

Hvitfiskmel

Analyser og muligheter

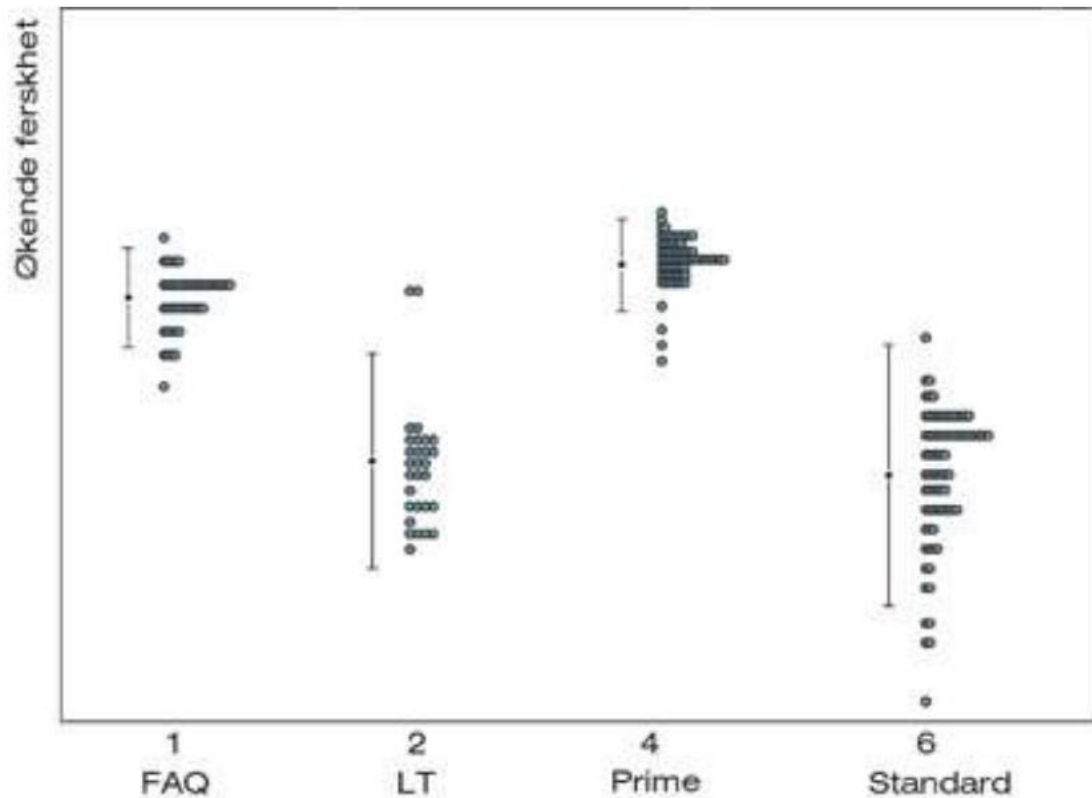
28 februar 2014

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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

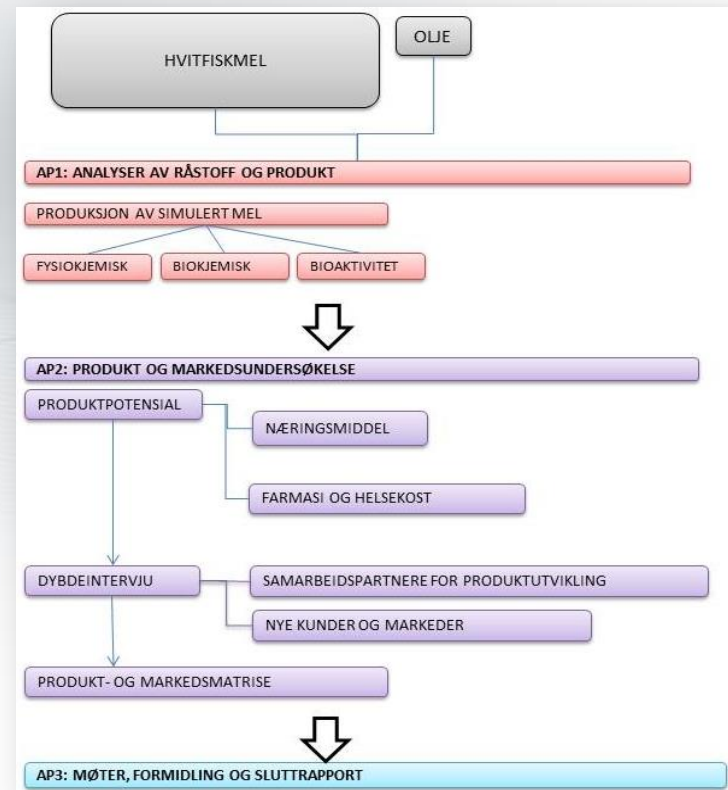


*«FPCP protein content is generally over 50% based on dry weight.
Therefore, the key solution must be in utilization of the FPCP protein»*

He, Franco and Zhang, Food Research International, 2013

Prosjekt

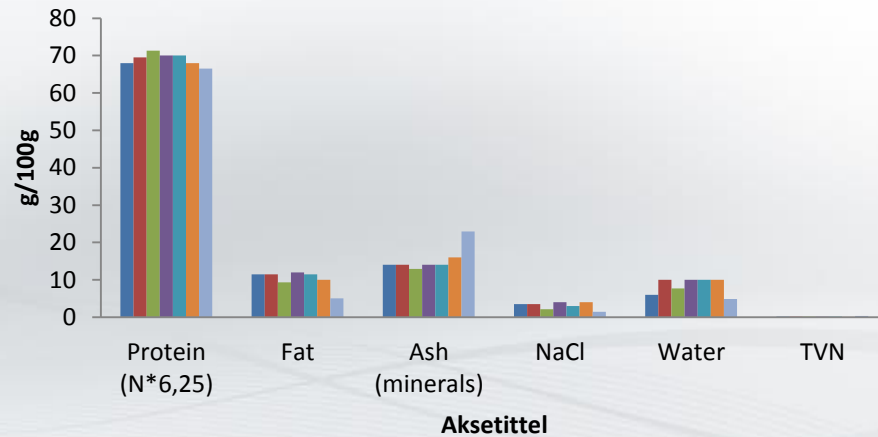
- Forprosjekt (VRI-midler)
 - Litteratur/data på fiskemel (og marint protein)
 - Samle og organisere kjemiske data
- Hovedprosjekt (MR Fylke)
 - Analyser
 - Markedsmuligheter



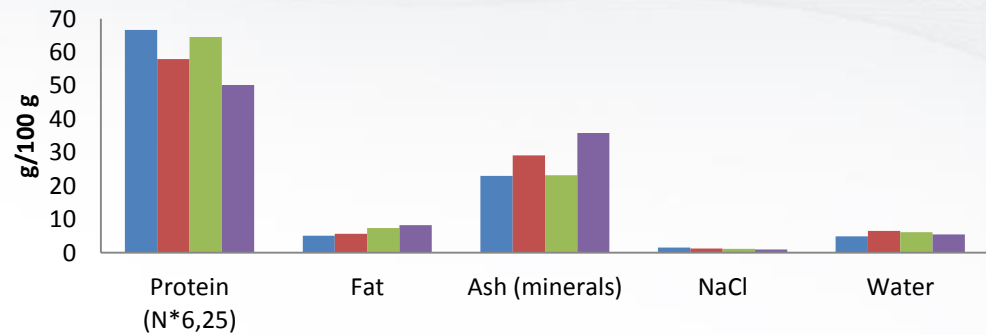
ANALYSER	TYPE	DOKUMENTASJON
Kjemisk innhold	Fett, vann, aske, salt, TVN,	Kvalitet Variasjon gjennom året
Komplett aminosyreprofil		Essensielle aminosyrer
Frie aminosyrer		Kvalitet/Ferskhet Taurin innhold
Biogene aminer		Kvalitet/Ferskhet/ Lukt, smak Mikrobiell nedbryting
Fysiokjemiske parametere	Vannbinding 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

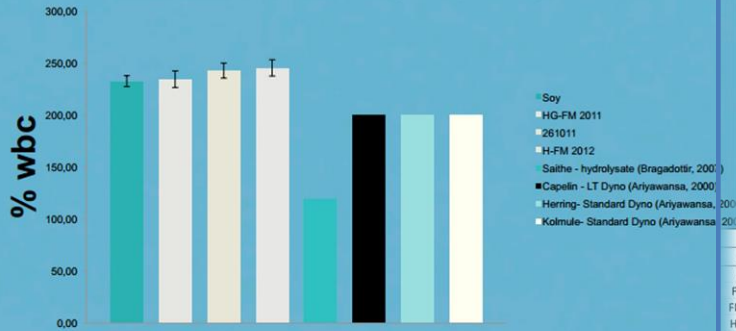
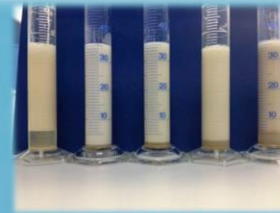
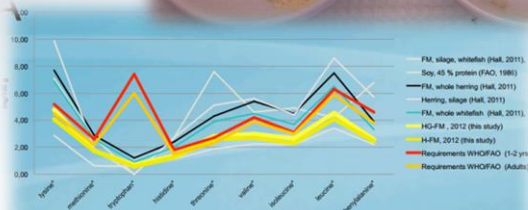
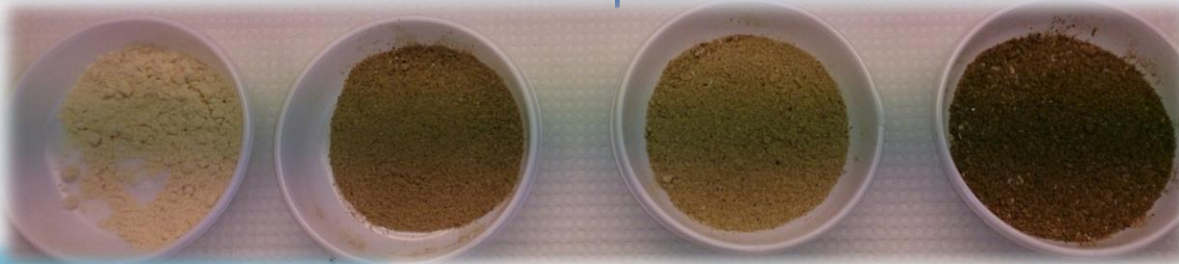


Figure 4. Water binding capacity compared to soy meal (37 % protein).

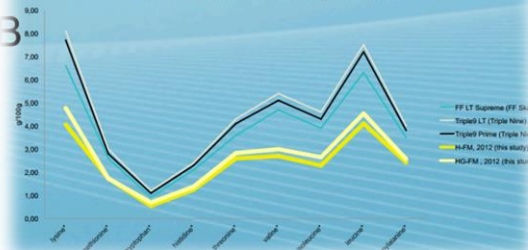


Sample	Emulsion stability (%)		% decline, 24 hrs
	2 hrs	24 hrs	
Soy meal	70.23 ± 2.51	63.20 ± 2.40	10
FM 9/2010	85.97 ± 2.32	71.05 ± 5.59	17
FM 10/2011	80.17 ± 6.66	62.50 ± 5.94	23
H-FM, 2012	76.07 ± 2.48	63.35 ± 7.42	17
HG-FM, 2012	68.67 ± 6.86	60.40 ± 12.87	12

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



Essential amino acid content compared to other FMs



Approx. solubility in water relative to soy meal

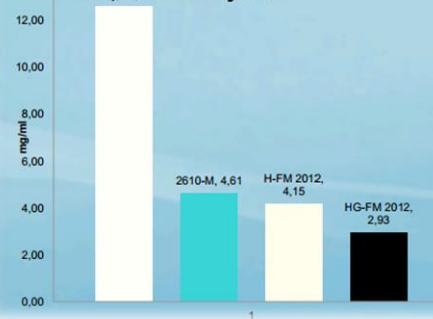


Figure 5. Testing of solubility of the fishmeal in water. Values are average of 3 experiments.

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.

Crop	Acres planted (millions)	Production (million tonnes)	Protein content as fed (%)	Lipid (%)	Anti-nutritional factors
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

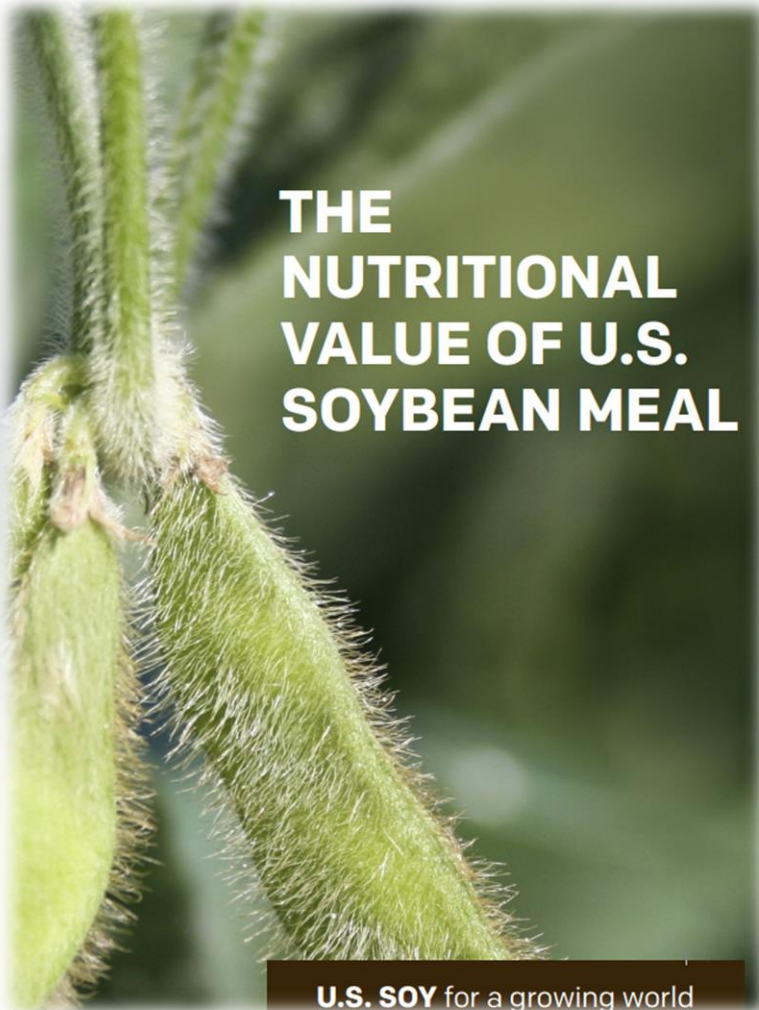
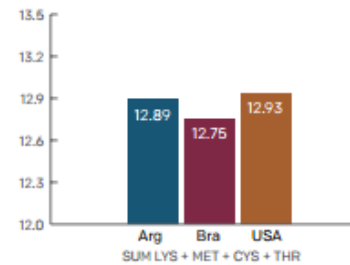
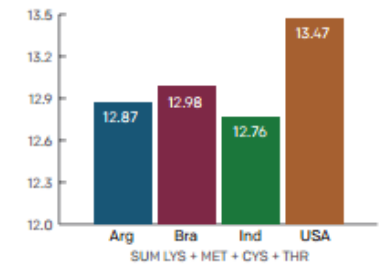


Figure 1. Amino Acid Profile of Soybean Meals of Different Origins (% CP)

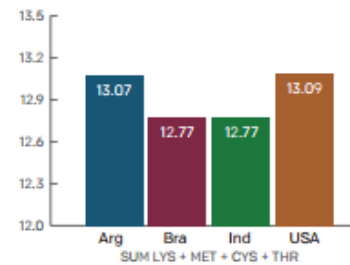
UNIV. POLITÉCNICA MADRID – SPAIN 2007-2011



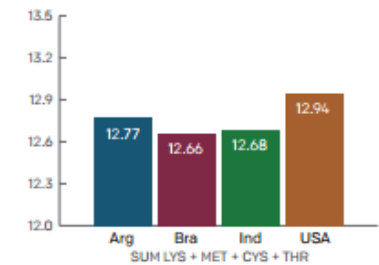
MASSEY UNIVERSITY – NEW ZEALAND 2011



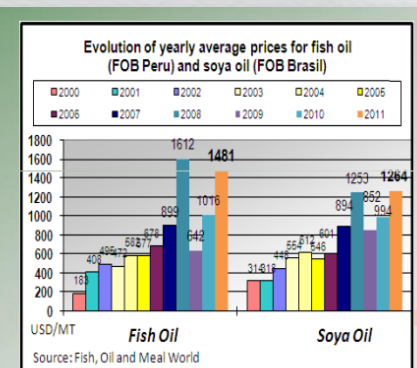
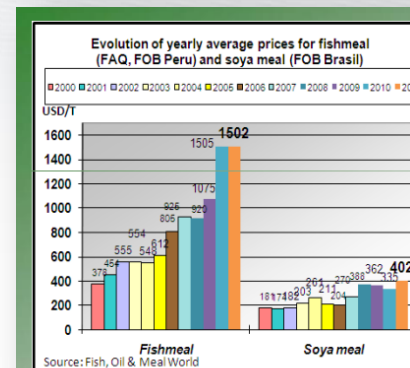
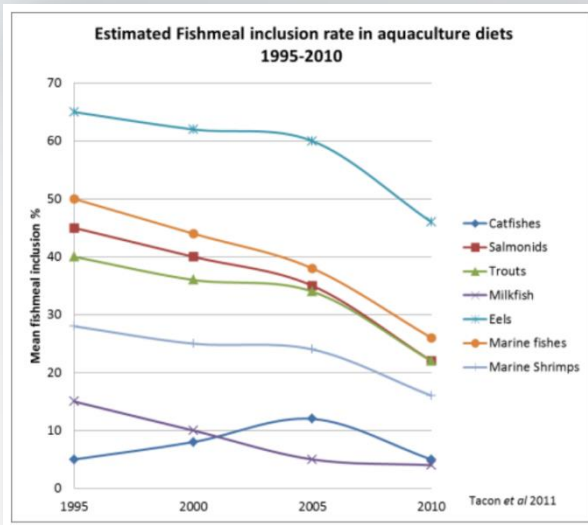
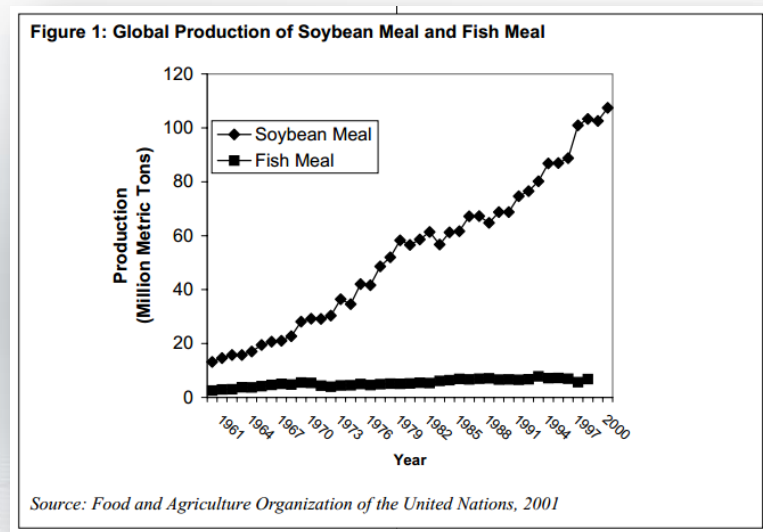
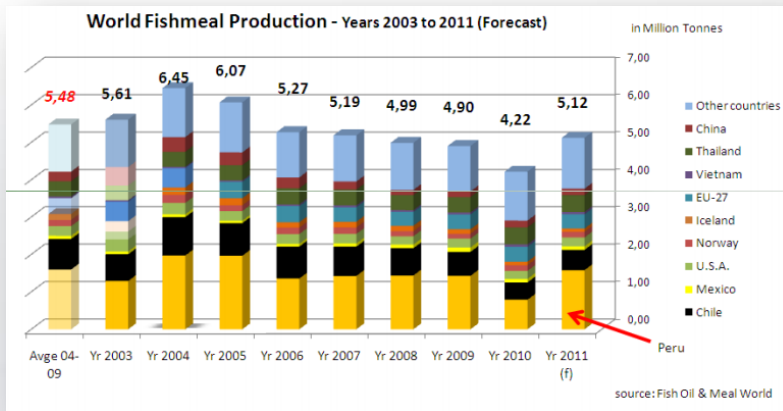
KOREA FEED ASSOCIATION 2007-2011



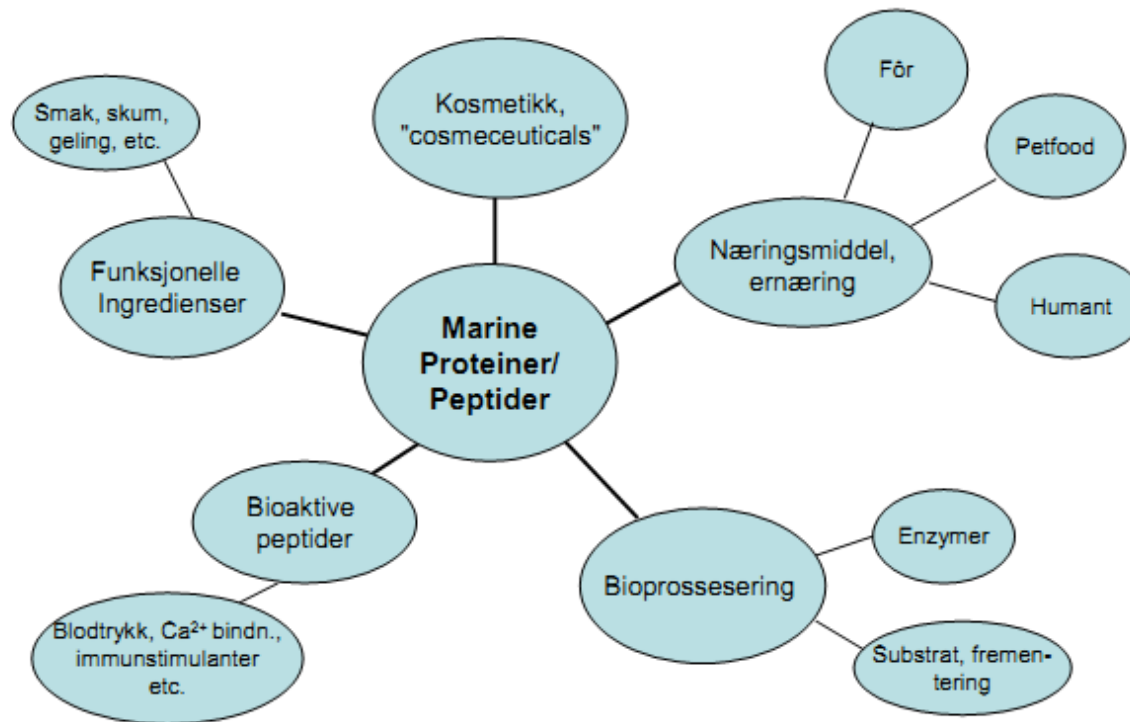
EVONIK* – AMINODATA 2005-2010



Hvitfiskmel i perspektiv



Vurdere nye markeder



Lykkes på eksisterende markeder

1. Kvalitetskontroll (GMP)

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

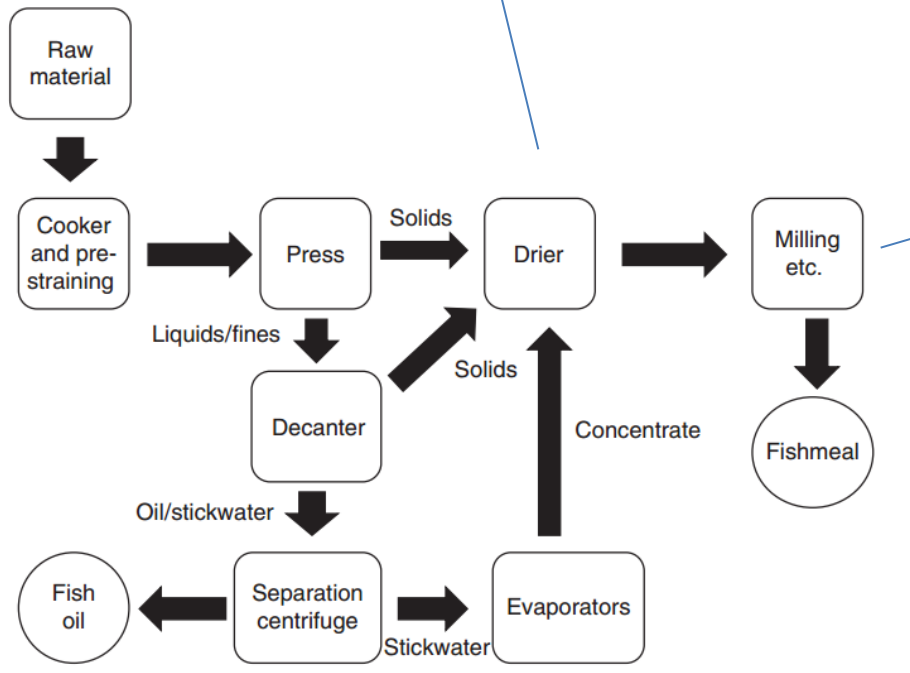
2. Kvalitets (assurance) dokumentasjon

- Sporbarhet
- Matsikkerhet
- Renhet

Kvalitetskontroll

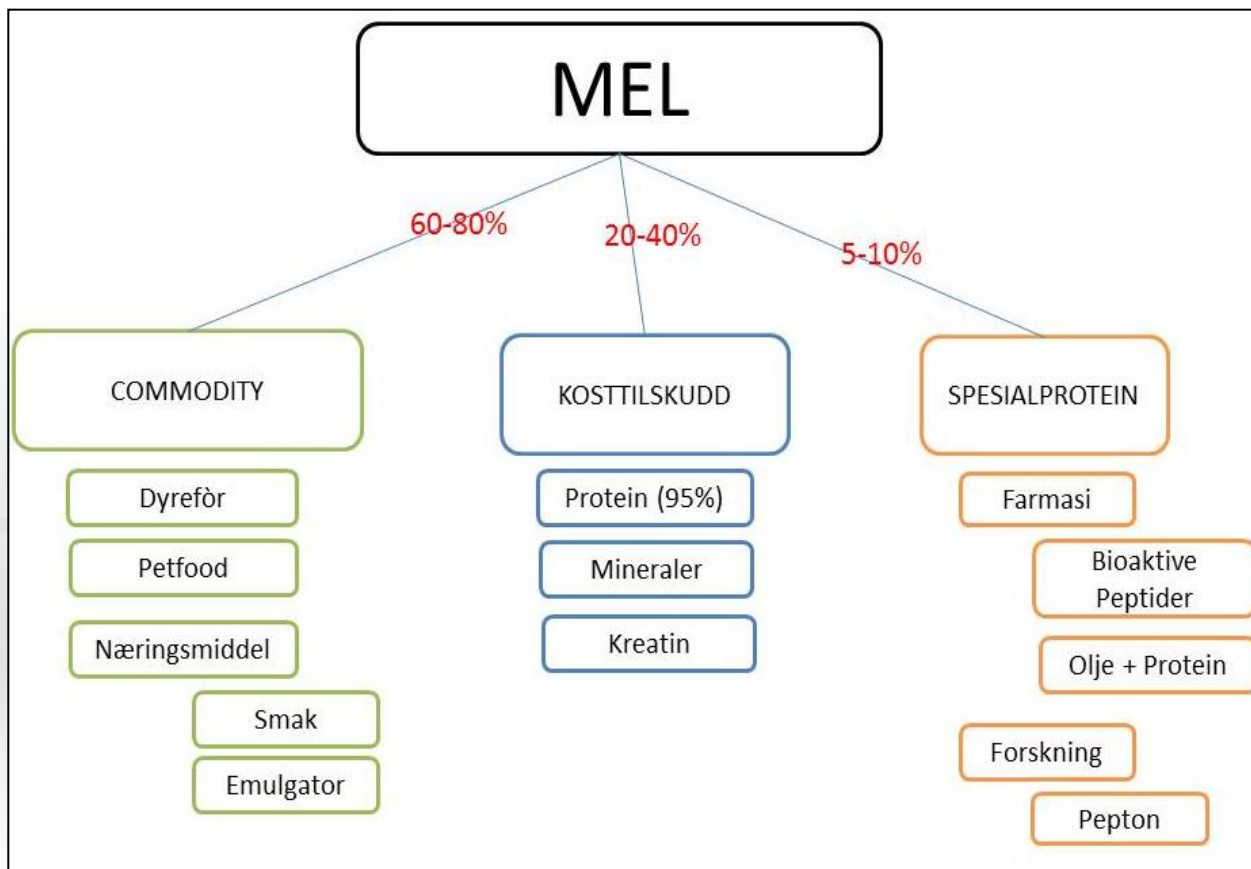
- Ferskhet
- Sammensetning
- Råstoff

- 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