

Fishmeal and other aquatic products

Fishmeal manufacture was originally a means of exploiting surpluses from fisheries for human consumption. As interest in this product grew, however, specialised "industrial" fishing began to supply the demand.

Aquaculture fact sheet - March 2008

<http://en.aquaculture.ifremer.fr/Info.-Card>

Origin and production

The principal countries producing fishmeal are those in northern Europe – United Kingdom, Denmark, Norway and Iceland – and the west coast of South America – Peru and Chile.

In Europe, six main species of small pelagic fish are used to make fish oil and fishmeal: sandeel, Norway pout, sprat, capelin, blue whiting and herring .

- The first five of these species are little sought for direct human consumption: less than 10 % of the first species fished and **25 % of blue whiting catches** are consumed in this way.
- The herring used for fishmeal comes from excesses of TAC (Total Allowable Catch) or fisheries discards.
- Mackerel, anchovy and horse mackerel are also used in fishmeal production.

In addition, a third of all fishmeal produced comes from treating waste or by-products from the food processing industry (Spain, Germany, France, United Kingdom and Iceland).

In Peru, the anchovy is by far the main species for fishmeal production, followed by the jack mackerel. In Chile, the industry uses the anchovy, jack mackerel, horse mackerel and sardine (FIN, 2006; Data UK, 2005)

World fishmeal production (in tonnes) of the five main exporting countries in 2004-2005-2006 (Eurofish, 2007).

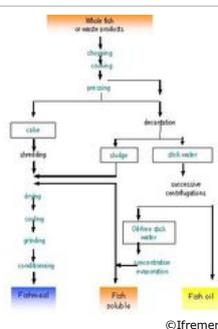
Countries	2004	2005	2006
Peru	1 983 000	2 126 000	1 456 000
Chile	935 000	815 000	776 000
Denmark	259 000	222 000	213 000
Norway	212 000	154 000	176 000
Iceland	204 000	179 000	162 000
Total of five countries	3 593 000	3 496 000	2 283 000
World total			5 719 000

Almost 60% of this production is exported.



European Anchovy: *Engraulis encrasicolus*

Manufacture



Production of fishmeal

Several similar methods are used for the fishmeal production process. These differ in whether there is a cooking step before the drying step and in what temperature used for these two steps.

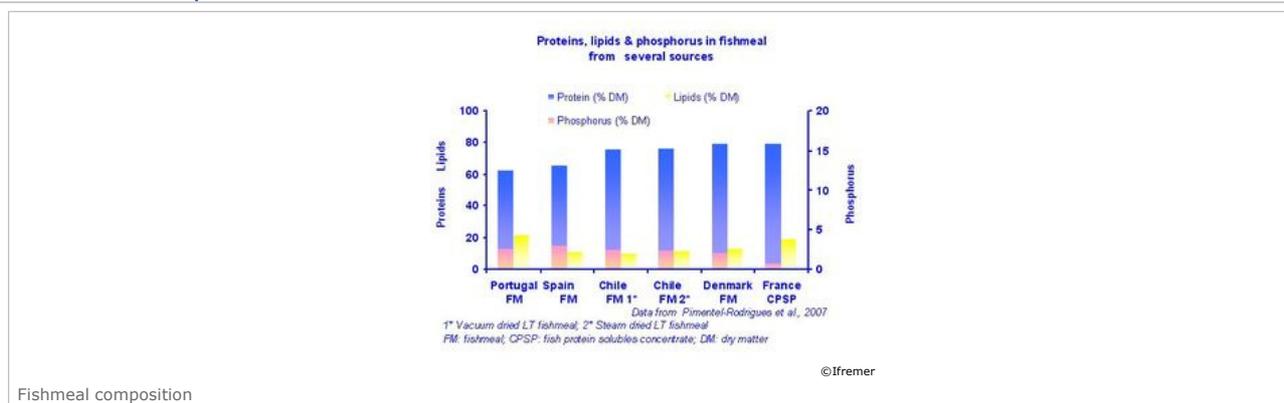
Direct drying produces white fishmeal (used on whole fish, partially emptied fish and waste left over after the removal of filets; fat content 3 - 6 %).

Drying after cooking (used on whole fish from which the oil has been extracted by cooking), produces a darker meal.

Temperature is an important parameter for the quality of a meal (protein digestibility). LT (low temperature: 70°C) meals are available on the market. Their maximum humidity is fixed at 10 % to ensure their stability.

The processing of lean fish gives a whole meal whereas oily fish also give oil and fish solubles.

Fishmeal composition



Fishmeal composition

Fishmeal protein content depends on which parts of the fish are used to make it, it can vary between 58 and 70 % according to the type of meal: type 62 (58 to 63 %); 65 (63 to 68 %); 70 (68 to 70 %).

Fishmeal quality also concerns digestibility of Nitrogen (dN 88 to 90 %) and Phosphorus (dP 38 to 51 % - Sauvart et al., 2004).

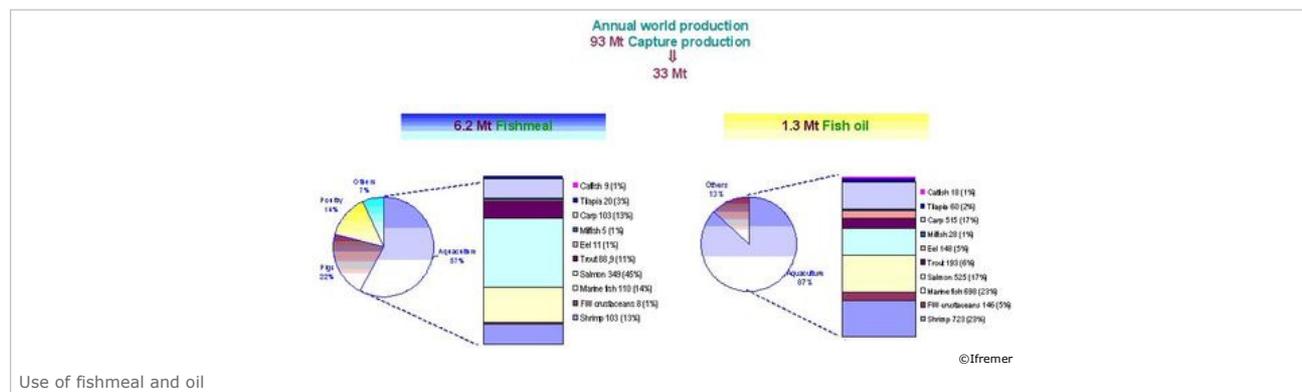
Elementary composition of soluble fish protein concentrate (SFPC)

Soluble fish 'protein' concentrate is obtained by grinding, enzymatic hydrolysing, filtrating, concentrating and deshydrating fresh fish (whole fish or wastes of fish threading). It contains peptides and aminoacids which give to it a great solubility and a high digestibility of nitrogen (digestible Nitrogen 95 %).

Elementary composition of soluble concentrate (crude produce)	Lean :	Fat:
	less than 10 % of crude fat	more than 15% of crude fat
Crude protein	80 %	72.5 %
"Hydrolysis" fats	4.7 %	21.2 %

Uses

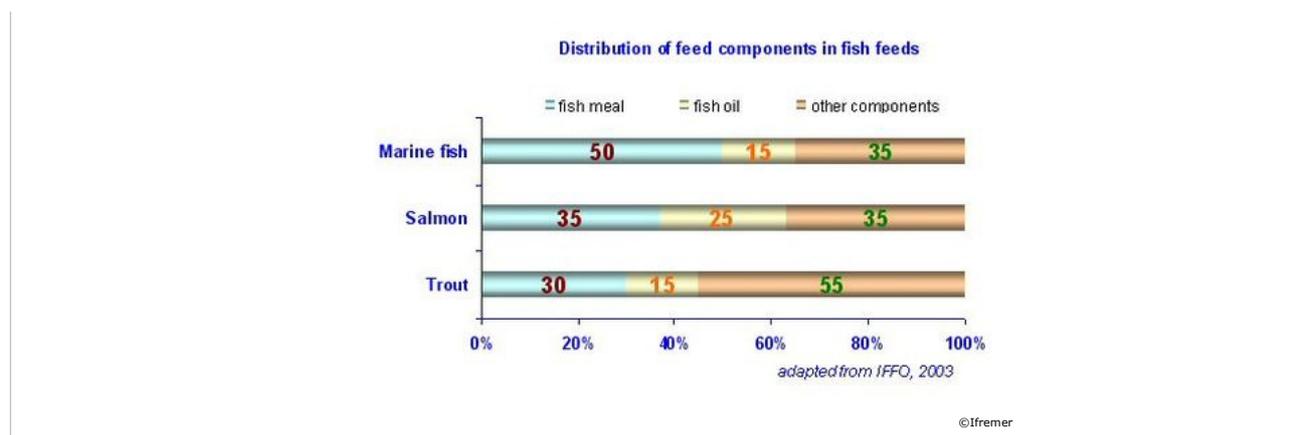
Fishmeal is used as feed for livestock both in terrestrial (pigs, poultry, etc.) and marine systems and there is strong competition between these sectors: 43 % of meal is used for terrestrial livestock, 57 % for fish and crustaceans.



Use of fishmeal and oil

In aquaculture, fishmeal is used as feed for a large array of carnivorous and omnivorous species. Shrimp, marine fish and salmonids are the principal consumers. As for fish oil, aquaculture consumes 87 %, of which half is used for salmonids.



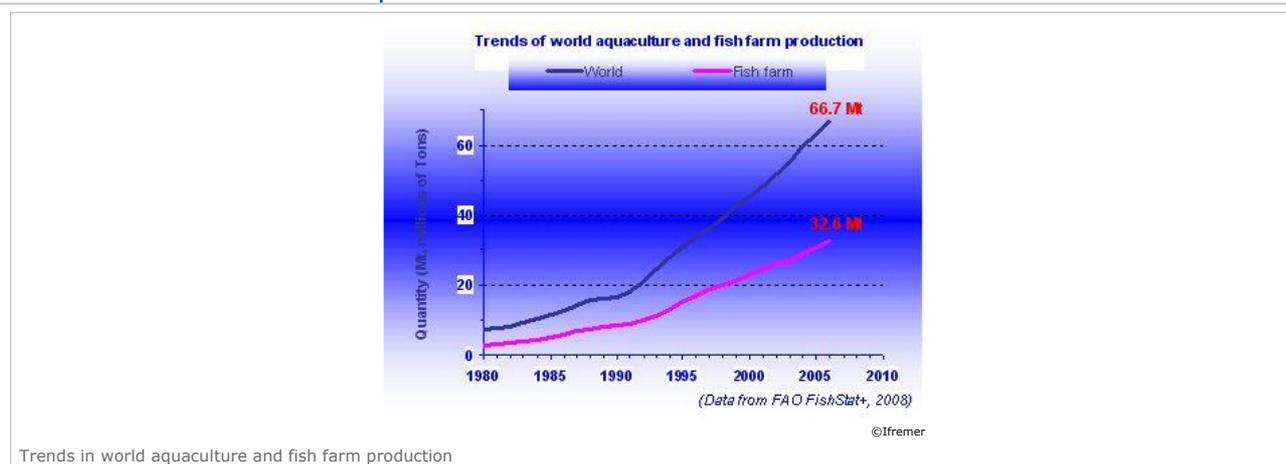


Commercial value of fish meal

The market value of fishmeal is not only based on its protein content but is related to demand, supply and competition with other protein sources.

The recent increase in the price of fishmeal is due to the high demand from China and other countries in Asia.

Present situation and Prospects



On the worldwide scale, most wild-capture fisheries have almost reached their limits of sustainable exploitation, if they have not already surpassed them.

Aquaculture is the fastest growing sector in animal-based food production, with an annual growth rate of 8.8 % since 1970, compared with only 1.2 % for capture fisheries and 2.8 % for terrestrial animal production systems during the same period.

Faced with the growing demands from aquaculture and the foreseeable stagnation of fish meal and oil production from fisheries, it appears necessary to reduce the proportion of fish meal in the feeds used in aquacultural rearing.

The research for **alternative feeds** of vegetable origin has been going on for several years.

Strong points

- Fishmeal is almost identical to food found in the natural environment **
- Balanced composition to optimise growth, resistance to diseases and maintenance of the immune system
- Good conversion rate
- Omega 3 fatty acid contribution similar to wild fish consumed by humans (IFFO, 2007)

Weak points

- Limited commodity, unstable supply and increasing cost.
- Possibility that contaminants are concentrated in the food chain

**** As a precaution, no reared species of fish is used to produce meal intended to feed the same species.**

Last modified : Friday 09 December 2011

Know more

- The state of world fisheries and aquaculture 2006. FAO Fisheries and Aquaculture Department – Food and Agriculture Organisation of the United Nations

Nations, Rome, 2007, 180 p. <http://www.fao.org/docrep/009/A0699f/A0699f00.htm>

- FIN, Fishmeal Information Network, 2006. Annual review of the feed grade fish stocks used to produce fish meal and fish oil for the UK market. 54p.
- Gérard A. and coll. Pisciculture marine – Éléments de prospective – on line
- Jackson, A., 2007. Challenges and Opportunities for the Fishmeal and Fish Oil Industry. Annual Biomarine Industry Seminar. Bergen, Norway. Feed Technology Update (FTU) solutions for the global feed industry, 2, 4 – 12.
- Guillaume, J.C., Kaushik, S., Bergot, P., Métailler, R., 1999. Nutrition et alimentation des poissons et des crustacés. Inra, Paris – Ifremer, Issy les Moulineaux (co Eds), 489p.
- Sauvant, D., Perez, J.M., Tran, G., 2004. Tables de composition et de valeur nutritive des matières premières destinées aux animaux d'élevage. INRA (Ed.), 301 p.
- Tacon, A.G.J., Hasan, M.R., Subasinghe, R.P., 2006. Use of fishery resources as feed inputs for aquaculture development: trends and policy implications. FAO Fisheries Circular. No.1018. Rome, FAO, 99p.
- Eurofish, 2007. Fish Infonetwork market report on fishmeal. <http://www.eurofish.dk/>