Fishmeal and Fish Oil – The Facts, Figures, Trends, and IFFO’s Responsible Supply Standard

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International Fishmeal & Fish Oil Organisation

1st February 2011
International Fishmeal and Fish Oil Organisation is the global trade association representing fishmeal and fish oil producers and related trades.

Represents two thirds of world production and 80% of trade in fishmeal and fish oil worldwide with producers in Europe, South America, Africa, USA, China and India.
Important feed ingredients

Fishmeal is an excellent high protein feed ingredient used at least at some stage in almost all intensive aquaculture systems.

Fish oil is the best source of the omega-3 fatty acids EPA & DHA and its use in feeds ensures a healthy product for the final consumer.

However, despite the growth of aquaculture, the global production of both fishmeal & fish oil has remained fairly static.

Graph showing the production of fishmeal and fish oil from 1963 to 2008.

IFFO data
Production of fishmeal and oil has remained relatively steady although the introduction of precautionary quotas & increased use for direct human consumption has resulted in reduced volumes of whole fish going for fishmeal & oil.
Eco-efficiency of fishmeal & fish oil

Seasonal surplus of less desirable fish and inedible by-products are collected.

They are efficiently converted into concentrated stable products which can be economically shipped to where they are required.

IFFO estimates 2008
Volumes of whole fish being used as feed are decreasing

Whole fish rendered for different purposes
Tonnes,000

Aquaculture
Oil for Human Consumption
Oil other uses
Other land animals
Pigs
Chickens
Use of Fisheries By-products is increasing

Estimate of Global Production By-Product Fishmeal  2008

<table>
<thead>
<tr>
<th>Production in thousand tonnes</th>
<th>Fishmeal</th>
<th>By-Product Coefficient %</th>
<th>By-product FM Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>THAILAND</td>
<td>468.0</td>
<td>60</td>
<td>280.8</td>
</tr>
<tr>
<td>JAPAN</td>
<td>202.9</td>
<td>90</td>
<td>182.6</td>
</tr>
<tr>
<td>CHILE</td>
<td>673.3</td>
<td>14</td>
<td>94.3</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>216.2</td>
<td>25</td>
<td>54.1</td>
</tr>
<tr>
<td>MEXICO</td>
<td>105.8</td>
<td>50</td>
<td>52.9</td>
</tr>
<tr>
<td>ICELAND</td>
<td>140.9</td>
<td>32</td>
<td>45.1</td>
</tr>
<tr>
<td>RUSSIAN FED.</td>
<td>71.0</td>
<td>50</td>
<td>35.5</td>
</tr>
<tr>
<td>DENMARK</td>
<td>161.3</td>
<td>20</td>
<td>32.3</td>
</tr>
<tr>
<td>CANADA</td>
<td>31.2</td>
<td>100</td>
<td>31.2</td>
</tr>
<tr>
<td>NORWAY</td>
<td>135.0</td>
<td>22</td>
<td>29.7</td>
</tr>
<tr>
<td>TOTAL 10</td>
<td>2,205.6</td>
<td></td>
<td>838.4</td>
</tr>
<tr>
<td>OTHERS</td>
<td>2,612.4</td>
<td>15</td>
<td>389.5</td>
</tr>
<tr>
<td>TOTAL WORLD</td>
<td>4,818.0</td>
<td>25%</td>
<td>1227.9</td>
</tr>
</tbody>
</table>

Increasingly marine feed ingredients are coming from fisheries by-products - now reached over 25% of global production.
We estimate that in 2009 63% of global fishmeal production went to aquaculture and that was split almost equally between salmonids, marine fish, crustacean and others.
We estimate that in 2009 81% of global fish oil production went to aquaculture and that 68% of that went to salmonids.

• Direct Human Consumption,
•** Other usage including fat hydrogenation & industrial use

Source IFFO
Global aquaculture production has continued to grow while usage of fishmeal & fish oil is static.
Will static supplies of marine ingredients limit aquaculture growth?

- As prices rise alternatives (e.g. soy meal, rapeseed oil) are used in partial replacement
- Increasing nutritional knowledge allows more replacement to take place particularly on more established species
- Improved genetics and processing are improving the quality of alternative proteins
- Increasingly fishmeal is being used as a strategic ingredient at lower levels and retained in special diets e.g. fry and broodstock diets
Feeding fish to fish

Fish is a natural food for fish – all fish are carnivorous at some stage

Fishmeal & fish oil provide an almost perfect nutrient balance promoting health & welfare

Increasing amounts are going for direct human consumption....

Ethical case that the ‘feed’ fish should/could go for direct human consumption not that simple in fact – Wijkstrom...
Increasing use for direct human consumption

- Norway - Capelin, Herring & Blue Whiting
- Denmark - Herring & Blue Whiting
- Chile - Jack Mackerel & Horse Mackerel
- Peru – Last year approx. 190,000 tonnes of anchovy went for human consumption (3%)
Some are concerned about the ethics of feeding fish to fish as opposed to direct to humans – subject of a recent report for FAO.

“The idea of landing large quantities of anchoveta, or sand eel, or most of the other species used in feed fisheries, and using them to provide food for the poor is a laudable objective, but unrealistic.”
Wijkstrom divides whole fish used for fishmeal into three groups

<table>
<thead>
<tr>
<th>Species</th>
<th>Marketability as food</th>
<th>Annual catch for food and feed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. INDUSTRIAL GRADE FORAGE FISH</strong></td>
<td>No market at all as food. Fishery would cease if no fishmeal plants.</td>
<td>1.2Mt</td>
</tr>
<tr>
<td>Gulf Menhaden, Sandeel, Atlantic Menhaden, Norway pout</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. FOOD GRADE FORAGE FISH</strong></td>
<td>Demand often small, localised or niche. Fishmeal plants take what food fish markets cannot absorb.</td>
<td>13.2</td>
</tr>
<tr>
<td>Peruvian, Japanese, South African, European and other anchovy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capelin, Blue Whiting and European spratt</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. FOOD FISH REJECTED BY THE MARKET</strong></td>
<td>Well established food markets. Landings not in demand for food go for fishmeal and fish oil</td>
<td>6.25Mt</td>
</tr>
<tr>
<td>Chilean Jack mackerel, Chub mackerel &amp; other species of sardine, mackerel &amp; herring</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Then calculates net addition to supply for human consumption via aquaculture for each group – total **7-8Mt globally per annum**
Wijkstrom’s own SUMMARY

Given that overall:
1. The amount of fish available as food is larger than when fish is used as feed than without this practice, by 7-8Mt
2. That the price of fish globally is reduced because of aquaculture
3. That employment is larger with the practice than without it
4. Reduction fisheries can be, and increasingly are managed effectively

The practice of using fish as feed is viable, that is, is capable of surviving as a practice within the coming decades.
But Wijkstrom also says:

“Where feed fisheries are not managed sustainably, aquaculture today constitutes an important threat to world fish stocks because of aquaculture’s reliance on fishmeal and thus on reduction fisheries”

Sustainable management of feed fish stocks is the crucial issue
Most fisheries have been poorly managed at some stage
Significant improvements have been made in the last ten years
For example Peru now has some of the best managed fisheries in the world:

Table 6. Average performance scores for the 53 countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Average score</th>
<th>Country</th>
<th>Average score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peru</td>
<td>6.42</td>
<td>Sweden</td>
<td>3.82</td>
</tr>
<tr>
<td>Namibia</td>
<td>5.10</td>
<td>Pakistan</td>
<td>3.81</td>
</tr>
<tr>
<td>USA</td>
<td>5.10</td>
<td>Indonesia</td>
<td>3.80</td>
</tr>
<tr>
<td>Germany</td>
<td>4.90</td>
<td>Japan</td>
<td>3.78</td>
</tr>
<tr>
<td>Poland</td>
<td>4.82</td>
<td>Australia</td>
<td>3.78</td>
</tr>
<tr>
<td>Norway</td>
<td>4.71</td>
<td>Spain</td>
<td>3.77</td>
</tr>
<tr>
<td>Senegal</td>
<td>4.70</td>
<td>Taiwan</td>
<td>3.75</td>
</tr>
<tr>
<td>Chile</td>
<td>4.67</td>
<td>Thailand</td>
<td>3.74</td>
</tr>
<tr>
<td>South Africa</td>
<td>4.64</td>
<td>Viet Nam</td>
<td>3.70</td>
</tr>
</tbody>
</table>

RANKING MARITIME COUNTRIES BY THE SUSTAINABILITY OF THEIR FISHERIES Mondoux et al (2008)
Responsible management of fisheries

- World’s largest feed fishery - the Peruvian anchovy – now well managed
- Europe re-building their feed fisheries
- Still concern over feed fisheries in Asia – mostly due to the use of trash fish and a lack of fisheries information
- It is becoming increasingly important to be able to demonstrate responsible fisheries management of the raw material
Reassuring the value-chain about fisheries management

- FAO Code of Conduct for Responsible Fisheries is the only internationally recognised measure of good management
- MSC standard certifies fisheries that are managed according to FAO Code
- Currently small volumes of fishmeal & fish oil available from MSC approved fisheries – more under assessment
- It can be slow and expensive to undertake an MSC assessment
IFFO recently launched its Global Standard for Responsible Supply (IFFO-RS)

- RS is a B-to-B initiative following the ISO-65 Standard
- Standard developed by multi-stakeholder committee including retailers & NGOs
- 3rd party auditable standard ensures responsible raw material procurement & good manufacturing practice
- The standard requires an applicant to demonstrate that the factory:
  - Sources its whole-fish raw material from fisheries managed according to the FAO Code of Conduct for Responsible Fisheries
  - Avoids the use of Illegal, Unreported & Unregulated fish IUU
  - Does not source fisheries by-products from IUCN red listed fisheries
  - Manufactures under a recognised quality control scheme to ensure product safety & purity
MSC & IFFO RS are different things

IFFO RS is a B-to-B certification programme that enables a compliant factory to demonstrate that it responsibly sources its raw material from well managed fisheries and responsibly converts that into pure and safe products.

The MSC's fishery certification program and seafood eco-label recognise and reward sustainable fishing.
## IFFO-RS progress to date - 1

Launched to members in October 2009

First factory was awarded certification in February 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Fishery</th>
<th>Nº of companies</th>
<th>Nº of certified factories</th>
<th>Nº of factories pending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peru</td>
<td>Peruvian anchovy (<em>Engraulis ringens</em>)</td>
<td>9</td>
<td>44</td>
<td>10</td>
</tr>
<tr>
<td>USA</td>
<td>Gulf menhaden (<em>Brevoortia patronus</em>)</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Iceland</td>
<td>Summer spawning Herring (<em>Clupea harengus</em>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capelin (<em>Mallotus villosus</em>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blue whiting (<em>Micromesistius poutassou</em>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Atlanto spring spawning herring (<em>Clupea harengus</em>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>Norway pout (<em>Trisopterus esmarkii</em>)</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sand eel (<em>Ammodytes marinus</em>)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>54</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>
This represents over 20% of world production of fishmeal and fish oil.

There are more factories in assessment.

Factories utilising fisheries by-products can now apply for approval under a recently launched new extension to the RS standard.

The IFFO-RS standard is under continuous development e.g. Chain-of-Custody.
IFFO-RS Improvers Programme under discussion

- Concern that factories in some countries will find the RS Standard difficult to achieve
- No wish to dilute the current IFFO-RS standard
- Desire to bring about fishery and factory improvement where required
- May require government commitment in some cases
- May require access to capital funds for investment in factory & fisheries management
- Multi-lateral discussions are taking place with different parties including FAO, NGO’s etc
But is IFFO RS becoming recognised?
4. To support independent standards

We will continue to support the development and widespread adoption of certification standards for responsible fisheries and aquaculture as well as a process for certifying producers who adopt the standards. Examples include:

- The Marine Stewardship Council
- The Aquaculture Stewardship Council the WWF Aquaculture Dialogues
- The International Fishmeal and Fish Oil Organisation Global Standard for Responsible Supply
- GlobalGAP
- The Global Aquaculture Alliance Best Aquaculture Practises
- The International Seafood Sustainability Foundation
- Icelandic Responsible Fisheries

AIPCE is the EU Fish Processors and Traders Association.

The companies in AIPCE have sales in excess of 4 billion euros.
# Summary of the Aquaculture standards

<table>
<thead>
<tr>
<th></th>
<th>GlobalGAP</th>
<th>GAA BAP</th>
<th>WWF ASC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Safety</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Environmental</td>
<td>Not much</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>B-to-B or Consumer facing</td>
<td>B-to-B</td>
<td>Both</td>
<td>Eco-label</td>
</tr>
<tr>
<td>ISO 65 or ISEAL</td>
<td>ISO</td>
<td>ISO</td>
<td>ISEAL</td>
</tr>
<tr>
<td>Recognition of IFFO RS</td>
<td>NOT APPLICABLE</td>
<td>Yes</td>
<td>Yes, qualified</td>
</tr>
</tbody>
</table>

IFFO RS is becoming recognised as a useful tool to demonstrate responsible production.
Conclusions

Marine ingredients are essential ingredients for the production of most efficient & healthy aquaculture products

Marine ingredients are no longer commodities and are increasingly being used strategically in specialist diets

It is increasingly important to be able to demonstrate responsible sourcing of marine ingredients

IFFO RS is being adopted by marine ingredient producers to demonstrate their responsible practices – already over 20% of supply

IFFO RS is increasingly being accepted by the value-chain as a useful tool to demonstrate responsible aquaculture products
Contacts, reference and copies

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This paper will be emailed to you if your email is on the list of attendees

More about the IFFO RS at www.iffo.net