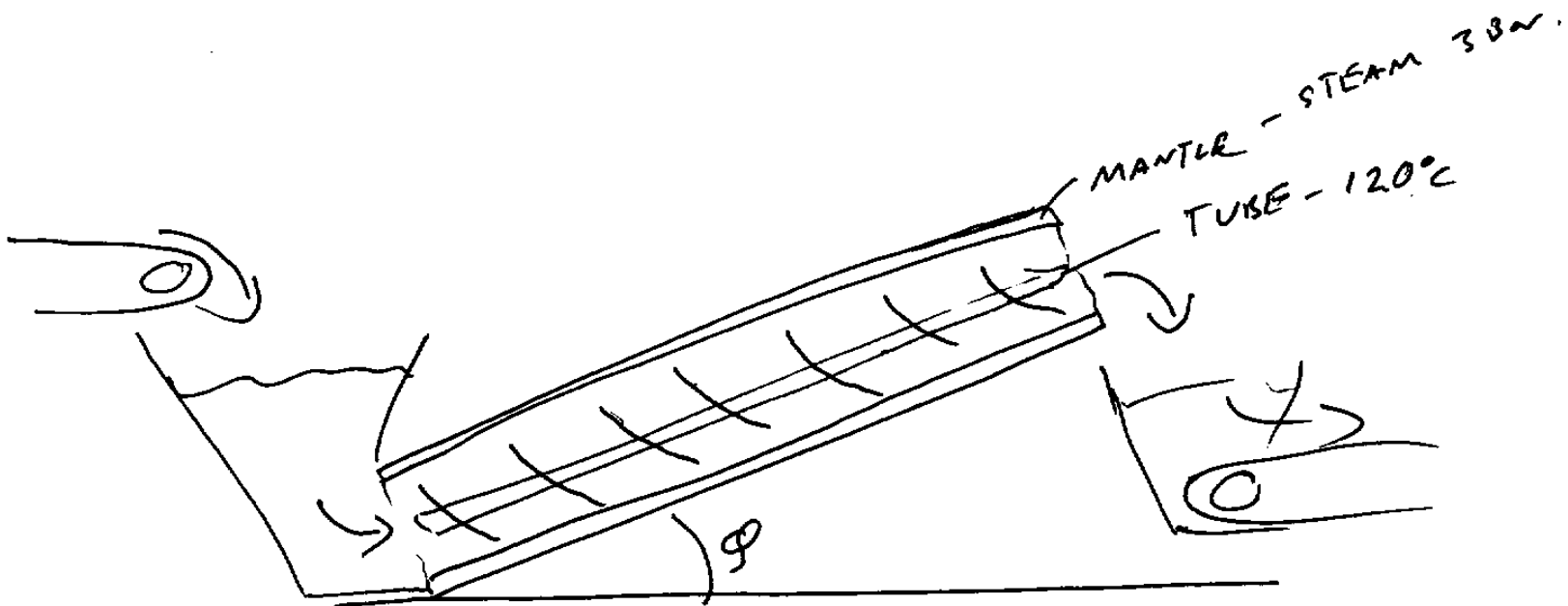
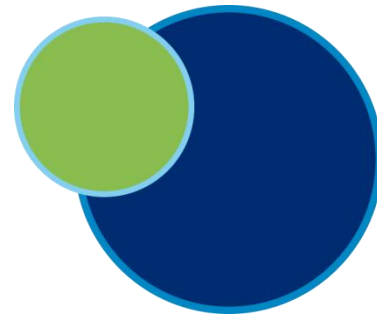


Separationsprocess
ved DAKA:

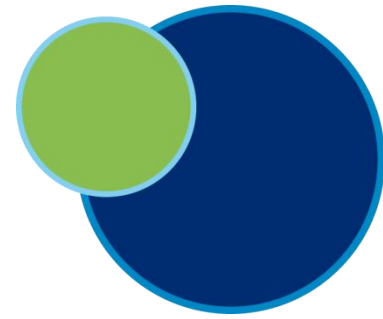
Fornyelsesfonden

Daka, AlfaLaval, Core A/S, AAU,
SDU

Koagulator



Model formulering



Energibevarelse

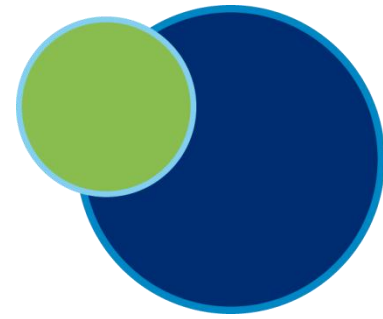
$$\rho \tilde{c}_p \frac{\partial T}{\partial t} - \tilde{k} \frac{\partial^2 T}{\partial z^2} + \rho \tilde{c}_p U \frac{\partial T}{\partial z} = q'$$

$$\rho_{H_2O} c_{pH_2O} \frac{\partial T_{HW}}{\partial t} - k_{H_2O} \frac{\partial^2 T_{HW}}{\partial z^2} + \rho_{H_2O} c_{pH_2O} V_{H_2O} \frac{\partial T_{HW}}{\partial z} = -q'$$

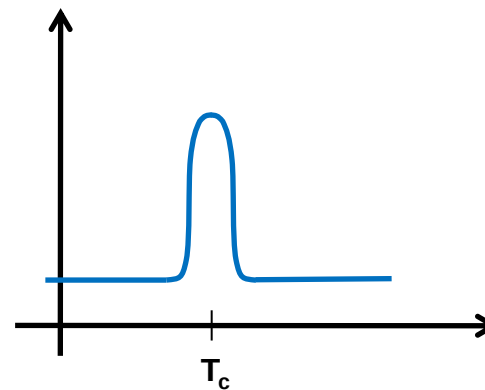
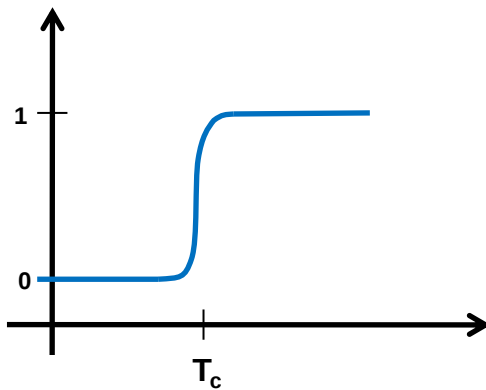
$$\rho \tilde{c}_p = \alpha((\rho_{As}(1 - \phi) + \rho_{Al}\phi))((c_{pAs} + \phi' dh_A)(1 - \phi) + (c_{pAl} + \phi' dh_A)\phi) + \beta \rho_B + \gamma \rho_C$$

$$\tilde{k} = \alpha(k_{As}(1 - \phi) + k_{Al}\phi) + \beta k_B + \gamma k_C$$

Model formulating



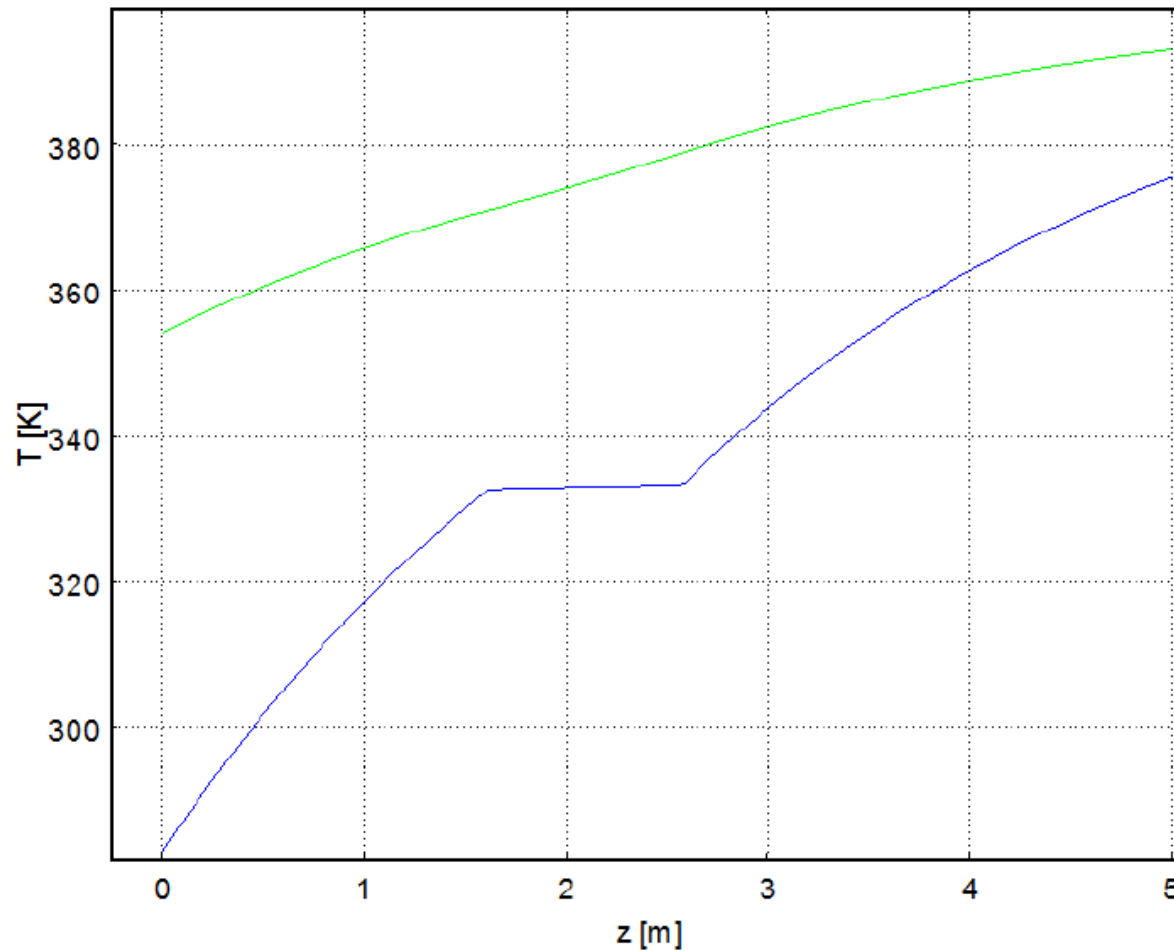
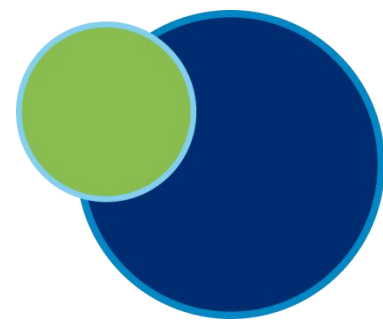
Faseskift



$$\phi' = \frac{\partial \phi}{\partial T},$$

$$\int \rho dh_A \phi' dT = \rho dh_A.$$

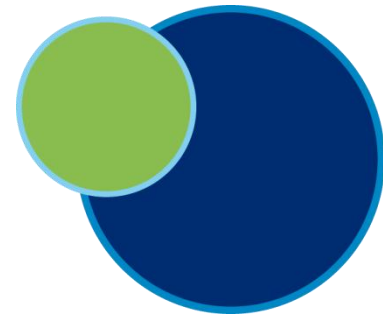
Schematic



Vand

Råvare

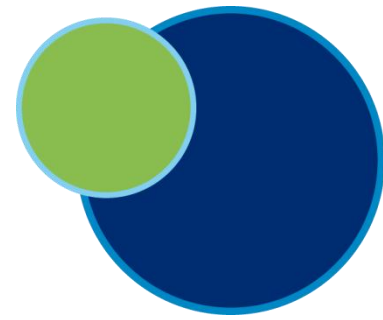
Gruppearbejde Procesmodellering



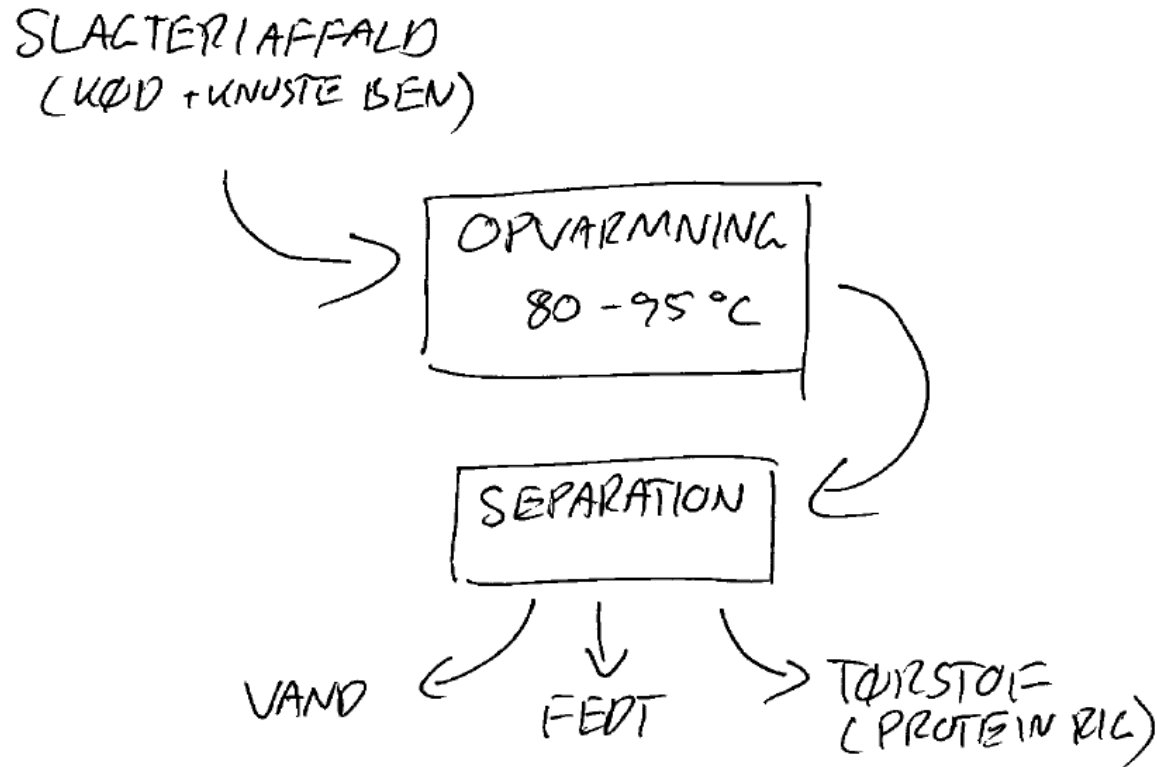
Med udgangspunkt i de tidligere definerede processer:

- Hvilken har størst potentiale for energibesparelse / kvalitetsforøgelse ?
- Beskriv funktionen og de væsentlige fysiske processer/fænomener
- Hvad er optimal drift ?
- Identificer reguleringsparametre og variable, Input/output
- Identificer måling af parametre og variable
- Identificer modelleringsmål

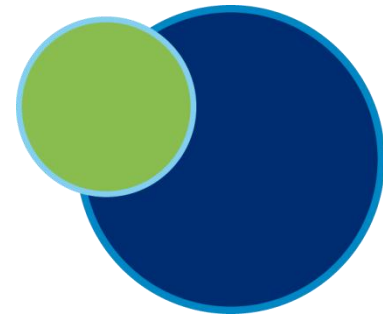
Separationsproces



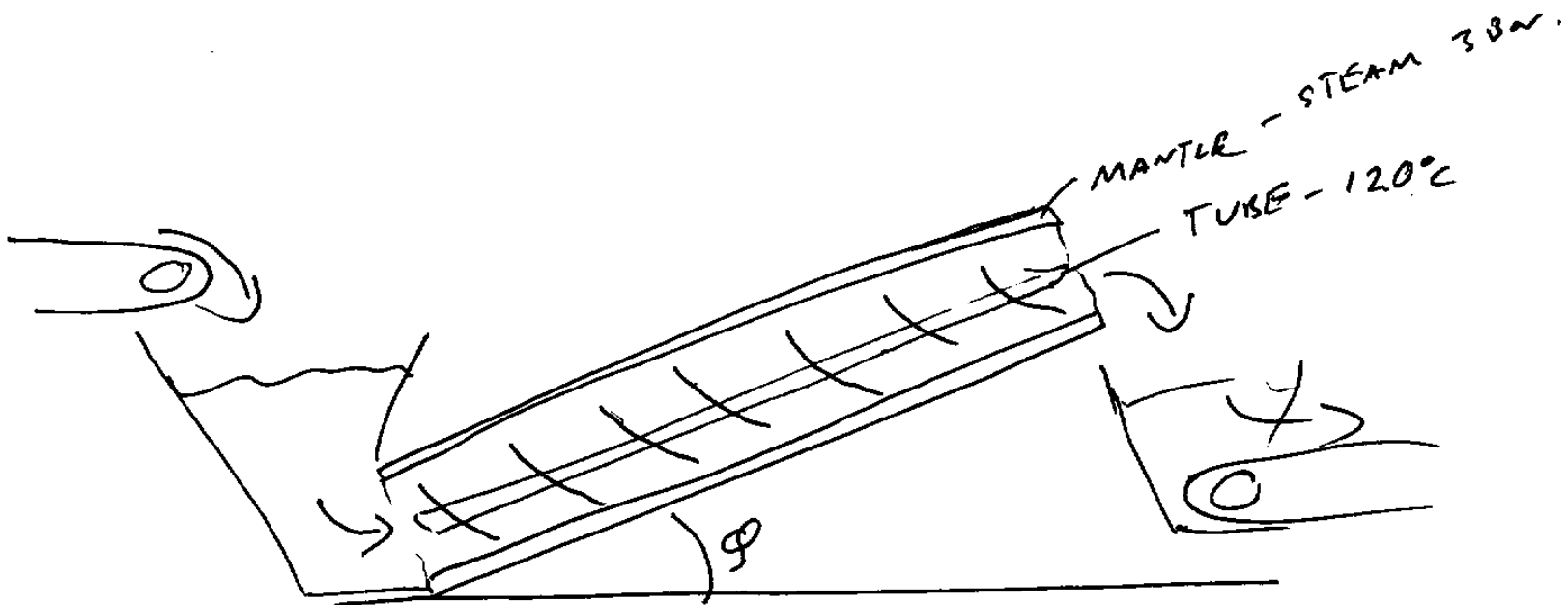
Separation af slagteriaffald:



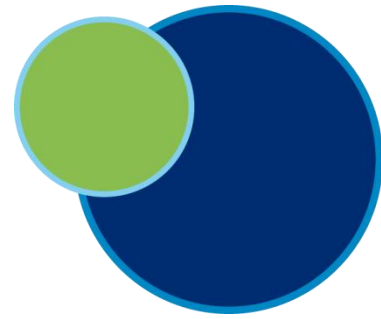
Separationsproces



Funktion:

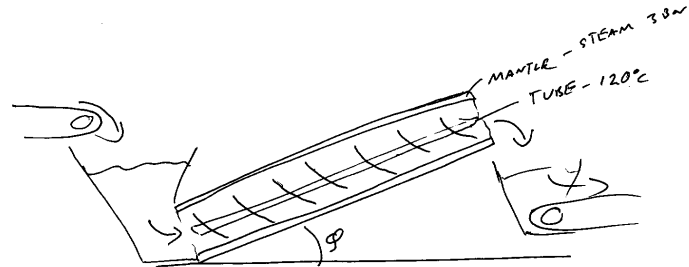


Separationsproces

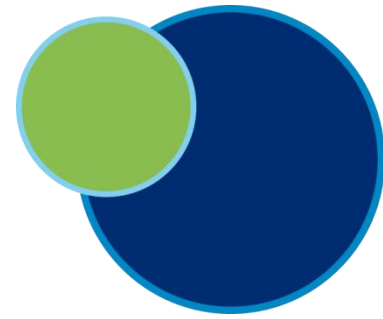


Process/Fænomen:

- Opvarmning
- Transport
- Smeltning (faseovergang – latent varme)
- Koagulation af protein (giver udskillelse af fedt og vand)



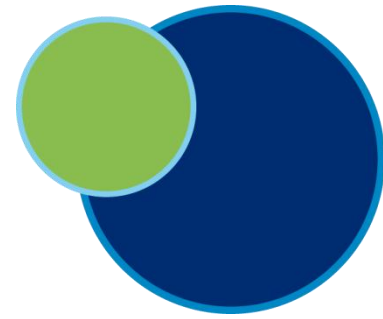
Separationsproces



Optimal Drift:

- Fuld afsmeltning af fedt
- Fuld koagulering (tilstrækkelig holdetid)
- Ingen kogning af vand
- Minimalt energiforbrug

Separationsproces



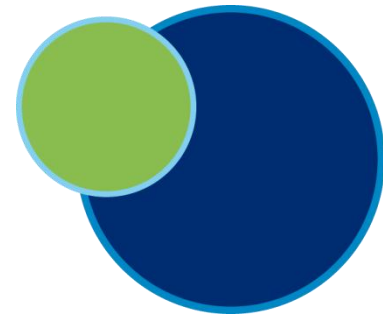
Reguleringsparametre:

- Damp + H₂O Flow – via ventil
- Omdrejningstal på skruen

Variable / Input

- Råvaresammensætning, flow og temperatur
- Omgivelsestemperatur

Separationsproces



Målemuligheder:

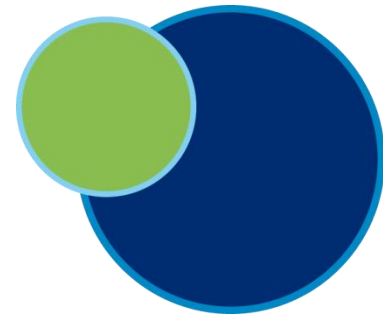


Damp+H₂O
Temperatur (ud,ind)
Tryk(Tcond)
Omdrejningstal
Vinkel
Akselmoment
Råvaretemperatur
(ind/ud)



Råvaresammensætning
Damp+H₂O flow

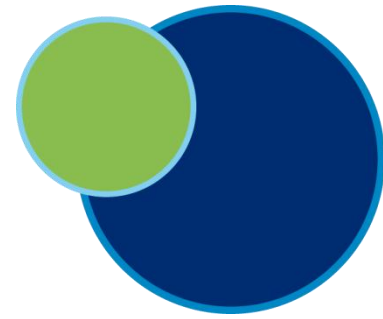
Separationsproces



Modelleringsmål:

- Forudsigelse af udgangstemperatur
- Forudsigelse af temperaturforløb (holdetid)
- Kvalitative analyse af følsomhed overfor ændringer i råvare sammensætning
- Identifikation af max/min belastning

Gruppearbejde Procesmodellering



Med udgangspunkt i de tidligere definerede processer:

- Hvilken har størst potentiale for energibesparelse / kvalitetsforøgelse ?
- Beskriv funktionen og de væsentlige fysiske processer/fænomener
- Hvad er optimal drift ?
- Identificer reguleringsparametre og variable, Input/output
- Identificer måling af parametre og variable
- Identificer modelleringsmål