

AQUACULTURE COMPENDIUM – CAB INTERNATIONAL

Key Topic

NAME OF KEY TOPIC:	Quality certification
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KEY TOPIC TEXT

Background

Overview:

The increasing degree of competition in the current economy has underscored the importance of non-price competition in an always more globalized market. Moreover, food crisis in several parts of the world and public denunciations of the environmental impact of agriculture have raised a concern toward the quality of alimentary products found on the markets and the conditions of their production. Aquaculture production chains are not spared by this tendency as was illustrated by the publication in January, 2004 of an alarmist study on farmed salmon contamination by the journal "Science", which has entailed an immediate and dramatic collapse in the European sales of fresh salmon, in spite of the reassuring press releases from many food safety agencies and governments. Quality now means "staying in business" for many producers worldwide, and it has become a keyword for suppliers in the provision of food products to the consumer.

Quality certification aims at responding to these preoccupations and challenges. At least, it assures that a product or a process possesses some expected characteristics, which gives a minimal security to the buyer. But it can also testify that the product owns some attributes superior to those of the concurrency, helping to position it more competitively on some markets. For this reason, many labels, marks or quality signs are now being shown on the aquatic products, certifying many very diversified qualities, and this could increase the confusion instead of restoring the confidence: What do they mean? Are they equivalent? Which ones assure the highest quality level? As a matter of fact, quality certification includes characteristics relating to attributes as diverse as the composition of the products, their geographical origin, the methods used for their production or, more and more frequently, the natural, social, economical, cultural, ethical (etc.) conditions of production.

Definitions

For aquatic products, quality has for a long time been associated to freshness but in reality, quality is a more complex concept, which also has to do with perceptions and not only with facts, and which does not necessarily mean the same for the client, the consumer, the retailer or the producer. The functional definition used here will be the one considered by the ISO 9000 standard, even if it is not unquestionable: it is the capacity of an aquatic product to attend the needs and expectations of the client. These expectations can be implicit (for example, not to get intoxicated by eating fish, which was under suspicion after the publication of the Science article), explicit (for example, no off-flavour, nice taste, healthy etc.) or latent (*i.e.* expectations that have remained hidden until now but could emerge at every time, for example, that aquatic production be conducted respecting certain ethical principles etc.).

Quality certification refers to a procedure by which a third party gives written assurance that a product, process, or service conforms to specified requirements, which are generally described in a document, called "standard". The presentation (electronic document, book, manual etc.), content and

availability of the standard (free and free of charge, free but must be bought, restricted-access or confidential etc.) can vary greatly, depending on the objectives and strategy of its developers, users and owners. The standard contains all the rules that govern the certification, which can include operating procedures, inspection rules, deficiencies management, complaints procedure, farming and processing operations, product specifications, management of the documentation systems (forms development, information collection and storage), monitoring, divulgation policy and means etc. The quality certification process is generally concluded by the delivery of a certificate, which states that the process followed by the producer has shown no significant difference with the process described in the standard after an inspection (also called "audit"). The validity of the certification is generally limited in time and must be regularly re-audited, either internally and/or by third parties, on a frequency and following a methodology described in the standard.

If allowed by the rules of the standard, the certification can be divulgated to the consumer by displaying a quality mark (gill and tail tags, symbols incorporated on packaging and labels etc.). It must be noted that "quality product" is not a synonym of "premium product" or "superior product", since as long as a product meets the expectations of its consumers, it is considered like a quality product, but quality certification can definitely be a tool for creating product differentiation, market segmentation and increasing the value of the product. For example, with the fresh Scottish salmon awarded the French "Label Rouge" certification in 1999, there was a price premium at export of 9% in 1999 and 20% in 2000 compared to standard Scottish salmon.

The qualities certified

Overview:

The first challenge of a quality certification program in aquaculture is to provide the delivery of a product that fulfils the expectations of the consumer in terms of food safety, taste, nutritional value and technological attributes of the flesh. This can be called "intrinsic quality". For the food safety, the regulations in many countries of the world have made risk analysis mandatory, in order to ensure a high level of protection to the consumer. For this reason, it should not be necessary that a third party certifies what is already submitted to inspection by the authorities, but in reality, several retailers require a DS 3027 standard (or ISO 22000 when published) certificate from their furnishers. For more details, see the HACCP specific key topic in this compendium. Traceability is another legal requirement in several countries that is also included in many standards in order to trace the complete history of every product sold. In some cases, it allows to deepen the mandatory traceability.

Attributes such as the taste, the texture, the composition, the nutritive value etc. are the targets of several programs, either already available or in development. They are generally species-specific and are given for every step from seed or fry up to slaughtering and commercialization. The salmon, trout, channel catfish, shrimps already have their own standards whereas the ones for tilapia or striped bass are still under development.

There is also an always-stronger tendency towards jointly certifying processes that are related to ethics and sustainable development. The Brundtland Commission defined sustainable development as a "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The spectrum is much wider in terms of time scale and number of stakeholders, but the process is similar to quality, except that the beneficiaries are not the clients, but the present and future generations. The scope is consequently very broad, but until now, the standards have mostly focused on the preservation of the environment, the corporate social responsibility, the staff safety and welfare, and the animal well-being. This is of course the case for most organic and eco-labels which exhibit a concern toward the protection of the environment, but also for programmes that certify traditional know-how or places of production, such as the Protected Designation of Origin (PDO) or Protected Geographical Indication (PGI). By highlighting the origin of a product, the respect of established processes or ecological values, such schemes put forward and contribute to preserve the tradition, culture and patrimony of a region or activity. As a consequence, opinion polls show that they are also perceived as if they were certifying peculiar attributes such as a

better taste or superior nutritive value, despite they are not explicitly aimed at that. These certifications are conveying what is sometimes qualified of “symbolic quality”.

Another family of attributes that are currently not included in the standards but could turn out to be certified in the future is what is qualified of “service attributes”. It does not focus on the product itself, but on the service provided on the occasion of its selling. This includes the behaviour of the shop assistants, their uniform, the design of the sale’s place and any other attribute that increases the satisfaction of the consumer.

Finally, instead of focusing on the product and its production, the certification can concentrate on the farms, their management and organization to support quality. The objective is then to promote a management in which the structure fulfils the customer's expectations and applicable regulatory requirements, while aiming at enhancing customer's satisfaction, and achieving continual improvement of its performance. Such certifications are based on Quality Management Systems (QMS), which have been widely popularized by the ISO 9000, particularly the ISO 9001/2000.

The underlying specifications

Most of the time, the qualities that are certified are complex and based on a bunch of basic requirements that are only jointly and additively responsible for the presence or absence of the quality sought. These “elementary” specifications can be technical or organizational. The first group of technical characteristics relates to the place of production, the selection and management of the production site and the water quality. The concern is not only sanitary (how to manage the diseases transmission from one farm to another, the chemical contaminants in the water, the bad water quality etc.) but also environmental (how to reduce the impacts on the aquatic and terrestrial environments such as biodiversity reduction, eutrophication, mangrove swamps destruction etc.). Attributes specific to the species are either sanitary (control of toxins in shellfish, drug residues such as antibiotics in the flesh etc.) or environmental (mode of use of transgenic organisms, mode of use of exotic vs. indigenous species etc.). The management of the farming is submitted to the respect of many criteria, including the hatchery and brood stock management (drugs used for induced reproduction, hormonal treatment of brood stock, eggs and fry, genetic management of brood stock, etc.), the feeding (feed composition for growth in quantity and quality, with a concern for residues, additives, GMO or fishmeal & fish oil content, storage, feeding practices etc.), the stocking (stocking density etc.) or the harvest, transport and slaughtering (off-flavour, stress and diseases, animal well-being etc.). Health management is also a topic largely described, whether to prevent the outbreak of diseases or to regulate the curative treatments (drugs approved, latency period to be respected before commercialization etc.). The post-slaughtering processing (cutting, freezing, smoking etc.) and the packaging are included in some standards, particularly for the species where the final characteristics can be greatly influenced by these steps. This is the case for example for salmonids (trout, salmon). They include the processes (temperature, duration of each step) as well as the control of several characteristics concerning the flesh (weight/size of the portion, colour of the flesh etc.). The respect of the relevant legislation is at the base of any standard, which are generally stricter.

The main organizational characteristic is probably the monitoring of the products, since almost all standards include that statistical sampling and analysis be performed respecting strict protocols. The results must be kept in a documentary system, which is also described in detail. Most recent standards are partly or largely inspired by the principles of QMS based on the ISO 9000. As a consequence, they generally require that the farm focuses on customer by researching and communicating throughout the firm its needs and expectations and that the business aims at a continual improvement of its overall performance. The leader and the staff must also show that they have understood the goals and objectives and that they are motivated and involved in the improvement of the quality. The decision-making must be based on facts, analysis of data and information whereas the activities must be managed as processes that permit reaching the goals in a more efficient way, through effective use of resources. At the level of the organization, the processes must be identified and managed as a system, in which the interdependencies between the processes

are understood and harmonized in order to achieve the general objectives in the most effective and efficient way.

Standards used for the quality certification in aquaculture

The development of the standards

Specialized organizations such as the ISO (International Organization for Standardization) have strict protocols for developing standards, which are generally followed more or less strictly and with some adaptations by every institute that aims at releasing a new standard. Such institutes include producers' associations, NGOs, extension services, universities etc. For some standards, the governments are also involved. Once the need for a new or revised standard has been expressed and recognized, its technical scope is defined. Working groups, which can comprise technical experts, producers, industry representatives, academic researcher, retailers, consumers and any person or body whose point of view is considered useful, are then in charge of developing drafts submitted to negotiation, until a consensus is found. The final phase comprises the formal approval of the resulting draft, followed by its publication.

The main difficulty in the development of a standard is not so much the definition of the technical requirements, but the identification of the attributes that the consumer wants to find in the product, and their link with the production parameters and steps that will be controlled by the standard. A logical way of taking the expectations of the consumer into account is to follow a well-established methodology such as a risk analysis. By doing so, the standard gets its own specificity, by attending specifically to a combination of requirements aimed at supporting a specific quality policy. As a consequence, there might be many similarities in the content of the standards, since several of their objectives are common. The difference is not so much in the requirements of the standard, than in their combination and level of intensity to achieve specific goals.

The choice of the standard

The quality certification is sometimes a commercial duty that leaves the producer with no choice. Nevertheless, when it comes to defining a voluntary quality policy, a selection must be done between various schemes currently available but when considering their abundance, as well as the fact that many of them exhibit similarities, the decision-making can be very difficult.

The choice can be based on the divulgation strategy, either based on private marks, which can be individual or collective, or on open schemes. The main advantage of the private marks is that they allow the development of a flexible programme that consequently can fit perfectly the needs of the consumers. Depending on what is most convenient, the underlying standard can be based on private or open certifications, particularly the ones that are not aimed at being displayed on the product (e. g. ISO 9001/2000 etc.). For example, many supermarkets and retailers have established their own criteria for the suppliers to meet in order to have an "independent" quality image. Many producers associations have also registered their own private collective marks. But the mark is also one among others and it does not automatically benefit from the recognition of the consumer. This kind of scheme is well adapted to companies that already have a renowned brand or that possess the financial conditions for communicating on it. On the other hand, open quality schemes (e.g. PDO, PGI, organic farming etc.) may be much more rigid and complex. It is not uncommon to have a certification process that lasts 5 to 10 years for certifications such as the French Label Rouge or the European PGI, whereas the organic farming requires a conversion period that can last several years. But once established, the product immediately benefits from a wide recognition and high legibility from the public.

Another element to take into account is the cost of the certification, even if to date it is difficult to measure this economic aspect, which can vary greatly from one certification to another, or from one business to another. For example, for a large and renowned French certification body, the direct cost

for an ISO 9001/2000 has been estimated between 3000 and 15000 euros for the first year (9000 euros in average) depending on the complexity of the business, and at about one third of this value for the annual audits. For NF V 45-100, it is in average 1000 euros. But studies showed that the global cost can be much higher, up to 5-10 times the former values when considering the cost of the induced changes in the structure and production process, the awareness-raising of the staff, the maintenance of the documentation etc. But quality also entails savings, so that the return on investment can be as short as 1-2 years, but this is also very variable. However, some schemes, particularly those that have been developed by some professional associations, are intended to reduce the cost at the level of the producer and this is of course an important characteristic to put forward.

Some examples

The Scottish Quality Farmed Salmon schemes have already been described in detail by Greenhalgh (2001), whereas Hilbrands (2002) reviewed several programmes for fisheries and aquaculture, among which stand the FAO Code of conduct for responsible fisheries, the EurepGAP (before the publication of the Integrated Aquaculture Assurance scheme described below), the Safe Quality Food 1000/2000, the Global Aquaculture Alliance, the Marine Stewardship Council, or the Organic farming. Label Rouge is described by Bermejo (2000) whereas Kristensen (2000) depicts the FEAP Code of conduct. This paragraph provides information on further certifications with the objective of illustrating how the strategy of the promoters of the certifications has been translated into the standard's content and structure. The listing is absolutely not exhaustive and only deals with illustrative standards that are available to everybody.

The Catfish Quality Assurance (CQA) has been developed by the Catfish Farmers of America with the aim of preserving and enhancing the image and market for farm-raised catfish in the United States. The standard can be downloaded at the Mississippi State University Extension Service website. It has been developed to help producers avoid drug or chemical residues in fish, as well as to improve their skills and knowledge so that efficiency be increased. Resulting from a hazard analysis, the structure of the standard lists practices that allow controlling eight critical points:

- Selection of the production site
- Selection of the water supply
- Management of the water quality during production
- Management of the hatchery and brood stock
- Feeding practices and nutrition
- Management of the catfish health
- Harvest and transport
- Processing

If the length of each part may be used to assess the importance of each point, the management of health is by far the most critical, followed by the feeding, in accordance with the objectives of the scheme. The style used is clear and direct, and provide explicit and very detailed instructions. For every consideration, an explanation is given (for example: "*Careful attention to the purchase and storage of catfish feeds and to feeding methods can reduce production cost, decrease the likelihood of disease and increase product quality for the consumer*") before the requirements are listed (e. g. "*Do not use feed that has become molded*" "*Place the feed in all possible feeding areas*" etc.).

The French quality trout standard (NF V 45-100) could be compared to the CQA by its objectives and scope, but it differs strongly by the style of the standard. It has been published by the French Association for standardization (AFNOR), at the instigation of the Interprofessional Committee of Aquacultural Products (CIPA). Its scope includes the production (production structures, farming, harvest, transport), processing (slaughtering, evisceration, filleting, freezing, packaging, labelling) as well as specifications for whole fish, fillet, and steak (colour, size, weight etc.). It is aimed at assuring minimal qualitative attributes. Unlike the CQA that gives very detailed instructions, this scheme gives very little indication on the means to be used but lists the objectives to be reached (e. g. "*Nets or any*

mean used for harvesting and handling fish must not damage their skin and fins") except on some peculiar aspects (e. g. *"Bone meals are excluded"*).

EUREPGAP started in 1997 as an initiative of the Euro-Retailer Produce Working Group to develop standards and procedures for the global certification of Good Agricultural Practices. It is a Business-to-Business certification, which is not aimed at being communicated to the final consumer. Unlike the former two, the scope of the EUREPGAP's Integrated Aquaculture Assurance standard includes technical requirements to ensure food safety, but also the protection of the environment, the health, security and welfare of the staff and the well-being of the animals. In fact, it assures a threshold quality but is not supposed to replace schemes aimed at producing high quality products. It is composed by two modules, one for all farmed fish and another one for specific requirements that is currently only available for salmonids. Requirements are rather given in terms of results to be reached (*"Residue test results must be traceable to the specific batch of fish"*) than in terms of means to be used. Compliance with the standard is modulated since requirements are classified as "recommended", "minor must" or "major must". All "major must" must be respected whereas 90% compliance of all applicable minor must is compulsory for each applicable module. There is no minimum percentage of "recommendation" compliance set.

ISO 9000 has not been developed for agriculture and its application might be somehow difficult, particularly for small familial farms. For that reason, many QMS have been developed to attend more specifically to the characteristics of agricultural production. Agriconfiance (NF V 01-005) is one that has been used in aquaculture. It focuses on the relationships between many producers and one central structure, generally, an agricultural cooperative. It is based on both ISO 9000 and ISO 14001 (Environmental QMS) and has been published by the French Association for standardization (AFNOR) at the instigation of the French Agricultural Cooperation (CFCA). It is not specific for aquaculture and it also deals with various schemes (grain, grapes, meat) but is currently used by a French trout-producing cooperative. It is aimed at having a consistent quality submitted to processors, but also at limiting the negative impact on the environment. Unlike the other programmes, this standard does not list technical requirements but focuses on the respect of the commitments between the producers and a central structure. Fields covered are:

- the review of the client's contract in order to make sure that its expectations are known and that the structure has the capacity to attend to them,
- the reciprocal commitments between the central structure and the producers, in order to make sure that everyone knows them and that they are in accordance with the client's contract
- diverse arrangements to describe how to manage the quality policy, the documentation, the traceability, the training of the producers, the internal auditing, the quality tests and sampling etc.

For most considerations, an explanation is given before the requirements are listed in terms of results to attain: *"Once the contract has been established [...] non compliance may appear due to the producer, to the organized structure [...] or to uncontrollable events [...]. Each mode of settlement of the non-compliance to the contract must be preestablished"*

Conclusion

Certifying quality is not an objective in itself, it is a tool aiming at supporting a quality strategy by strengthening the relationships between producers and consumers. As such, it should be used properly and fulfil its duty. But if it does not, it is not the tool that must be questioned in priority, but the way it has been used and particularly, if its choice and the selection of the standard content have been done in adequacy with the expectations of the customers and the objectives of the producers. This diagnostic is with no doubt the most critical step for the success or failure of the process of quality certification.

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LINKS TO WEBSITES

NAME	ADDRESS (URL)
Agriconfiance (NF V01-005)	http://www.cooperation-agricole.coop/sites/CFCA/qualite_reglement_alim/agri_confiance/agri_confiance.aspx#Autres
Aquaculture Certification Council	http://www.aquaculturecertification.org/
Australian Organic aquaculture	http://www.australianorganic.com.au/files/Organic_Standard_Version6_REVISIONS.pdf
Canadian Organic aquaculture	http://www.certifiedorganic.bc.ca/rcbtoa/services/aquaculture-standards.html
Catfish Quality Assurance	http://msucares.com/aquaculture/catfish/qualityassurance.html
Development of International Standards	http://www.iso.org/iso/en/stdsdevelopment/whowhenhow/proc/proc.html
EUREPGAP Integrated Aquaculture Assurance	http://www.eurep.org/fish/Languages/English/index.html
European Quality Signs	http://europa.eu.int/comm/agriculture/foodqual/quali1_en.htm
FAO Code of Conduct	http://www.fao.org/fi/agreem/codecond/codecon.asp
FEAP Code of Conduct	http://www.feap.info/feap/code/default_en.asp
French Organic aquaculture	http://www.agriculture.gouv.fr/spip/IMG/pdf/ccrep_abfconsoa1a5.pdf
French Quality Trout	http://www.lapisciculture.com/scripts/site/04_page.php?cont_appli_id=5&cont_id=1&page_id=12&menu_id=12&menu_id=12
German Organic aquaculture (Naturland)	http://www.naturland.de/englisch/n2/aquaculture_12_2002.pdf
Global Aquaculture Alliance	http://www.gaalliance.org/
Irish Quality Salmon scheme website	http://www.irishqualitysalmon.com/
Library shop for NF V45-100 & NF V01-005	http://www.boutique.afnor.fr/Boutique.asp?url=NRM%5Fn%5Fhome%2Easp&lang=French&btq=HOM
Marine Stewardship Council	http://www.msc.org/
Quality management principles	http://www.iso.org/iso/en/iso9000-14000/iso9000/gmp.html
Safe Quality Food System	http://www.sqfi.com/
Scottish Quality Salmon scheme website	http://www.scottishsalmon.co.uk/
UK Organic aquaculture	http://www.soilassociation.org.uk/web/sa/saweb.nsf/0/87f4f9e592f32e80256e2f0050cad9?OpenDocument
US Organic aquaculture	http://www.nal.usda.gov/afsic/AFSIC_pubs/afnotes5.htm#chap2

OTHER MATERIALS

MATERIAL	FORMAT
Environmental and Social Standards, Certification and Labelling for Cash Crops	http://www.fao.org/docrep/006/y5136e/y5136e00.htm
Global quality assessment in Mediterranean aquaculture	http://www.ciheam.org/util/search/detail_numero.php?mot=764&langue=fr
Product Certification and Ecolabelling for Fisheries Sustainability	http://www.fao.org/DOCREP/005/Y2789E/y2789e00.HTM
Seafood market studies for the introduction of new aquaculture products	http://www.ciheam.org/util/search/detail_numero.php?mot=772&langue=fr

