“Fishmeal and Fish Oil”
IFFO The Marine Ingredients Organisation
Dr Neil Auchterlonie (Technical Director)

Seafish ACIG Meeting, London, 5th April 2017
IFFO is.....

- International “not for profit” trade association representing companies in the global marine ingredients sector;
- Promotes fishmeal and fish oil & wider marine ingredients;
- Established in 1959;
- Sector value c. US$9.5bn;
- 60% of global production and 80% of sector traded value within IFFO membership;
- Funded by levy;
- Board of Directors (13 representatives – 4 ex Peru; 3 ex Chile; 3 ex Scandinavia; 1 ex USA; 2 ex Rest of World);
- Secretariat – London (HQ), Lima, Beijing offices;
- Annual Conference; annual Members’ Meeting;
- Evidence-based – invests in science.
Who are our members?

• **Producers**
  i. *Fishmeal and Fish Oil manufacturers*

• **Non-Producers**
  i. *Feed companies, Petfood ingredient suppliers*
  ii. *Fish oil refiners*
  iii. *Fish farmers*
  iv. *Traders and Brokers*
  v. *Retailers, insurance co’s, laboratories.*
What are Marine Ingredients?
The Process.....

Whole Fish: 16,473

By-Products: 5,491

FISH OIL: 1,032

Water/Steam: 15,990

Total: 21,964

Estimate: c.20mT per annum raw material total

Thousand tonnes
Raw Material supply

Increasing:
• Shepherd 2012: estimated byproducts @ 25% of total raw material volume in 2011;
• FAO predicts increase to 49% by 2022;
• FAO: “95% of increasing quantity of fishmeal will come from byproduct”
**Historical trends: fishmeal**

* Peru, Chile, Denmark, Norway, Iceland, UK, EIRE, Faroe Islands, USA, South Africa

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**Total production (000 mt)**  
% IFFO Countries  
% Peru

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* Peru, Chile, Denmark, Norway, Iceland, UK, EIRE, Faroe Islands, USA, South Africa
Historical trends: fish oil

* Peru, Chile, Denmark, Norway, Iceland, UK, EIRE, Faroe Islands, USA, South Africa
Changing patterns of consumption: Aquafeed now dominates global fishmeal consumption
The need for feed

Fishmeal supply static – aquaculture grows

Source: Shepherd, 2012
Resulting in: Decreasing inclusion rates in grower diets....

Figure 3: Salmon feed formula development, a gradual replacement of marine ingredients

<table>
<thead>
<tr>
<th>Year</th>
<th>Fishmeal (%)</th>
<th>Fishoil (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>63.8%</td>
<td>23.4%</td>
</tr>
<tr>
<td>2000</td>
<td>37.5%</td>
<td>30.7%</td>
</tr>
<tr>
<td>2010</td>
<td>25.6%</td>
<td>17%</td>
</tr>
</tbody>
</table>

Source: EWOS, 2015

Fig. 1. Nutrient sources in Norwegian salmon farming from 1990 to 2013. Each ingredient type is shown as its percentage of the total diet.
Changing market for marine ingredients....

- Move from a commodity market;
- Expensive!
- Use as a strategic feed ingredient;
- High protein; good amino acid profile; PUFAs (EPA, DHA); other micronutrients;
- Hatchery; broodstock; pig weaning; laying hens
Decoupling of price dynamics in fish oil....

Figure 4: Fish oil and soy oil prices are no longer correlated, 2007-2015

Source: Oilworld, Bloomberg, 2015
Expecting the same to happen with fishmeal.....
Nutritional quality

- Fishmeal is more than just crude protein supply:
  - Good amino acid profile (for fish);
  - Vitamins (esp. B group);
  - Minerals (Ca, P, Mg, K, Se);
  - EPA/DHA.

- Also...
  - Highly digestible;
  - Palatability;
  - No ANFs.

Table 3. Percentage of essential amino acids (EAA)\(^1\) in fishmeal (FM), rendered meat meal (MM), poultry by-product meal (PBM), blood meal (BM), soybean meal (SBM). Percentage of crude protein in the meal (in parenthesis).

<table>
<thead>
<tr>
<th>Essential Amino Acid</th>
<th>FM (64.5%)(^2)</th>
<th>MM (55.6%)(^2)</th>
<th>PBM (59.7%)(^2)</th>
<th>BM (89.2%)(^2)</th>
<th>SBM (50.0%)(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>3.82</td>
<td>3.60</td>
<td>4.06</td>
<td>3.75</td>
<td>3.67</td>
</tr>
<tr>
<td>Histidine</td>
<td>1.45</td>
<td>0.89</td>
<td>1.09</td>
<td>5.14</td>
<td>1.22</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>2.66</td>
<td>1.64</td>
<td>2.30</td>
<td>0.97</td>
<td>2.14</td>
</tr>
<tr>
<td>Leucine</td>
<td>4.48</td>
<td>2.85</td>
<td>4.11</td>
<td>10.82</td>
<td>3.63</td>
</tr>
<tr>
<td>Lysine</td>
<td>4.72</td>
<td>2.93</td>
<td>3.06</td>
<td>7.45</td>
<td>3.08</td>
</tr>
<tr>
<td>Methionine + Cystine(^1)</td>
<td>2.31</td>
<td>1.25</td>
<td>1.94</td>
<td>2.32</td>
<td>1.43</td>
</tr>
<tr>
<td>Phenylalanine + Tyrosine(^4)</td>
<td>4.35</td>
<td>2.99</td>
<td>3.97</td>
<td>8.47</td>
<td>4.20</td>
</tr>
<tr>
<td>Threonine</td>
<td>2.31</td>
<td>1.64</td>
<td>0.94</td>
<td>3.76</td>
<td>1.89</td>
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<tr>
<td>Tryptophan</td>
<td>0.57</td>
<td>0.34</td>
<td>0.46</td>
<td>1.04</td>
<td>0.69</td>
</tr>
<tr>
<td>Valine</td>
<td>2.77</td>
<td>2.52</td>
<td>2.86</td>
<td>7.48</td>
<td>2.55</td>
</tr>
</tbody>
</table>

\(^1\)The percentage values for the EAA composition of each feedstuff were taken from the 1993 NRC (National Research Council. Nutrient Requirements of Fish, National Academy of Sciences, Washington, DC).
\(^2\)Percentage of total crude protein in feedstuff.
\(^3\)Cystine can be synthesized from methionine.
\(^4\)Tyrosine can be synthesized from phenylalanine.

Source: R.D. Miles and F.A. Chapman “The Benefits of Fish Meal in Aquaculture Diets”
http://edis.ifas.ufl.edu
Looking forward...

• More feed needed for aquaculture;
• Volume of supply of ingredients;
• Currently already vegetable origin ingredients use widespread;
• Alternative ingredients are required to meet demand;
• Nutritionally fishmeal is very difficult to replicate – looking for complementary ingredients for aquafeeds;
• “As well as, not instead of”…

www.iffo.net
Fishmeal - Traceable & Certified

IFFO RS (Responsible Supply)
- Launched in 2009
- Over 110 certified producers;
- Predict c.47% of global production in 2017;
- Supported by all leading feed companies;
- v2.0 in development for end of 2017.
More information: www.iffo.net
Thank you for listening, any questions?