

# Hvitfiskmel

## Analyser og muligheter

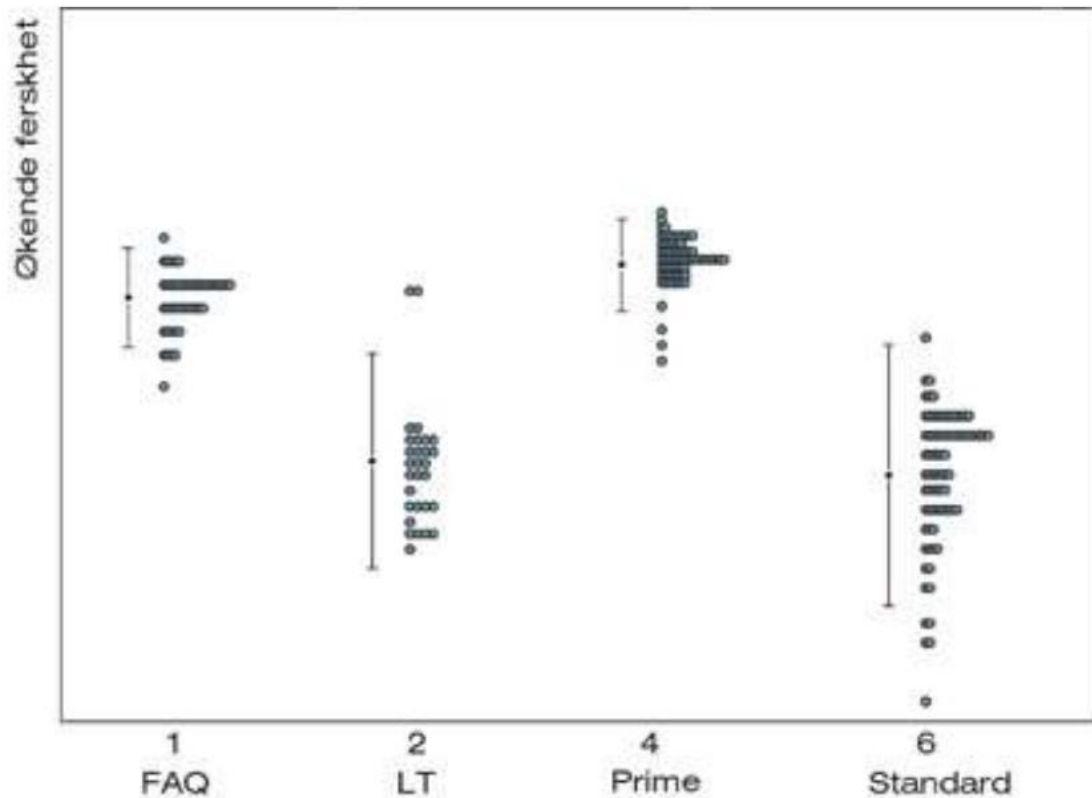
28 februar 2014

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Marin Bioteknologi  
Møreforsking AS

# Oversikt

- Kort om mel prosjekt på hvitfiskmel
- Kort om soyamel versus fiskemel
- FoU utfordringer og markedsmuligheter

# Ulike fiskemel på markedet



# Restråstoff proteinkilde

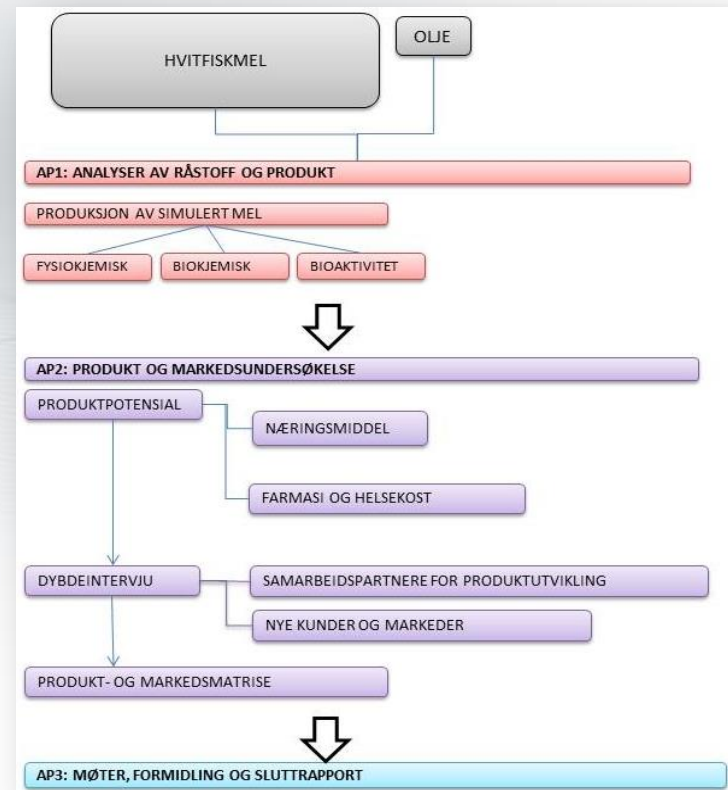


*«FPCP protein content is generally over 50% based on dry weight.  
Therefore, the key solution must be in utilization of the FPCP protein»*

*He, Franco and Zhang, Food Research International, 2013*

# Prosjekt

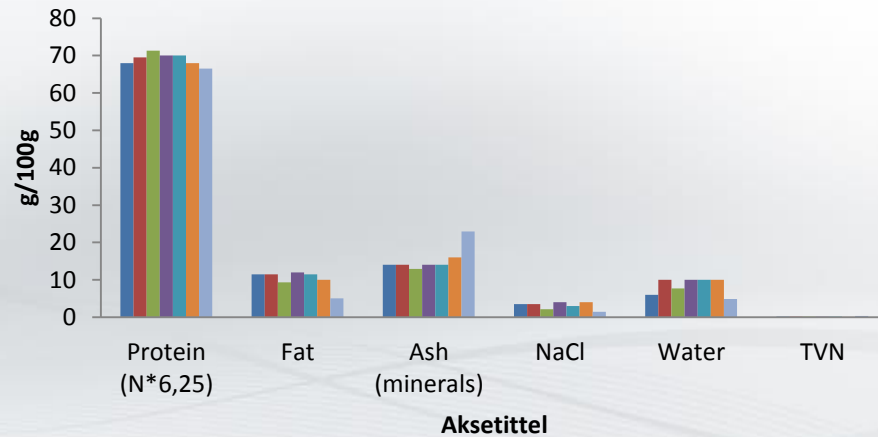
- Forprosjekt (VRI-midler)
  - Litteratur/data på fiskemel (og marint protein)
  - Samle og organisere kjemiske data
- Hovedprosjekt (MR Fylke)
  - Analyser
  - Markedsmuligheter



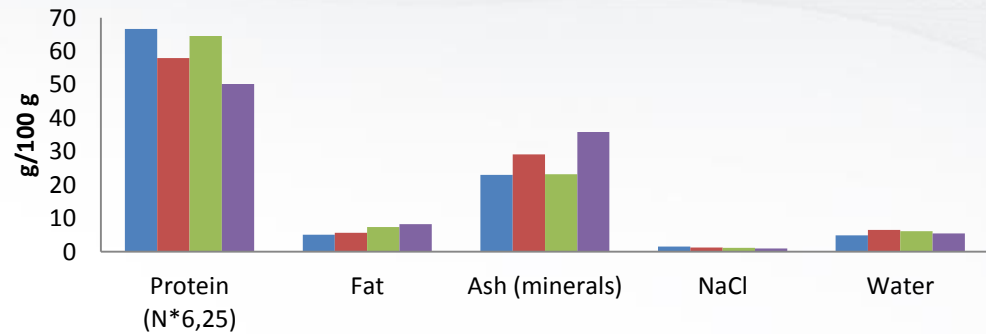
<b>ANALYSER</b>	<b>TYPE</b>	<b>DOKUMENTASJON</b>
Kjemisk innhold	Fett, vann, aske, salt, TVN,	Kvalitet  Variasjon gjennom året
Komplett aminosyreprofil		Essensielle aminosyrer
Frie aminosyrer		Kvalitet/Ferskhet Taurin innhold
Biogene aminer		Kvalitet/Ferskhet/ Lukt, smak Mikrobiell nedbryting
Fysiokjemiske parametere	Vannbinding Emulsjonsegenskaper Løselighet	Relevans for næringsmiddelmarked
Bioaktivitet (hydrolysat)	Enzymhemmende effekt Antimikrobiell effekt	Undersøke høyverdig potensial

# Eksempler

Sammenligne med andre  
Fiskemel på markedet



Årstidsvariasjon







Water binding capacity

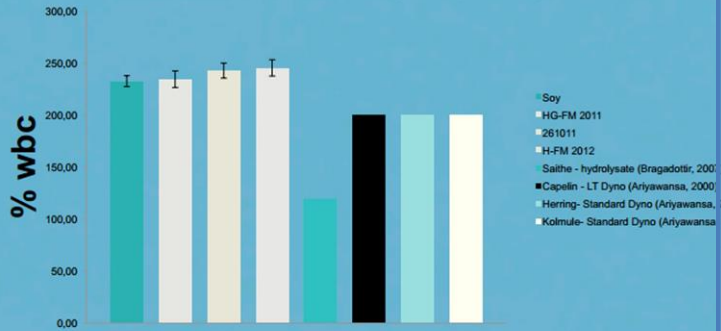
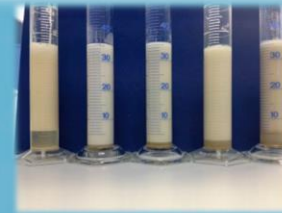
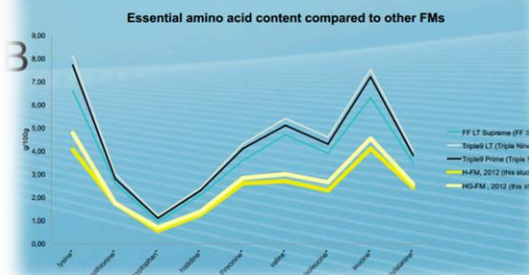
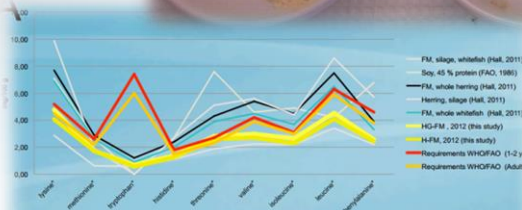
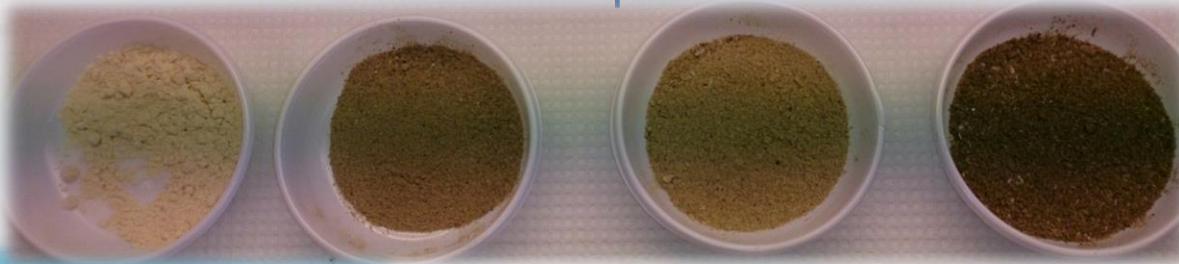


Figure 4. Water binding capacity compared to soy meal (37 % protein).



Sample	Emulsion stability (%)		% decline, 24 hrs
	2 hrs	24 hrs	
Soy meal	70.23 ± 2.51	63.20 ± 2.40	10
FM 9/2010	85.97 ± 2.32	71.05 ± 5.59	17
FM 10/2011	80.17 ± 6.66	62.50 ± 5.94	23
H-FM, 2012	76.07 ± 2.48	63.35 ± 7.42	17
HG-FM, 2012	68.67 ± 6.86	60.40 ± 12.87	12

Table 2. Emulsifying stability compared to soy meal (% ES).



Approx. solubility in water relative to soy meal

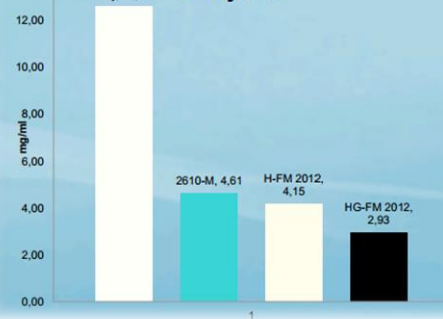


Figure 5. Testing of solubility of the fishmeal in water. Values are average of 3 experiments.



# Soyamel – styrker og svakheter

- ✓ «Gull-standard»
- ✓ Proteinkilde før-industrien (svin, kylling, aqua)
- ✓ Lettfordøyelig
- ✓ Komplette aminosyre profil
- ✓ Lite lukt og smak

MEN Produksjonsbetingelser påvirker kvalitetsparametere:

- ✓ Lavt proteininnhold (40%)
- ✓ Fornøyelighet
- ✓ Løselighet
- ✓ Essensielle aminosyrer
- ✓ Antinutrientielle faktorer
- ✓ GMO



# Plantabaserte proteinkilder

**Table 9.8** Potential fishmeal replacement plant feedstuffs in the US.

<b>Crop</b>	<b>Acres planted (millions)</b>	<b>Production (million tonnes)</b>	<b>Protein content as fed (%)</b>	<b>Lipid (%)</b>	<b>Anti-nutritional factors</b>
Barley	3.88	7.69	14.9	2.1	Nutrient composition, phytic acid, beta-glucans
Canola	Negligible		38.0	3.8	Glucosinolates, erucic acid, phytic acid
Corn	81.76	248.46	8.5 (corn gluten meal 60.4)	3.6 (gluten meal 1.8)	Pigments, lysine limitation
Cottonseed	14.19	7.71	41.7	1.8	Gossypol, quercetin
Peas/ lupins	1.66	2.19	25.6/39.2	1.3/10.3	Alkaloids, oligosaccharides
Soybean	72.38	75.19	De-hulled 48.5; concentrate 64.0	De-hulled 0.9; concentrate 3.0	Non-starch polysaccharides, oligosaccharides, antigenic proteins, protease inhibitors, lectins, oestrogenic compounds, phytic acid
Wheat	65.87	69.56	12.9	1.7	Lysine limitation

Source: After Gatlin *et al.* (2007).

# Soya - markedsføringsstrategi

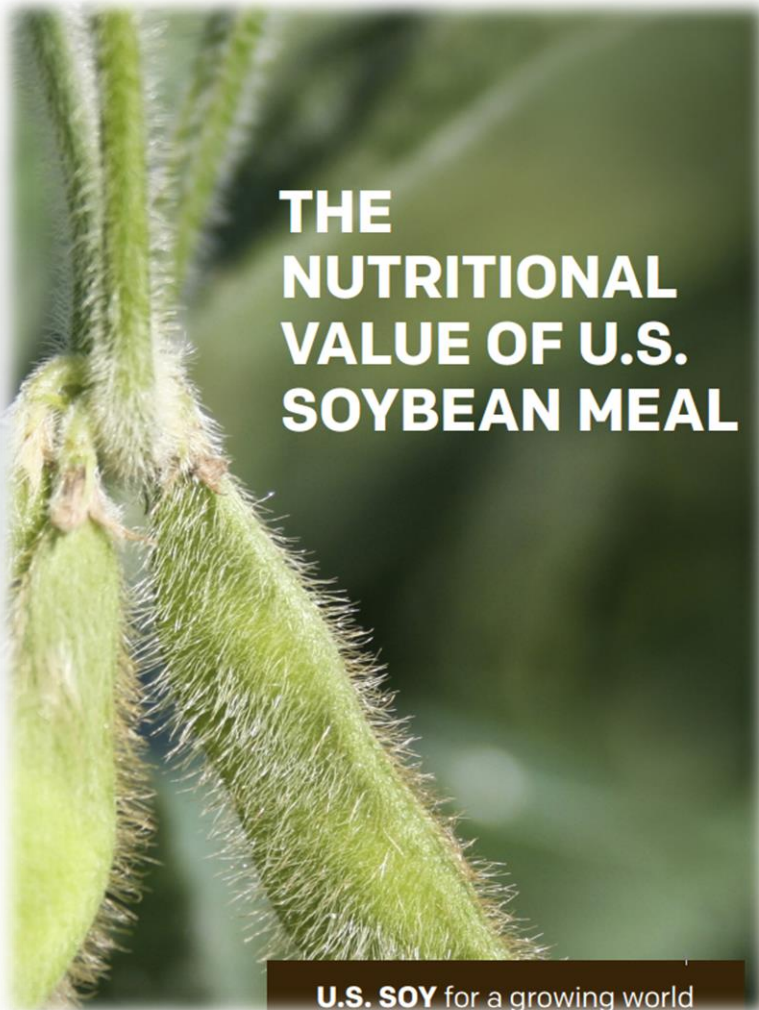
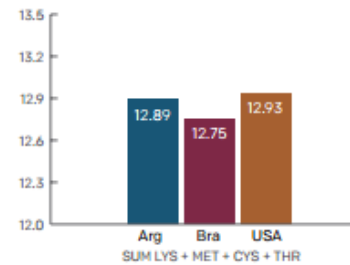
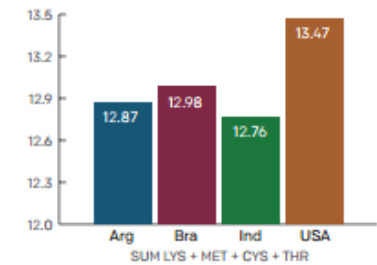


Figure 1. Amino Acid Profile of Soybean Meals of Different Origins (% CP)

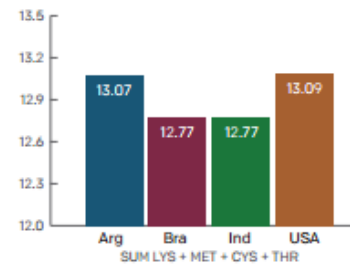
UNIV. POLITÉCNICA MADRID – SPAIN 2007-2011



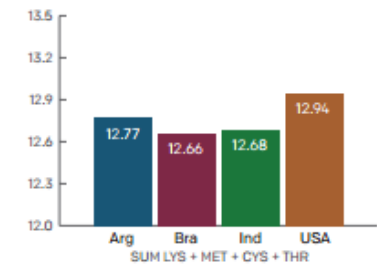
MASSEY UNIVERSITY – NEW ZEALAND 2011



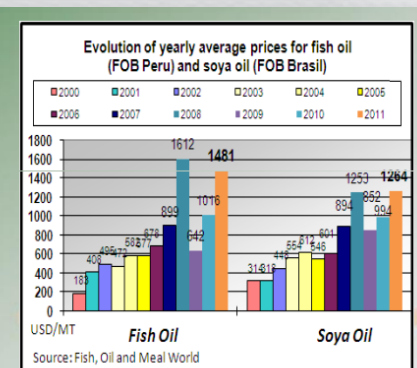
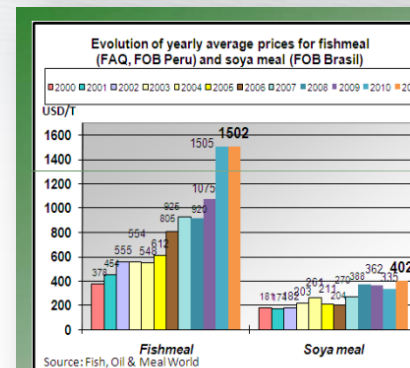
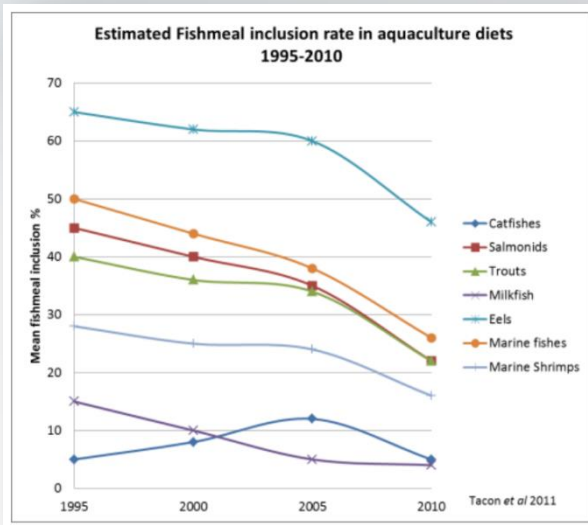
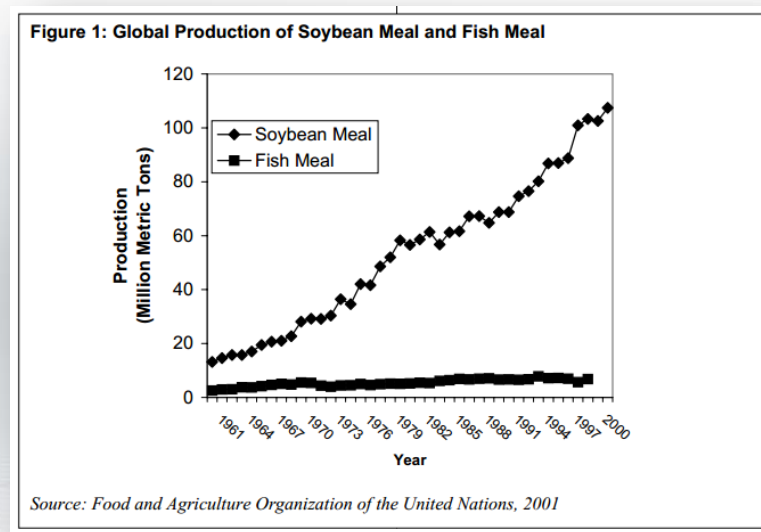
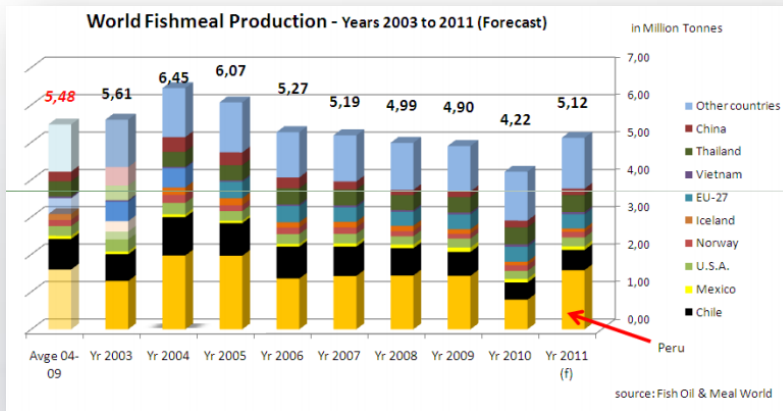
KOREA FEED ASSOCIATION 2007-2011



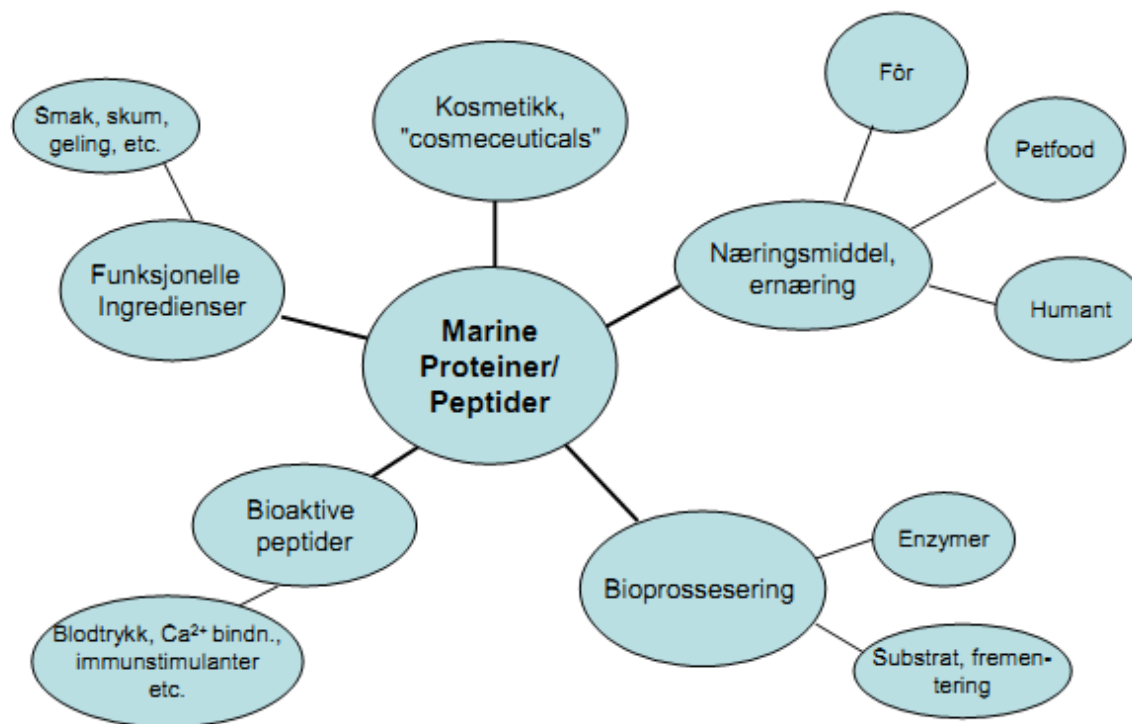
EVONIK\* – AMINODATA 2005-2010



# Hvitfiskmel i perspektiv



# Vurdere nye markeder



# Lykkes på eksisterende markeder

## 1. Kvalitetskontroll (GMP)

- Ferskhets på råvarer
- Prosesstemperatur
- Kontroll på oksidasjon av fett
- Hygiene

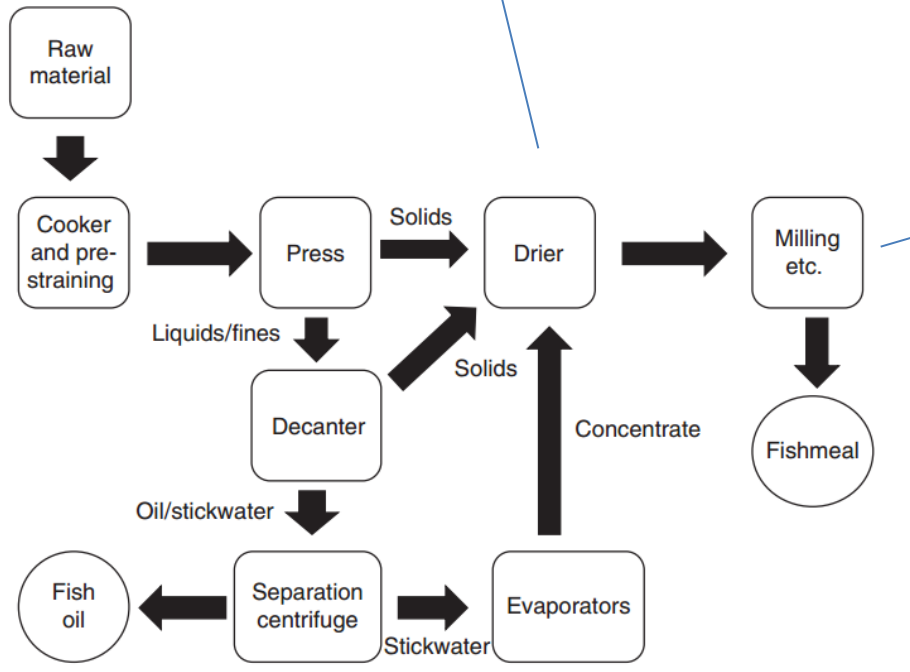
## 2. Kvalitets (assurance) dokumentasjon

- Sporbarhet
- Matsikkerhet
- Renhet

# Kvalitetskontroll

- Ferskhet
- Sammensetning
- Råstoff

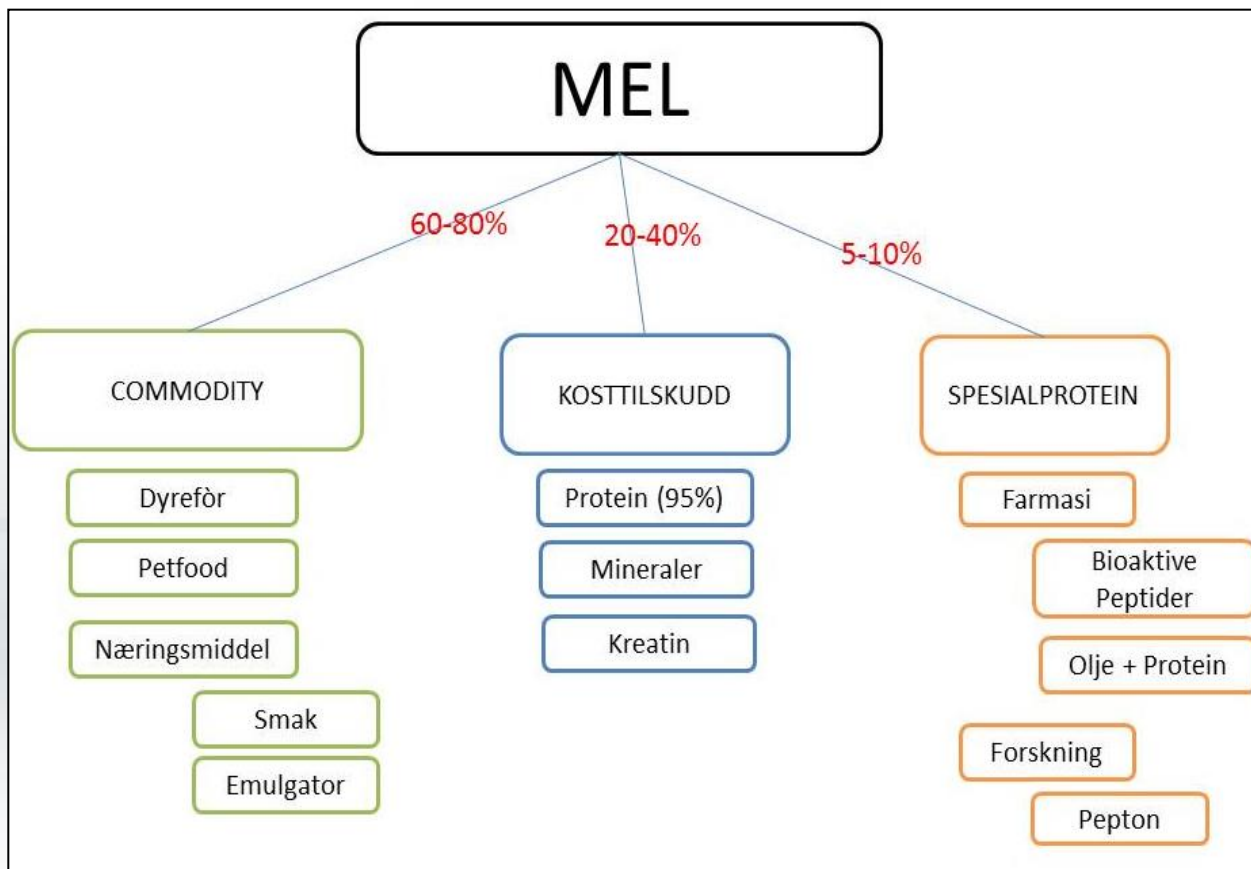
- Temperatur
- Tid



Malingsgrad?

- Limvann tilbake i prosessen?





VOLUM

PRIS

# Enzymbehandling av mel - prosess

Two interesting approaches to added-value products of proteinaceous nature:

## Physiochemical enhancers

- Additives in food articles
- Water- and lipid binding
- Emulsification
- Foaming

## Enzymatically derived biological active proteins and peptides (BAPs)

- Nutraceutical and pharmaceutical market
- Antihypertensive
- Antioxidants
- Antimicrobial activity