International Journal of Fauna and Biological Studies
Available online at www.faunajournal.com

IJFBS International Journal of Fauna And Biological Studies

E-ISSN: 2347-2677
P-ISSN: 2394-0522
IJFBS 2018; 5(1): 62-66
Received: 11-11-2017
Accepted: 12-12-2017

Priyanka Arya
Department of Aquaculture, College of Fisheries Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

RS Chauhan
Department of Aquaculture, College of Fisheries Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Akansha Khati
Department of Aquaculture, College of Fisheries Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Iqra Nazir
Department of Aquaculture, College of Fisheries Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Correspondence
Priyanka Arya
Department of Aquaculture, College of Fisheries Science, G.B. Pant University of Agriculture and Technology, Pantnagar, Uttarakhand, India

Organic aquaculture: A boon to fisheries industry

Priyanka Arya, RS Chauhan, Akansha Khati and Iqra Nazir

Abstract
Organic fish production is a model of production which supplies animal's lease with low stock density and attaches importance to human health without wing any chemicals, pesticides or the products modified genetically. This practice would entail raising aquatic food in a humane manner that is sustainable and doesn't pollute the environment. However, lack of certification organisations and standards for organic aquaculture in many countries causes lower production speed for organic aquaculture compared to organic agriculture. Organic aquaculture has attracted the attention of researchers from several academic disciplines as well as that of environmental advocates and entrepreneurial innovators. While the regulatory specifics still need to be addressed, this new organic market niche has significant potential for growth in the future. The review covers general principles, scenario and certification bodies in the context of the organic aquaculture.

Keywords: Pesticide, organic aquaculture

Introduction
Diminishing fishery harvests, wild fish food-safety issues, environmental concerns, increased fish consumption and the increasing market share of organic food have combined to focus attention on "organic aquaculture". Organic aquaculture is the farming of aquatic animals and aquatic plants without using antibiotics, chemicals, chemotherputants and fertilizers and is produced by preserving the eco system and bio diversity. It is a holistic model designed to optimize the productivity and fitness of aquatic ecosystem includes benthic organism, aquatic animal, and people. Managing aquaculture organically has become more popular since consumers are becoming more aware of the issues concerned with food safety, environment degradation, health risk, sustainability and animal welfare there emerges a positive perception of organic and eco-labeled food product.

Need of organic aquaculture
Problems of aquaculture today is the use of wild fish for farmed fish feed is a waste of protein resources and directly impacts ocean fisheries. But aquaculture can also diminish wild fisheries indirectly by habitat modification, collection of wild seed stock, changes in ocean food webs, introduction of nonnative fish species and diseases that harm wild fish populations, and nutrient pollution. Chemical and antibiotic usage, which is inherent to industrial aquaculture production and waste dispersal, pollute the surrounding marine and freshwater environment. Organic aquaculture is an earth friendly method of farming and processing food which keeps both biological and ecological aspects of environment. To apply this approach could yield significant reduction in negative environmental and health impact of industrial aquaculture.

Principles of Organic Aquaculture
The fish that are produced under natural conditions according to the organic agricultural principles, not exposed to any protective additives or genetic modification, fed with baits prepared with completely natural materials and certificated by a control agency are called "organic fish (Ötles, Ozden and Ötles, 2010) [8]. This pioneering work and developed standards for different species and production systems in aquaculture can be achieve by some principles.

- Careful selection of sites for aquaculture farms and protection of adjacent ecosystems
- Prohibition of chemicals (e.g. hydrogen peroxide, $KMnO_4$)
- Natural remedies and treatments in the case of disease
- Feed from organic agriculture

- Fishmeal and -oil in feed derived from by-products of fish processed for human consumption
- Prohibition of genetically modified organisms (GMOs), neither in feedstuff, nor in the stock itself. (Mansfield, 2003, 2004; Hatanaka, 2010) [6, 7, 3].
- Avoid high stocking density
- Processing according to organic standards

Scenario of Organic Aquaculture

Organic fish production started with the certification of a carp fish grown by a group of fisheries as "organic" by Bio Entre which is a certification company in Austria. Organic farmers in Austria and Germany first started to develop extensive "organic" carp production system in the early nineties. The earliest standard was established in 1994 in Austria for common carp (*Cyprinus carpio*). This first attempt was followed by the entrance of salmon and rainbow trout to the market. First organic trout was put up for sale in England in 1998. Atlantic salmon (*Salmo salar*), shrimp (*Penaeus* sp.), carp (*Cyprinus carpio*) and rainbow trout are among the species which have been produced and certificated according to the organic standards. Moreover, the production of gilthead sea bream (*Sparus aurata*), sea bass (*Dicentrarchus labrax*), mussel (*Mytilus* sp.) and sturgeon (*Acipenser* sp.) as organic has started. In continental Europe, organic trout production took off, a big organic *Pangasius* catfish project was started in Vietnam by the Germany-based seafood company, organic tilapia farming started in Israel and Ecuador and in the Mediterranean, seabass and seabream farms were converted to organic management.

Production status

Organic aquaculture was responsible for an estimated US$46.1 billion internationally (2007). There were 0.4 million hectares of certified organic aquaculture in 2008 compared to 32.2 million hectares dedicated to Organic farming. All over the world there are 240 number of certified organic aquaculture operations (including the production of micro algae) in 29 different countries in 2009 most of the operations are located in Europe (IFOAM EU Group, 2010) [5]. In China, 72 operations have received organic certification under the national Chinese regulation. The market for organic aquaculture shows strong growth in Europe, especially France, Germany and the UK - for example, the market in France grew 220% from 2007 to 2008. The top five producing countries are UK, Ireland, Hungary, Greece and France. 123 of the 225 global certified organic aquaculture farms operate in Europe and were responsible for 50,000 tons in 2008 (nearly half global production). Total organic aquaculture production reached about 53,500 tons in 2009, accounting for about 0.1 percent of aquaculture production worldwide. Organic salmon is the top species and retails at 50%. Salmon had the highest production of 16,000 tonnes/year in 2008, followed by "shrimp" (combining *Litopenaeus vannamei* and *Penaeus monodon*) with 8,800 tonnes/year and common carp with 7,200 tonnes/year (Bergleiter *et al*., 2009) [2].

Certification bodies

Private, national or intergovernmental organizations or institutions sets the standards but the inspections or audits of the farms are conducted by independent "third party" inspection bodies (IBs) who are hired to provide the service, usually at the recommendation of the standard-setting body. The actual certification is conducted by certification bodies, i.e. the institutions setting and maintaining the standards. These are normally accredited according to ISO 65 according to their operational procedures of standard setting, commissioning third-party IBs to conduct independent audits and annual inspections. A suite of audit rules, manuals for interpretation of the standards and conduct of inspections and audits, as well as checklists for the inspections and audits need to be prepared for each standard. Inspectors need to be trained in the specifics of the respective standards and their interpretation, so that they meet necessary qualifications. Certification bodies as well as IBs maintain outreach offices and liaison offices through partner organizations. In the implementation of the inspection, auditing and certification process, cost efficiency is a major factor for consideration in the design of these services. Several countries have formulated national standards and strategies for up-scaling of organic aquaculture, for example, Thailand (Ruangpan, 2007) [9], which reflects government commitment and support to the growth of the sector. Table 1 summarizes the organizations currently carrying out certification of organic aquaculture products, together with the species certified and specific organic aquaculture standards employed.

Table 1: Organic aquaculture certification programmes and standards in 2001

Certification programme	Organic certification of/Standards for
1. EUROPE	
Private organic aquaculture certifiers	
BIOSUISSE (Switzerland)	Trout
DEBIO (Norway)	Salmon, trout
ERNTE (Austria)	Carp, trout
KRAV (Sweden)	Salmon, trout, artic charr
Bioland, Demeter, Biokreis (Germany)	Carp
Naturland* (Germany)	Carp/tench (1995), salmon (1996), trout (2000),
	Mussel (1999), shrimp (2001)*
SOIL (UK)	Salmon, trout (1999)
TÚN (Iceland)	Salmon, trout, artic charr, seaweed (1999)
QCI (Italy)	Trout, seabass, seabream (2001)**
National organic aquaculture standards	
France	Organic aquaculture standards (since 2000)
UK	Organic aquaculture standards (since 2000)
2. Oceanica	
Private organic aquaculture certifiers	
BIOGRO (New Zealand)	Salmon (1994)***, crayfish, oysters, seaweed (1999)

BFA (Australia)	Organic aquaculture standards (since Oct. 2001)
NASAA (Australia)	Organic aquaculture standards (since 1999)
National organic aquaculture standards	
Australia	Organic aquaculture standards (since Sept. 2001)
3. ASIA	
Private organic aquaculture certifiers	
ACT** (Thailand)	Shrimp
4. North America	
Private organic aquaculture certifiers	
FOG (USA)	
FVO (USA)	
NOFA Massachusetts (USA)	
U.S. State organic aquaculture standards	
Indiana	Organic aquaculture standards (since 2001)
Iowa	
5. International	
International organic aquaculture standards	
IFOAM	Draft Standards for Organic Aquaculture adopted in 2000, but have yet to be adopted as full standards
* 200 tonnes of shrimps exported from a certified Ecuadorian farm to the United Kingdom. ** experimental batches of non-certified organic European seabass and Gilthead seabream produced in Italy and delivered to domestic markets in 2001. *** 500-800 tonnes of salmon limited to one farm, since discontinued (Paul Steere, The New Zealand King Salmon Co. Limited (pers. comm.). Source: Bergleiter, 2001 [1], modified.	

Role of IFOAM in organic standards certification and labels:

The slow initial growth of organic aquaculture has been due the absence of internationally recognized and universally accepted regulations and standards for producing and handling organic aquaculture products. Realizing the need to address this issue, the International Federation of Organic Agriculture Movements (IFOAM) drafted *Basic Standards for Organic Aquaculture Production*. These guidelines were first prepared in 1998 and adopted as draft standards by IFOAM at its General Assembly in Basel, Switzerland, in 2000.

Draft IFOAM general principles concerning organic aquaculture production (Source: IFOAM, 2002)

Conversion to Organic Aquaculture

- Conversion to organic aquaculture is a process of developing farming practices that encourage and maintain a viable and sustainable aquatic ecosystem. The time between the start of organic management and certification of the production is known as the conversion period.
- Aquaculture production methods can vary widely according to biology of the organisms, technology used, geographical conditions, ownership structure, time span, etc. These aspects should be considered when the length of conversion is specified.

Basic Conditions

- Management techniques must be governed by the physiological and ethological needs of the organisms in question. The organisms should be allowed to meet their basic behavioural needs. Management techniques, especially when applied to influence production levels and speed of growth must maintain and protect the good health and welfare of the organisms.
- When introducing non-native species, special care must be to avoid permanent disruption to natural ecosystems.

Location of Production Units

- Location of organic production units maintains the health of the aquatic environment and surrounding aquatic and terrestrial ecosystem.

Location of Collecting Areas

- Wild, sedentary/sessile organisms in open collecting areas may be certified as organic if they are derived from an unpolluted, stable and sustainable environment.

Health and Welfare

- Management practices achieve a high level of disease resistance and prevention of infections.
- All management techniques, especially when influencing production levels and speed of growth maintain the good health and welfare of the organisms. Living aquatic organisms should be handled as little as possible.
- The wellbeing of the organisms is paramount in the choice of treatment for disease or injury.

Breeds and Breeding

- Breeding strategies and practices in organic aquaculture interfere as little as possible with natural behaviour of the animals. Natural breeding methods are used.

Nutrition (Aquaculture)

- Organic aquaculture production provides a good quality diet balanced according to the nutritional needs of the organism. Feed is only offered to the organisms in a way that allows natural feeding behaviour, with minimum loss of feed to the environment.
- Feed compromises by-products from organic food processing and wild marine feed resources not otherwise suited for human consumption.

Harvesting

- Harvesting certified organic aquatic organisms from enclosures or collecting areas creates minimum stress to the organisms. The act of collection does not negatively affect natural areas.

Transportation of Living Marine Animals

- The transportation medium should be appropriate for the species with regards to water quality, including salinity, temperature, oxygen, etc. Transportation distance, duration and frequency should be minimised.

Slaughter

- Slaughter process minimises the stress and suffering of the organism.
- Slaughter management and techniques governed by careful consideration of the physiology and ethology of the organisms in question and accepted ethical standards.

Organic Aquaculture in India

India is one of the richest in terms of shrimp and fish resources in the world and there is a huge demand for organic aqua products is European and America countries. All the big super markets coop (Switzerland) Aimare (Austria), and Bristall Bay (USA) are searching for organic product supplier throughout the world. India's Farmers are still practicing organic methods, passed down for millennia. Organic fertilizer and natural pest control are the only tools available to most of these farmers, who have always lacked the financial resources to explore chemical solutions. But these farmers, whose produce is as organic as they come, cannot afford to pay the fees required to gain official certification. The Indian Central Government set up National Institute of Organic Farming in October 2003 in Madhya Pradesh. The purpose of this institute is to formulate rules, regulations and certification of organic farm products in conformity with internationalstandards.

The world's first organic aquaculture harvest of the large fresh water prawn, scampi was made the backwaters of kerala on November 1, 2007. This Unique project is being implemented with the assistance of the Marine products Export Development Authority (MPEDA) in collaboration with the State Secretariat for Economic Affairs (SECO), Switzerland, Extensive use of chemicals and pesticides in conventional food production technology has been compelling health conscious people of developed countries to explore and support organic farming methods in agriculture and aquaculture. The Indian project for organic black tiger and scampi was initiated to pursue the huge market potential of selling aquaculture product in the European markets. The Indian Organic Aquaculture Project was first initiated in January 2007 in the maritime States of Andhra Pradesh and Kerala with technical consultancy from M/s Blue you. Certification is mandatory for selling organic products across the world and NATURLAND of Germany has been chosen as the certifying agency and INDOCERT in Kerala is the inspection body for the project.

Feasibility of organic aquaculture in India

Growing demand for fish as animal protein and International organization interested in promoting organic aqua product shaping the feasibility of organic aquaculture in India.

Strengths

- Availability of herbivorous species.
- Practice of extensive farming is closer to organic
- Availability of plant source as alternative for fish meal
- Practice of integrated fish farming still prevailing
- Presence of vast brackishwater system suitable for scampi production
- Presence of suitable land for organic farming in eastern India.

Weakness

- Infancy stage of organic aquaculture
- Extension services are partially available.
- Economic feasibility of organic fish production not secure
- No well-established local/ regional market for organic seafood
- This practice is not mentioned in the existing agricultural policy documents.

Conclusions

Organic aquaculture improved environmental sustainability, strengthening of institutional support to implement transparent and enforceable policy and regulatory frameworks, application of rules and procedures, application of innovations in aquaculture, better management of aquatic animal health, improved nutrition in aquaculture, improved food quality and safety, and the promotion of market development and trade. In the future, the efficiency of organic aquaculture value chains needs to be increased. One option is through contract farming of certified feed ingredients. A workshop with all relevant stakeholders could be conducted to address the feed bottleneck problem. In the future, joint ventures will be established between retailers and producers, and these will result in greater efficiencies and market-aligned production, as well as ensured and sustainable returns for farmers. Finally, there are no research and development facilities for the conduct of applied organic aquaculture research and demonstration of systems. The establishment of such facilities in key environments would further the scientific basis, credibility and expansion of the sector.

References

1. Bergleiter S. Organic products as high quality niche products. Background and prospects for organic freshwater aquaculture in Europe. Paper presented at the ad hoc EIFAC/EU Working Party on Market Perspectives for European Freshwater Aquaculture, Brussels/Belgium, 2001.
2. Bergleiter S. Organic aquaculture 2009 – production and markets. Munich, Organic Services GmbH and Graefelfing, Naturland 2009; V:120.
3. Hatanaka M. Certification, partnership, and morality in an organic shrimp network: rethinking transnational alternative agrifood networks. World Development. 2010; 38:706-716.
4. IFOAM. Basic standards for organic production and processing. Chapter 6. Aquaculture production, 2002. www.ifoam.org.
5. IFOAM EU Group. Organic aquaculture EU Regulations (EC) 834/2007, (EC) 889/2008, (EC) 710/2009. Background, assessment, interpretation. (A. Szeremeta, L. Winkler, F, Blake & P. Lembo, eds.) Brussels,

International Federation of Organic Agriculture Movements EU Group and Valenzno, Bari, CIHEAM/IAMB. 2010, 34.
6. Mansfield B. From catfish to organic fish: making distinctions about nature as a cultural economic practice. Geoforum. 2003; 34:329-342.
7. Mansfield B. Organic views of nature: the debate over organic certification for aquatic animals. Sociologia Ruralis. 2004; 44(2):216-232.
8. Ötles Y, Ozden O, Ötles S. Organic fish production and the standards. Acta Sci. Pol., Technol. Aliment. 2010; 9(2):125-131
9. Ruangpan L. Thailand's roadmap for organic aquaculture. AQUA Culture Asia Pacific Magazine. 2007; 3(3):810.