Fiskeriforskning;

Biomarint Industriseminar 2007

DUE MILJØ AS

“Merverdi ved bruk av avanserte mebranteknologier i fiskemel- og fiskeolje produksjon”

Eddy G. Torp, DUE MILJØ AS

Desember 2007

DUE MILJØ - Produkter og Markeder



Membran raffinerings – og gjenvinningsanlegg

Næringsmiddel/fôr

Farma

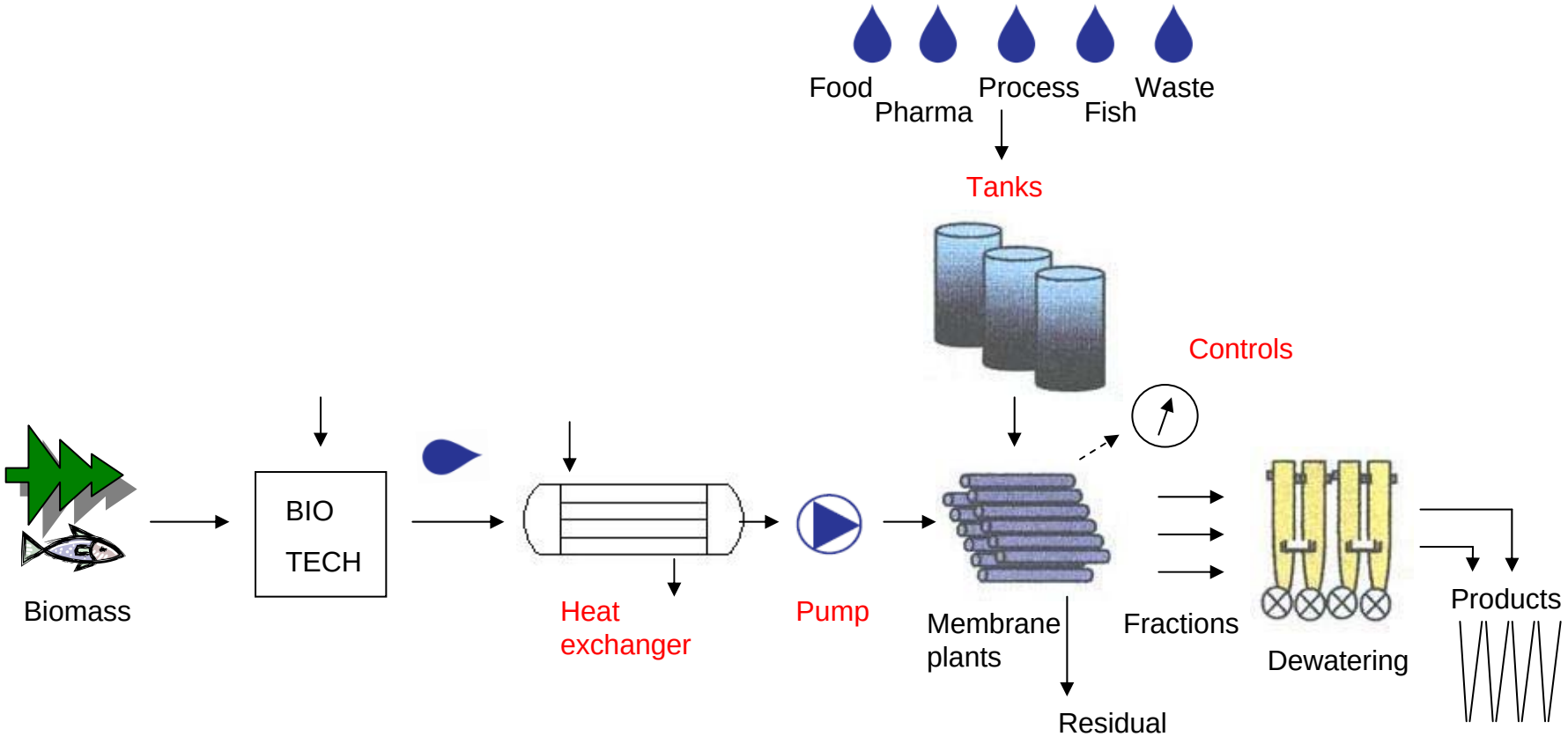
Emballering

Prosessutstyr

Katalytisk Membrananlegg

Prosess

DUE MILJØ - Separasjonsanlegg og Prosessutstyr.

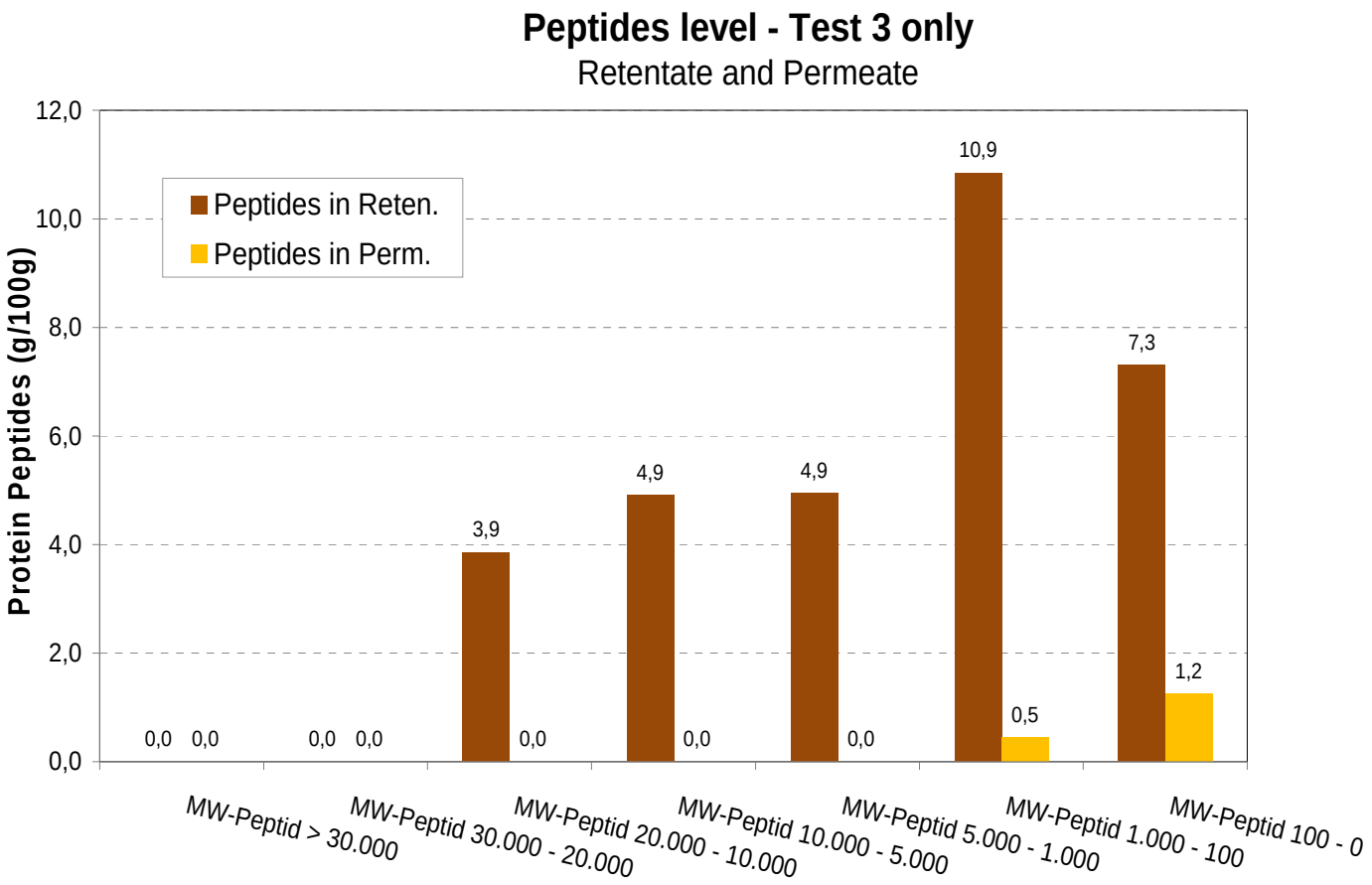


Membran Valg => Kan Velge Molvekt Separasjon

The Fish Peptides is retained very good in the selected membrane.

The peptides is total 31.9 g/100g. This is 98% of the total protein content.

95% of the Peptides is retained in the selected membrane.



Prinsipper, Membrantilgang, Pilottest gir mer UTBYTTE

Samarbeid med GE Infrastructure Water&Process Technologies, verdensledende innen industrielle membrananlegg

Prinsipper

Pilot anlegg

Ferdige anlegg

RO, NF, UF og MF kan separere:
- Vann (blå farge)
- Salter (rød farge)
- Sukker/amino syrer
- Proteiner/polysaccarider
- Partikler/kolloider

Lab. - og pilot tester, engineering, tilvirker og installerer/oppstart. **Industrielle** anlegg
Vi finansierer, kan drifte og yte service.

MER UTBYTTE=MINDRE AVLØP

DUE MILJØ Membrananlegg for Separasjon av Marine Ingredienser: Proteiner og Oljer

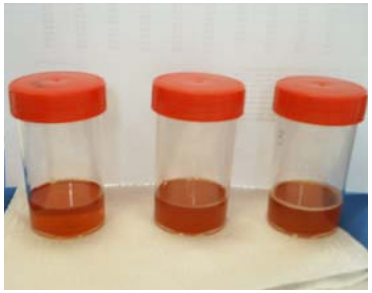
Membran Anlegg

FPI/AMS;
Limvann
Hydrolysater

Marine Oljer

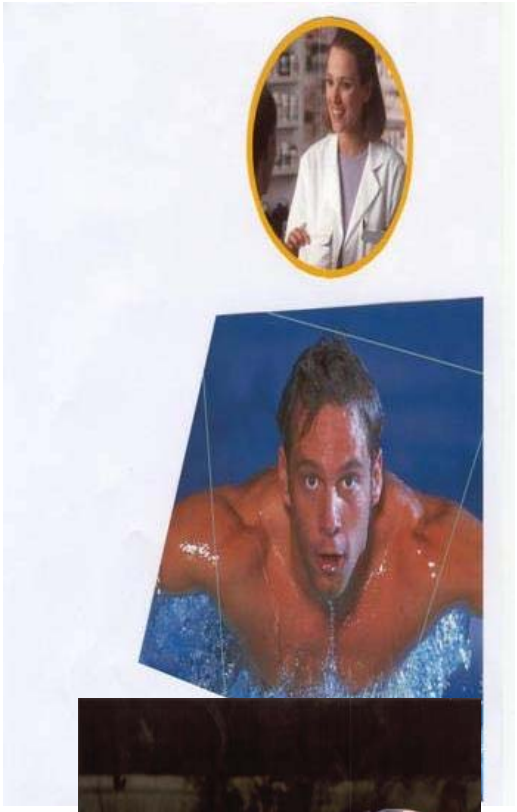
RAFFINERT FISKEMEL

RAFINERT MARINE PEPTIDER

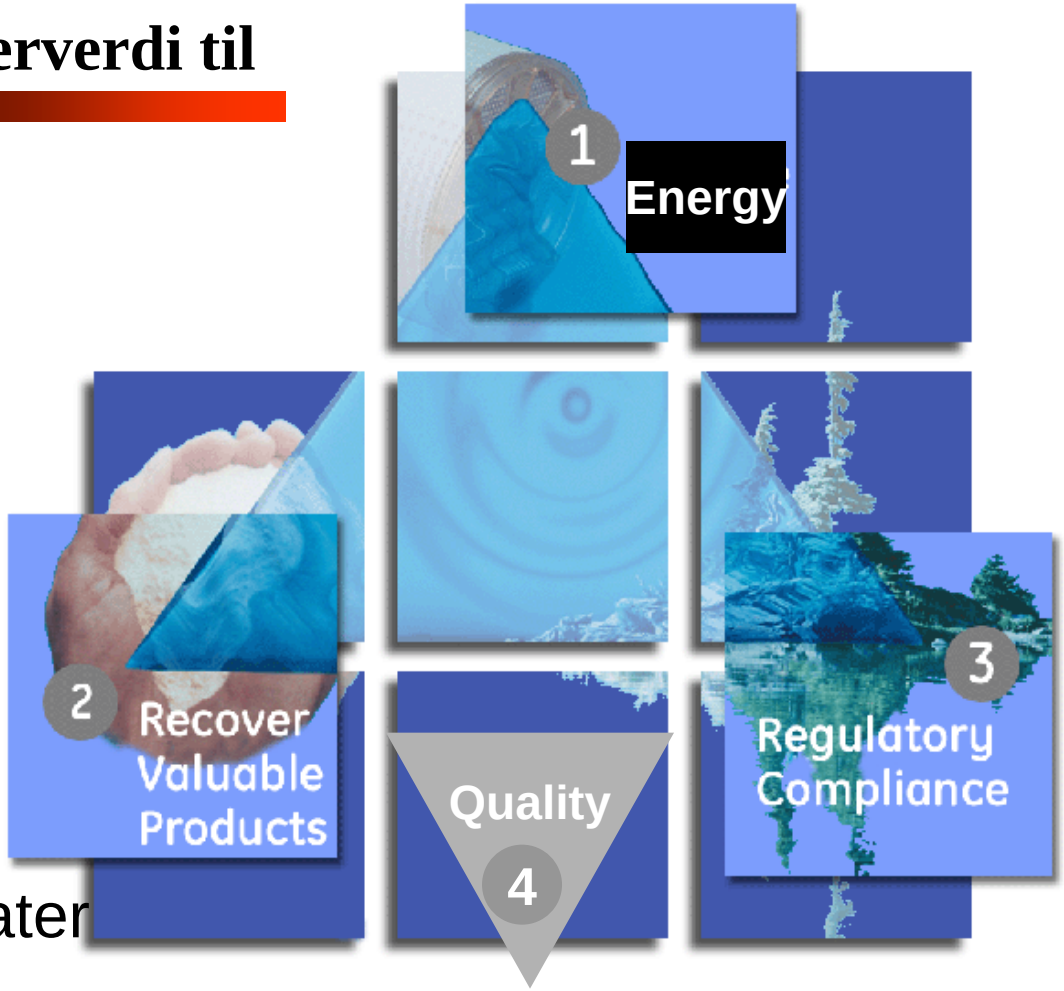


RENSET OLJE:: FFA, PBT +

INTERNATIONALE MARKEDER



FPI/AMS Anlegg gir Merverdi til

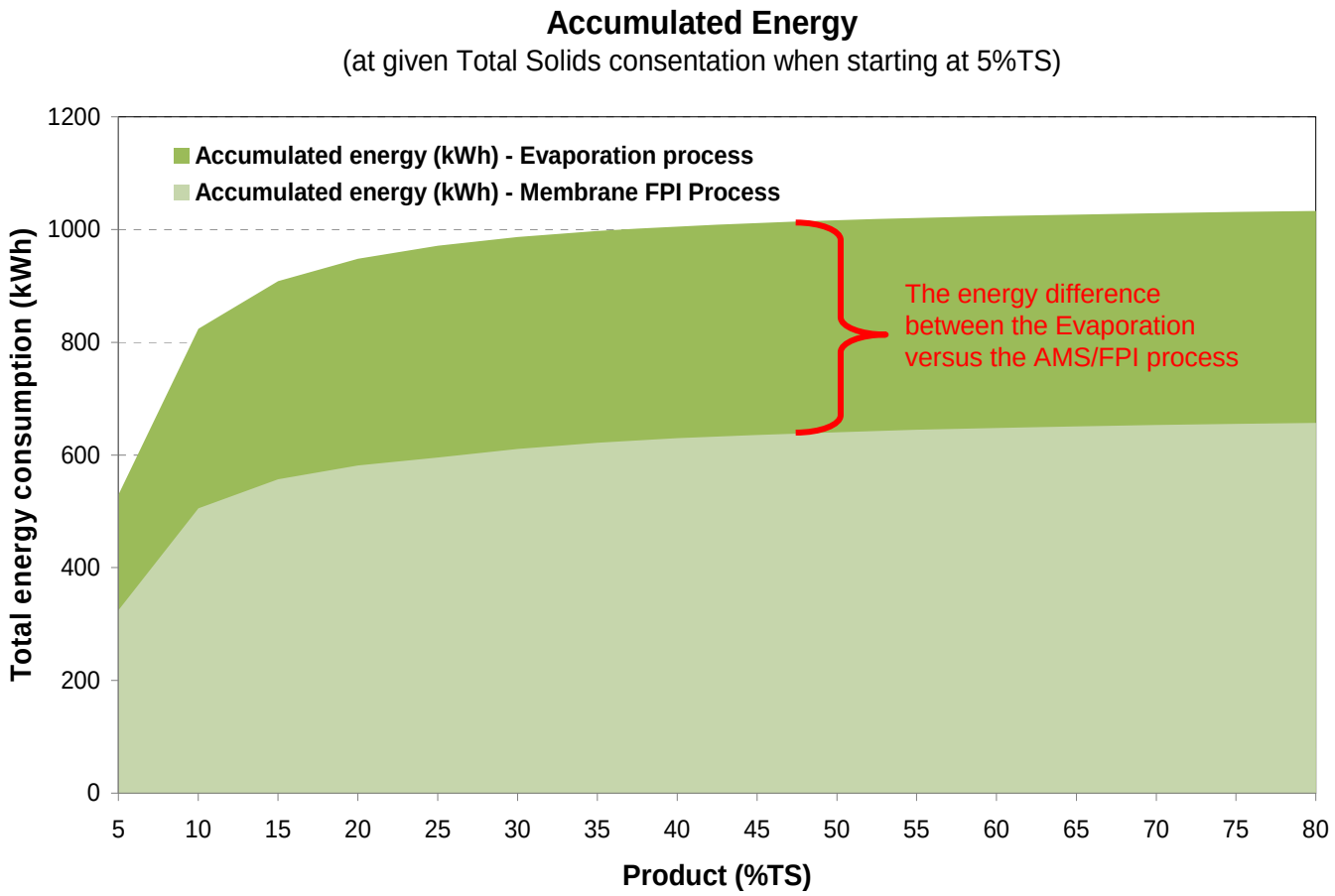


Limvann og Hydrolysater

FPI/AMS Prosessen gir mer ENØK enn Inndamper alene

The AMS/FPI consume 1/3 less energy than Eva-poration when feed TS 5% and final TS 80%.

Assumed membrane concentration achievable only 25%.



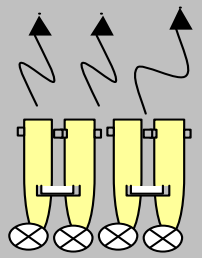
Traditional Evaporation Economics

"Smells/Odors & Steam"

Contaminates in Meal

1000kg

30 m3 / hr



1000kg

40 kg of salt

1 kg of "TVN"

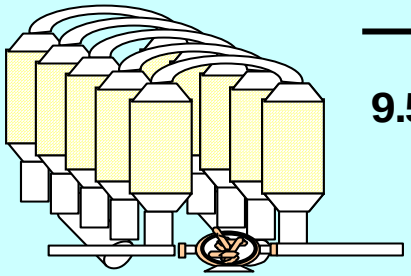
$ 600.00 per ton Sale value

$ 600.00 Total Meal Value

GE Advanced Membrane Economics

1000kg

30 m3 / hr



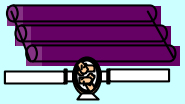
9.5 m3 / hr

20.5 m3 / hr

32 kg salt

0.8 kg "TVN"

REVERSE OSMOSIS



13.2 m3/hr

FRESH WATER for PLANT RE-USE

8.3 m3/hr

"TVN & salt water" sent back to the ocean

Boiler Saving = $148,00

1.Water @ $1.00/M3

2.Chemical

3.Energy

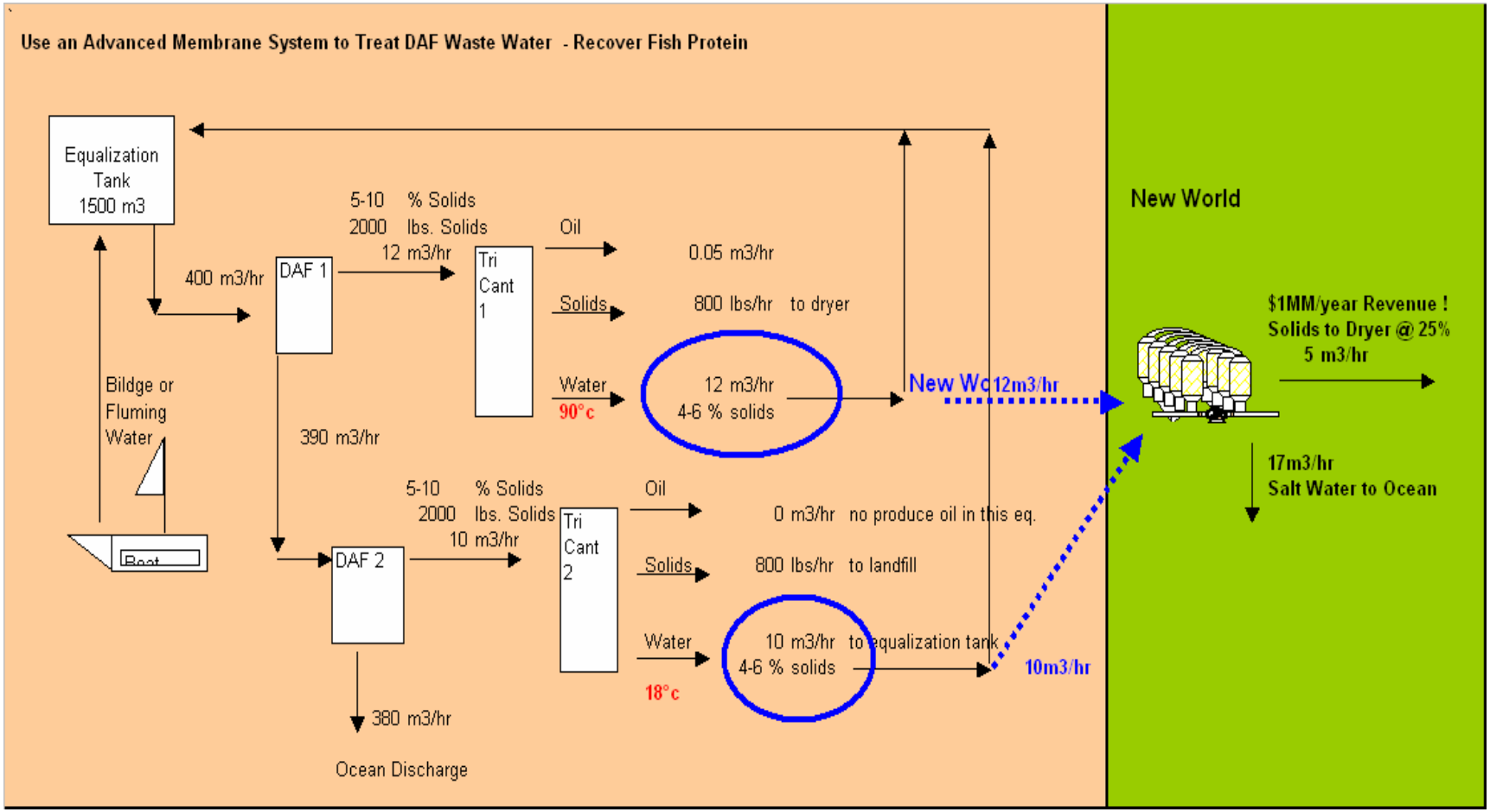
ROI = 1 season

imagination at work

NORCAPE BIOTECHNOLOGY

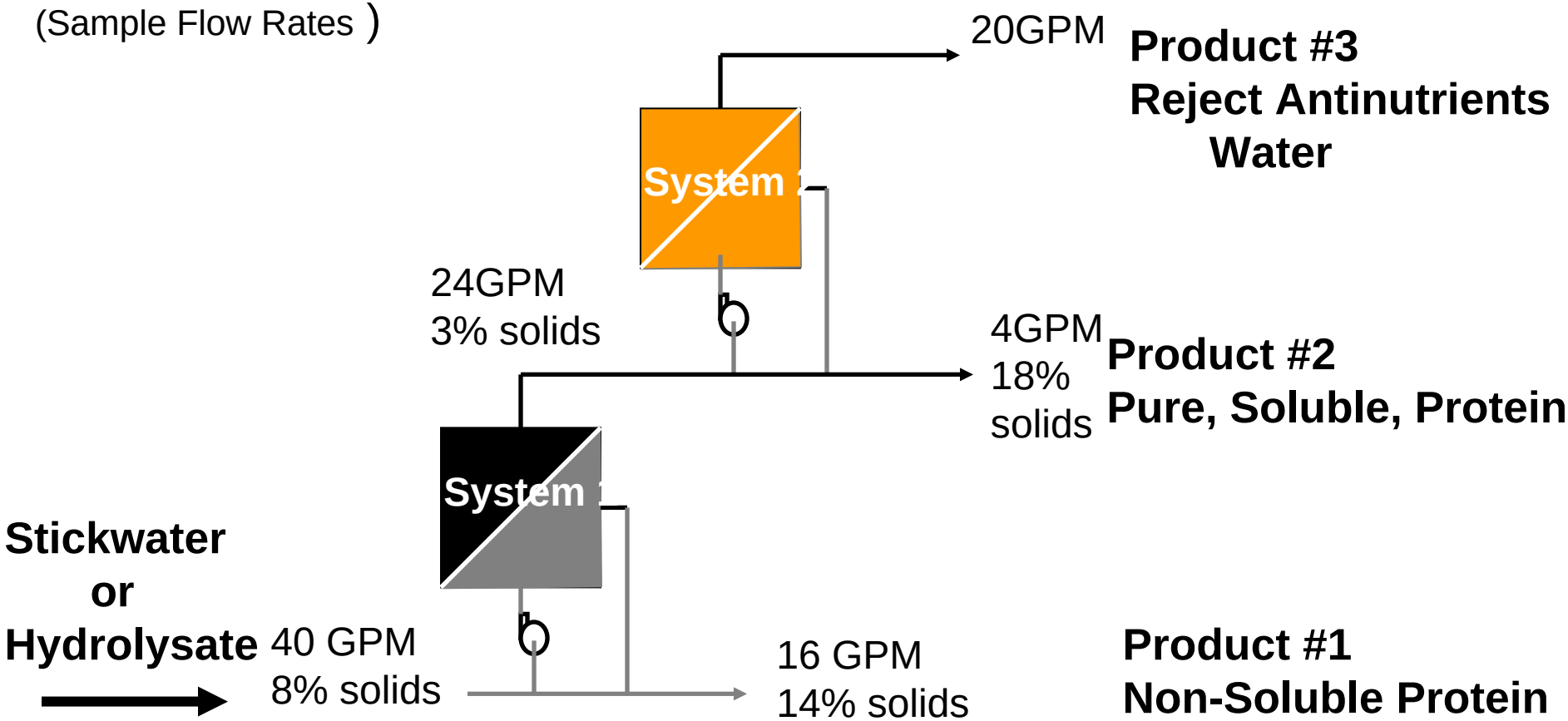
DUE MILJØ

FPI/AMS – Gjenvinner Proteiner fra Avløp.



FPI/AMS Prosessen På Innsiden;

FPI/AMS – Creates Three (3) Outputs
(Sample Flow Rates)



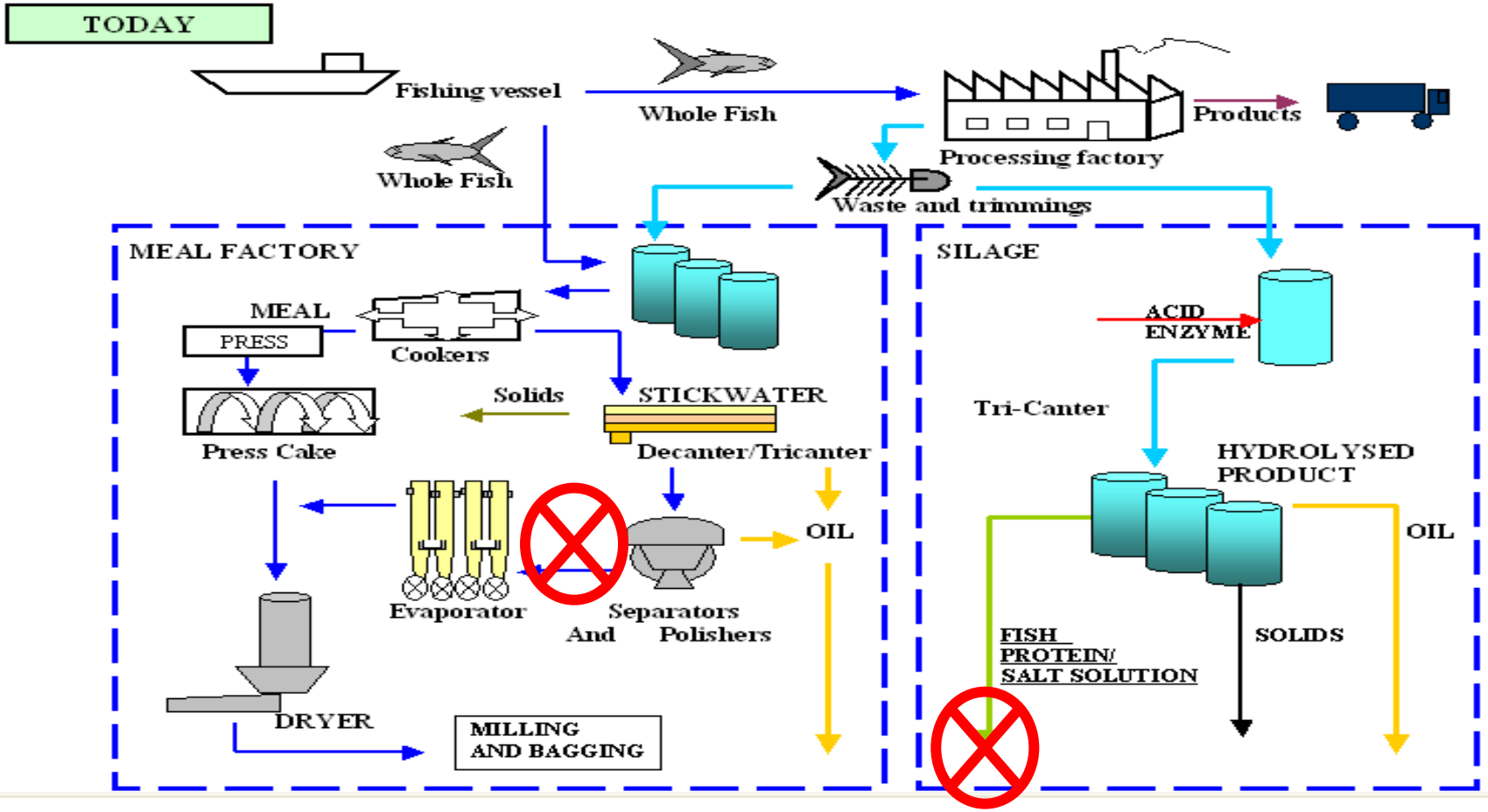
GE Gjenvinner Inndamper Kondensat

- Typisk Fiskemel Anlegg
- 30 m3/h Inndamper Kondensat

- GE Kondensat Gjenvinning System;
- Gjenvinner 80% av Vann (24m3/h)
- Fjerner 99.5 % av organisk materiale (TOC)
- **Høy Temp Design 75'C**

- Kan ELIMINERE BEHOV for tilførsel av vann
- ROI - typisk < 2 År

FPI: Fiske Protein kan kombineres med - Peptid Fabrikk

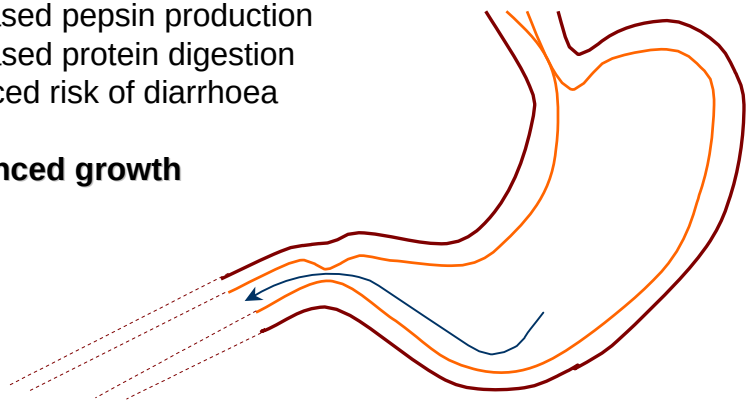


FPI – Fiske Peptider for økt startfôr vekst

Growth Hormone Releasing Peptides
Potential effects:

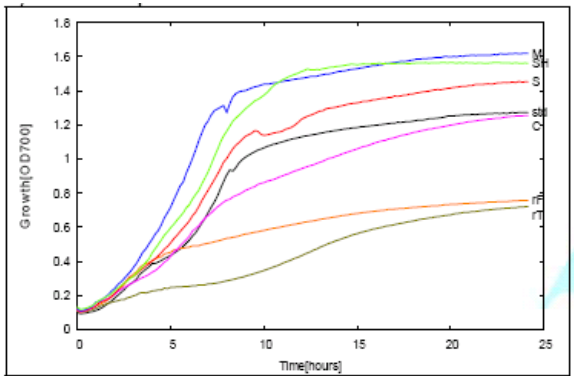
- Enhanced appetite
- Increased HCl production
- Reduced pH in the stomach
- Increased pepsin production
- Increased protein digestion
- Reduced risk of diarrhoea

- **Enhanced growth**

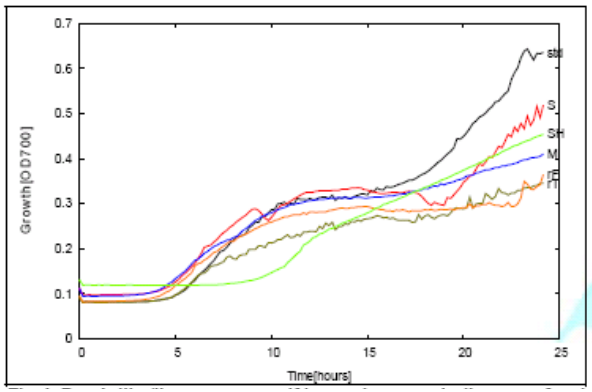


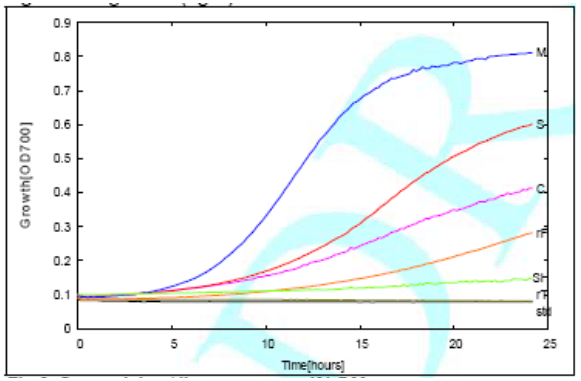
FPI – Fiske Peptider gir usedvanlig Bakterievekst

WW 6 most used bacterias and 5 substrates



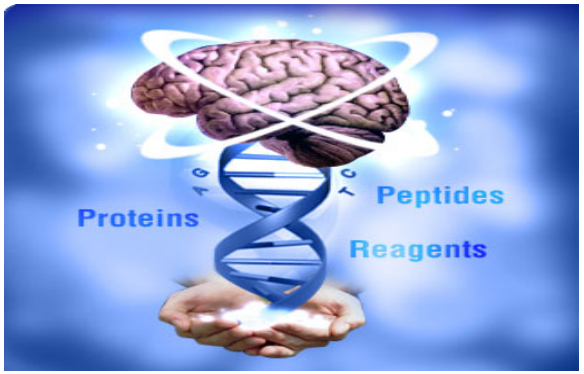
Marine peptides,advantages;
-Not bovin (BSE/mad cow)
-Not bird (not virus)
-Not vegetable (not GMO)
-Can be Kosher
-Can offer molweight refining



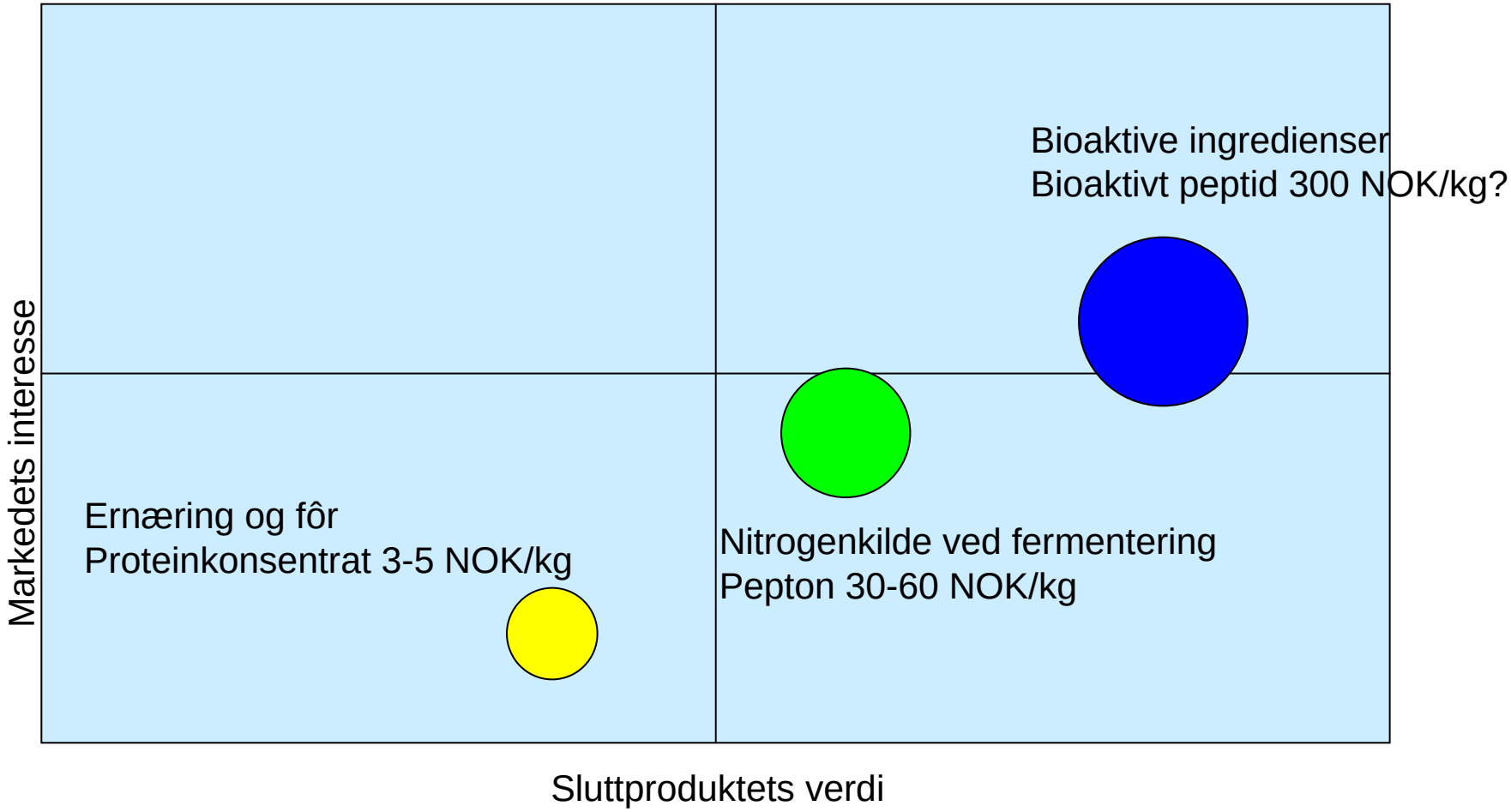


FPI – skånsomt grunnlag for Neutraceuticals

Forbedrer helsetilstand
Reduserer sykdom



Markedsverdi – Marine Proteiner < Peptider

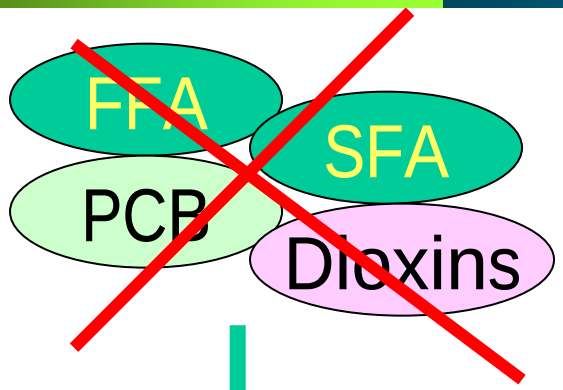


FPI/AMS Membranfiltrering - Sammendrag;

1. Økt kapasitet
2. Økonomisk fordelaktig
3. Miljøvennlig
4. Gjenvinner og bruker ressursene
5. Merverdi mulig
6. Bærekraftig råstoffutnytting
7. Bærekraftig industripraksis.

Bodø Sildoljefabrikk AS fikk GE Ecomagination i 2006 for vesentlig bidrag til FPI/AMS

Marine Oljer; Membran Rafinering for Fôr & Mat



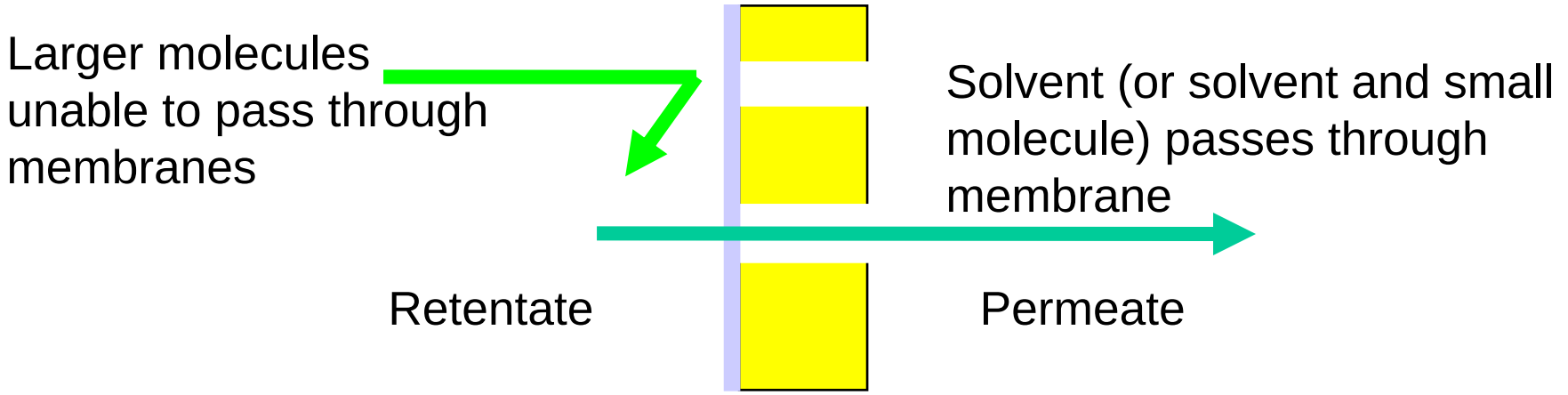
Membran filtration + Auxiliary

FEED

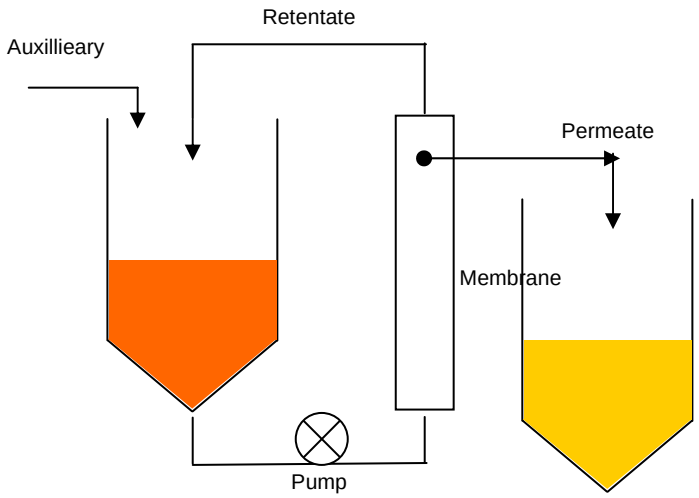
FOOD

Fjerning av FFA i oljer med Organic Solvent Nanofiltration (OSN)

- Nanofiltration membranes are capable of discriminating between molecules in MW range 200-1000 Da
- Up to now, applications are based in aqueous systems
- Emerging membranes available which are resistant to organic solvents



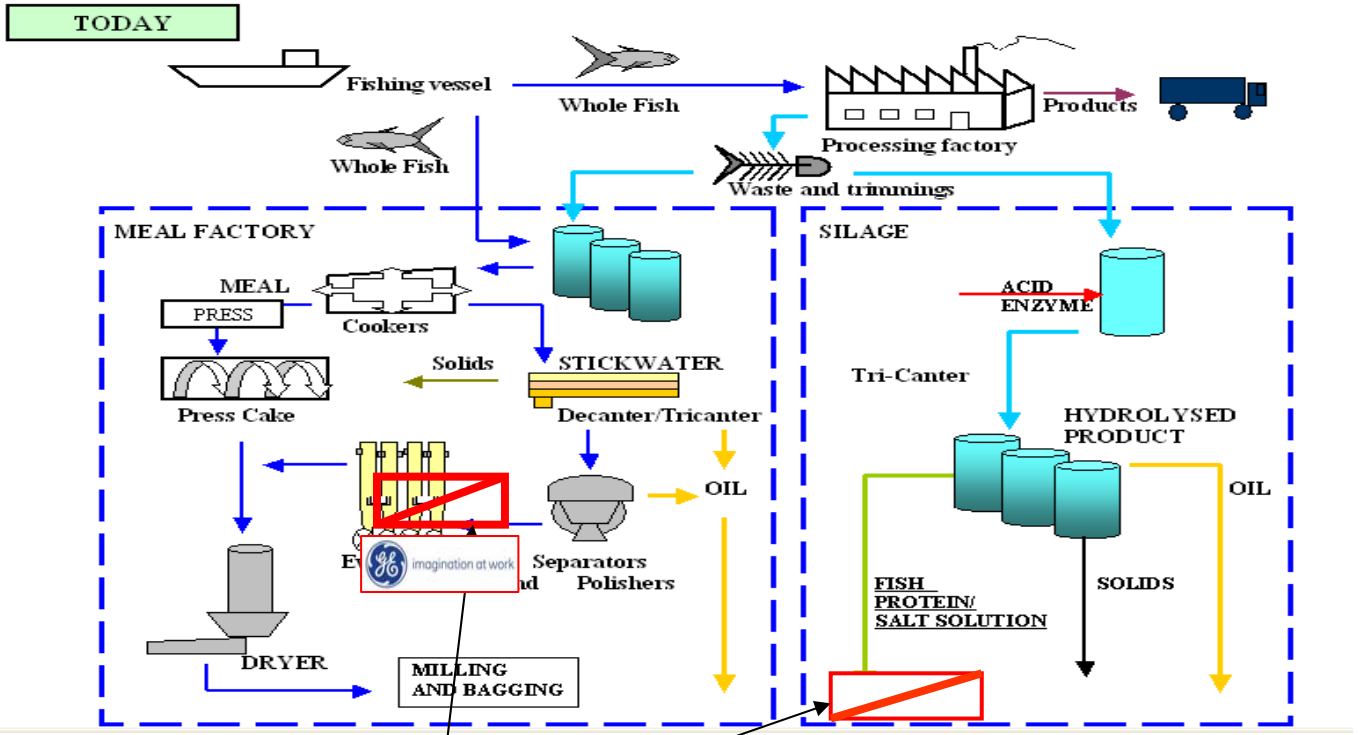
Fjerning av PBT + i oljer med Assistert Membranfiltrering



*__Fjerner__ PBTer som dl-PCB, dioxiner, PAH og tungmetaller til under EU krav
*__Skånsom:__ beholder viktige næringsemner, vitaminer, antioksidanter og omega-3 fettsyrer,
*__Mest kost effektiv:__ driftsikker/enkel prosess høyt utbytte, lite tapt olje og hjelpestoff.
*__Reduserer__ innholdet av lukt, farge og høysmeltepunkt komponenter
*__Lav investering/modulert__ utstyr; enkel kapasitetjustering
*__Kan kombineres__ med andre prosesser.

Tilbyr know how;

*Design/Engineering/Lisens
*Driftsoptimalisering
*Membran integritet



Membraner for
Merverdi av
Fiskemel og -olje

FFA/PBT