Trade and Safety in Aquaculture Products

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With tremendous growth in aquaculture production registered over the last few decades, it should come as no surprise that the absolute and relative contribution of farmed products to international fish trade has also grown considerably. As supply from world capture fisheries has stagnated, the aquaculture sector has become the main driver behind rising world supply of fish and fishery products. In many markets, aquaculture is the principal factor which determines channel structure, price formation and oftentimes market and product development, including niche market development (e.g. organic products).

J. H. Nierentz, FAO

Opening of the Global Trade Conference on Aquaculture in Qingdao, China in May 2007

In the world fish trade today, three large markets (i.e. Japan, the USA and the EU) represent 72 percent of all imports. With stagnant internal domestic supplies, these markets together with most other developed countries are forced to rely on imports to cover a growing share of domestic demand. This is also the main reason why import tariffs in developed countries are so modest and in reality, albeit with a few exceptions, do not represent any significant barrier to increased trade. A growing output of farmed species in the developing world has, therefore, over the last decades, been able to gain access to developed country markets without being hampered by prohibitive custom duties. In fact, the most important barrier today to increased exports, beyond the physical availability of product, is the lack of ability to adhere to quality- and safety-related import requirements, rather than import tariffs.

For developing countries, that together account for close to 50 percent of the US$ 78billion annual trade in fish and fishery products, these export constraints are further aggravated by the growing requirements on environmental and social issues. The emerging dominance of large retail and restaurant chains in seafood sales has further imposed private- or market-based standards and labels on developing country exports, as well as making it harder for most small-scale producers to enter international markets and distribution channels.

A gradual liberalization of world fish trade and a reduction over time in import tariffs is partly a result of the growing membership of the World Trade Organization (WTO). With its current 151 members, all important fish producing, exporting and importing countries[1] are now members of the organization and therefore bound by WTO rules on trade. The agreements most important for fish trade are the ones concerning tariffs, subsidies, anti-dumping, technical barriers to trade, sanitary and phytosanitary measures and resolution of disputes. Many countries have also complemented the process of multilateral trade liberalization in the WTO with similar initiatives on a regional or bilateral basis. Overall, WTO membership has the opportunity to provide significant benefits to

members. Most important is the improvement in market access for export products. In addition, the overall WTO framework of rules has made trade more transparent and predictable, thereby stimulating economic activity, job creation and income generation among members.

Unfortunately, the situation of low import tariffs for fish and fish products is, for the most part, limited to developed country markets. The majority of developing countries apply, in general terms, much higher import tariffs for all imported products. This is done mostly for fiscal reasons in order to generate government revenue rather than from any particular bias against fish products. The result, however, is reduced intra-regional and south-south fish trade. Over time, this situation will improve and we are already seeing growing trade in fish products in general and aquaculture products in many regions of the world, especially in Asia and South America.

Increased farmed production has in most cases yielded significant cost reductions thanks to economies of scale, improved technologies and know-how, better breeding methods, feed and yield improvements which in turn have permitted significant reductions over time in price. Combined improved logistics and a high degree of predictability and control in aquaculture production compared with capture fisheries, have permitted buyers to enter into long-term contracts with producers at fixed volumes and prices, buying parameters that are of particular importance for the retail and food-service sectors. This has contributed to increased availability of fish for consumers, to rising sales of fish products through these channels and to increased overall fish consumption particularly in developed countries but increasingly also in developing and transition countries.

J.H. NIERENTZ, FAO

Chinese officials at the Qingdao conference presenting aspects of Chinese policy on aquaculture development

Although the trade focus in the world market, for the most part, has been on high value finfish species such as shrimp, salmon, bass and bream, a number of high volume but relatively low-value species are also increasingly their trade importance, not only at domestic and regional levels in major producing areas such as Asia, as well as South America and also at the international level. In fact, volume-wise, these species contribute the most to output and to local food security in terms of nutritional value, especially the freshwater species such as tilapia, catfish and carp.

Strong demand in world markets for fish and fishery products is also influencing the nature of aquaculture production and the choice of species. Shrimp and salmon continue to dominate trade. Many species which registered the highest growth rates between 2002 and 2005 are mostly species destined for exports. Export growth rates for species such as catfish and tilapia are now exceeding 50 percent per year. These species are entering new markets where, only a few years ago, they were practically unknown, thus, underlining the potential for further growth in production, trade and consumption of species and products that respond to the need of consumers for moderately-priced white-meat fillets and which, for the most part, are sold through the supermarket or food service channels. Cobia, which is now being farmed in Asia and Central America, is an emerging species showing promising commercial potential.
The increasing presence of farmed products in world markets has, in general, been welcomed by importers, processors, distributors, retailers and consumers. However, it has also in some instances given rise to tension. This has, in particular, been the case when a combination of increased volumes and insufficient market segmentation have led, in general, to lower prices with the result that domestic fishermen or aquaculture producers have seen their own products becoming less competitive and having low profit margins.

In the WTO, countries are permitted to take measures against illegally subsidized or products that are being dumped in foreign markets. However, whether to enact such measures or not is often more influenced by the domestic political

agenda rather than a country's formal commitments under WTO rules. The common scenario is therefore that importing countries take action against imported farmed products after domestic pressure from fishermen or fish farmers. The exporting country is compelled to ask WTO to intervene, through its dispute settlement mechanism and to judge whether the importing country's measures are legitimate or not. This again underlines the advantages of WTO membership for exporters as only members can use WTO intervention in trade disputes.

In the future, with aquaculture production rising and exports of farmed products increasing further, it is most likely that we will see a growing number of trade disputes involving aquaculture products with accusations from domestic suppliers about illegal subsidies and dumping of products in export markets. Such a development can be anticipated as import duties on fish and fishery products will be lowered further, either though multilateral trade negotiations in the WTO or as a result of regional or bilateral trade agreements.

Trade statistics – with a caveat

Overall, international trade in fish and fishery products reached US$78.5 billion in 2005, including all products, whether captured or farmed. Further, it is estimated that close to 40 percent of all fish produced are now traded internationally.

However, the extent of regional and international trade in products originating from aquaculture is not straightforward to analyze. Trade in many aquaculture products is not yet well documented in the main producing countries and international trade statistics do not distinguish between wild and farmed origin. Thus, the exact breakdown in farmed and wild origin in international trade is open to interpretation. This situation will improve over time as farms become officially registered, producer associations emerge in main producing countries with improvements in record keeping, as well as in response to various trade regulations or retail pressure to distinguish between farmed and wild product, including the emergence of new traceability requirements. In fact, several important producing countries have now begun distinguishing the different types of origin in their export statistics. The situation is improving, thus permitting better analysis to take place in the future.

Safety in aquaculture products

Products of aquaculture are generally safe as there has been no major public health problems associated with them. Nevertheless, countries importing seafood are regularly monitoring fish, both aquacultured as well as wild for various safety parameters. In 2005, there were 13 notifications in the European Union Rapid Alert System for Foods and Feeds (EU RASFF) for wild crustaceans compared to 42 notifications for farmed crustaceans and products. This is mainly due to residues of veterinary drugs. In the case of finfish, there were 47 notifications for farmed finfish compared to 85 notifications for wild caught finfish. The EU RASFF had 104 notifications for veterinary drugs in fish and fishery products in 2005 and 80 notifications in 2006. However, the number of notifications has come down after a peak in 2002 for chloramphenicol and in 2003 for nitrofurans. Notifications for malachite green started appearing in 2002, reached a peak in 2005 and

GCP/INT/936/JPN: Towards sustainable aquaculture: Selected issues and guidelines: Food safety of aquaculture fish. The project envisages an assessment and review of the status of fish safety in aquaculture, the main issues, actual and potential hazards from aquaculture fish, for different type of aquaculture production, with particular reference to developing countries, which will be used to produce technical guidelines aimed to assist in the practical implementation of the Recommended Code of Practice for Fish and Fish Products (Codex Alimentarius) regarding aquaculture production, including the introduction of Good Hygiene Practices (GHP) and HACCP. A series of reviews and desk studies have been conducted These studies have assisted in drafting the technical and reference guides related to the practical implementation of the Code of Recommended Practices for Fish and Fishery Products for aquaculture fish. One training workshop has been held and a second is planned for 2008. The primary output, FAO Fisheries Technical Paper, including guidelines, on the practical implementation of the Codex Alimentarius Code of Recommended Practices for Fish and Fishery Products (Section 16 Aquaculture Production) for aquaculture fish is expected in 2008. [Responsible Officer: R Subasinghe (FIMA)].

TCP/LAT/3001 (A): Improving aquatic animal health and quality and safety of aquatic products. Commenced in 2005 and completed in 2007. Outstanding achievements include development of National Strategy on Aquaculture, capacity building of national officers and farmer/producers through various training courses and other awareness raising activities, overseas training for 3 national staff and provision of some office and laboratory equipment and 3 major publications: (i) National Aquaculture Strategy, (ii) Extension Manual and (iii) Parasite Checklist. Counterpart implementing agencies were National Board of Fisheries, Latvian Fish Resource Agency and National Diagnostic Center. [Responsible Officers: MB Reantaso (FIMA), R Subasinghe (FIMA), R Van Anrooy (FAO-SEC)].

declined in 2006. While there were only two notifications for crystal violet in 2005, there were five notifications in 2006. The United States Food and Drug Administration (US FDA) Import Refusal records show 271 refusals of fish and fishery products during June 2006-May 2007 with nitrofuran metabolites accounting for a large number of them. In Japan, there were 40 import refusals in 2005, 29 in 2005 for fish and fishery products due to the presence of veterinary drugs. However, the drugs responsible for most of the refusals in Japan were tetracyclines, fluoroquinolones and malachite green. It should also be pointed out that scientific research on the origin of some of the residues would be important. Already there are indications that traces of semicarbazides may be naturally found in algae and crustaceans. Another issue that is attracting attention is the antibiotic resistance of bacteria associated with products of aquaculture. However, caution needs to be exercised while drawing conclusions on the source of antibiotic resistant bacteria found in aquaculture settings, because the aquatic environment also receives treated sewage and animal wastes and antibiotic resistant bacteria arising from the application of antibiotics in human and veterinary sectors could also end up in the aquatic environment.

Among microbiological problems in products of aquaculture, particularly, molluscan shellfish, human pathogenic vibrios, viruses and biotoxins are attracting attention. These hazards may be associated both with wild as well as aquacultured shellfish. In some countries like the United States, human cases due to vibrios (*Vibrio parahaemolyticus* and *V. vulnificus*) has been increasing because of the habit of consuming raw shellfish. However, it is to be emphasized that these *Vibrio* spp. are natural flora of coastal and estuarine environments and are not introduced through fecal contamination. Therefore, zero tolerance for these vibrios in raw shellfish would be very difficult to achieve. The US FDA risk assessment has shown that 98 percent of illness due to *V. parahaemolyticus* can be averted by regulating the level of this organism at 100/g in oysters intended for raw consumption, but this would lead to diversion of 66 percent of oysters harvested from "raw shellfish" market. The FAO/WHO Risk Assessment of *V. parahaemolyticus* in oysters has shown that regulating oysters at 100/g in Australia and Japan would avert 99 percent of illness, but will lead to diversion of 67 percent of oysters from raw market (FAO/WHO, 2007)[2]. These risk assessments show that zero tolerance for *V. parahaemolyticus* is not necessary to achieve the public heath goal even in products intended for raw consumption. The FAO/WHO Risk Assessment of choleragenic *Vibrio cholerae* O1 and O139 in warm water shrimp in the international market shows that the risk of getting cholera through this product is extremely low. The number of predicted illness for the USA, Japan and Spain is 1-2 cases in a decade and for other countries it is approximately 1 case in 25 years. The prediction by this model is supported by epidemiological data (FAO/WHO, 2005)[3]. There have been no reported cases of cholera in importing countries attributable to imported warm water shrimp during the last several decades.

In contrast to *Vibrio* spp., human pathogenic viruses such as Hepatitis A virus and Noroviruses are introduced into the aquatic environment through fecal contamination. Processes like depuration are not very efficient in removing viruses from shellfish tissue. Thus, to reduce the problem due to viruses, it is essential to culture molluscan shellfish in areas free from fecal contamination. Classification of shellfish growing and harvesting areas based on levels of fecal coliforms in water/shellfish meat is the approach used by some countries to reduce the risk of viral infections through shellfish. This highlights the importance of certification of aquaculture facilities. Monitoring and certification of aquaculture facilities would be important for the control of problems due to biotoxins, which are produced by certain algae. These algae (dinoflagellates and diatoms) may occasionally cause blooms (commonly called red tides) and toxins produced by the algae may be accumulated by molluscan shellfish leading to public health problems. Monitoring shellfish for toxins and shellfish growing waters for presence of toxic algae would be useful risk management strategies.

The strong growth in the aquaculture sector during the last few decades has also increased the presence of farmed products in international trade. In fact, at present, farmed products are behind most changes in supply patterns, product development and price formation. In the future, aquaculture products will play an even stronger role in supply and international trade with a rising share of total supply. Regionally, we will see more farmed products in regional trade, particularly in Asia and South America.

[1] The only large fishery country not yet a WTO member is Russia. The country is, however, negotiating WTO accession with probable entry in 2008 or 2009.

[2] FAO/WHO. 2007. Risk assessment of *Vibrio parahaemolyticus* in oysters- interpretative summary and technical report. Microbiological Risk Assessment Series (in press).

[3] FAO/WHO. 2005. Risk assessment of choleragenic *Vibrio cholerae* O1 and O139 in warm water shrimp in international trade - interpretative summary and technical report. Microbiological Risk Assessment Series 9. 90 pp.