

## **Good Agricultural Practices in Turkish Aquaculture**

**Serpil YILMAZ<sup>1\*</sup>, Nilda ERSOY<sup>2</sup>, Erkan GÜMÜŞ<sup>1</sup>, Baki AYDIN<sup>1</sup>**

<sup>1</sup>Akdeniz University, Fisheries Faculty, Antalya, Turkey

<sup>2</sup>Akdeniz University, Technical Sciences, Program of Organic Agriculture, Antalya, Turkey

*Geliş* : 09.02.2017

*Kabul* : 19.04.2017

**Review / Derleme**

\*Sorumlu Yazar: serpilyilmaz@akdeniz.edu.tr

E.Dergi ISSN: 1308 - 7517

### **Abstract**

Technological innovations in our age that affect all sectors, affects the aquaculture sector, too. From now on, the safe food and rising standard of living to consumers has also increased its importance. Within this scope, Republic of Turkey Ministry of Food Agriculture and Livestock in Turkey for healthy production issued the Regulation on Good Agricultural Practices in the Official Gazette No: 25577 and September 08, 2004. In the study, the current station and problems in Good Agricultural Practices in Turkey were put forward. Discussions have been made on how to implement the application in Turkish conditions. The research was based on mainly legislation and literature scan. The main material of research is made from a variety of references and research on legislation related to Good Agricultural Practices. In the context have been benefited from the reports, statistics, and published articles on the subject, especially the latest developments was tried to obtain from the study report via internet browsing. The relevant institutions in the country have been tried to gather information through interviews. Not only legislation scan but also the relevant company was carried out interviews to learn their thoughts on Good Agricultural Practices.

*Keywords:* Good Agricultural Practices, certification, aquaculture, sustainability, consumer

### **Türkiye’de Su Ürünleri Yetiştiriciliğinde İyi Tarım Uygulamaları**

#### **Özet**

Çağımızdaki teknolojik yenilikler diğer sektörleri etkilediği gibi tarım sektörünü dolayısıyla su ürünleri yetiştiricilik sektörünü de etkilemektedir. Artık tüketicinin yükselen yaşam standardı ile güvenli gıda tüketiminin de önemi artmıştır. Bu kapsamda Türkiye’de T.C. Gıda Tarım ve Hayvancılık Bakanlığı sağlıklı üretim amacıyla 08.09.2004 tarih 25577 sayılı Resmî Gazetede İyi Tarım Uygulamaları yönetmeliğini yayınlamıştır. Çalışmada Türkiye’de iyi tarım uygulamalarında mevcut durum ve sorunlar ortaya konularak, Türkiye şartlarında söz konusu uygulamanın nasıl sağlanabileceği ile ilgili tartışmalar yapılmıştır. Araştırma esas itibarıyla literatür çalışması ve mevzuat taramalarına dayandırılmıştır. Araştırmanın ana materyali, İyi Tarım Uygulamaları ile ilgili mevzuatlar ve konu ile ilgili yapılan çeşitli kaynak araştırmalarından oluşmaktadır. Bu çerçevede konuyla ilgili yayınlanmış makale, rapor ve istatistiklerden yararlanılmış, özellikle son gelişmeler internet taramasıyla, çalışma raporlarından elde edilmeye çalışılmıştır. Bunun yanı sıra yurt içinde ilgili kuruluşlar ile karşılıklı görüşme yoluyla bilgiler toplanmaya çalışılmıştır. Ayrıca yalnız mevzuat taramasıyla yetinilmeyip yetiştiriciler ve ilgili firmalarla iyi tarım uygulamaları hakkındaki düşüncelerini öğrenmek amacıyla görüşmeler yapılmış, makale bunlara göre yönlendirilmiştir.

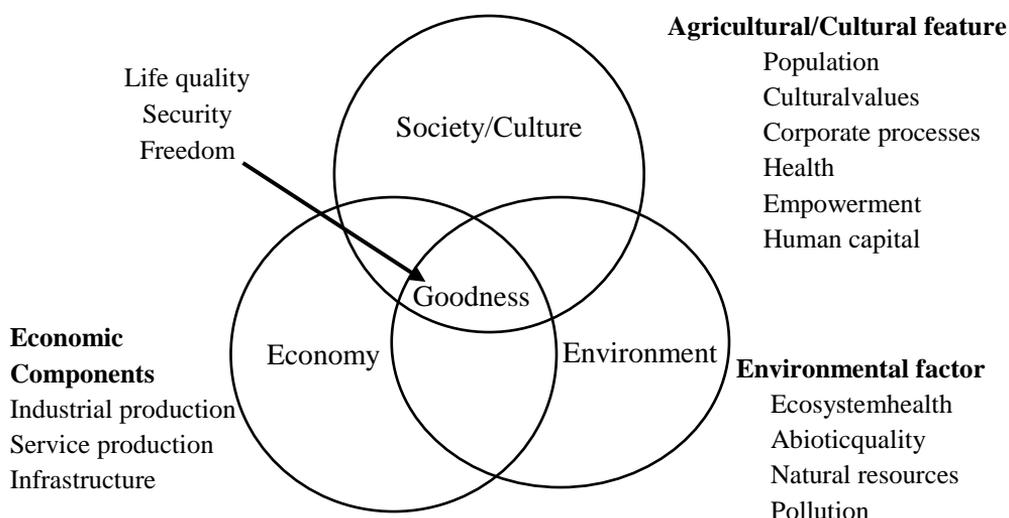
*Anahtar kelimeler:* İyi Tarım Uygulamaları, sertifikasyon, yetiştiricilik, sürdürülebilirlik, tüketici

## **INTRODUCTION**

Today, due to population growth, the importance of healthy and safe food intake is increasing. The consumer wants to make sure that the product they buy is manufactured in an ecological, safe and friendly environment. These expectations of producers have combined producers and retailers at a common point in bringing products to the

marketplace with some standards. Therefore, several initiatives have been made at the national and international level in order to protect the consumer and increase confidence in the products to be purchased.

In this context, expression of sustainable development was first articulated by the World Conservation Strategy of the International Union for Conservation of Nature and Natural Resources (IUCN, 1980). Since then, the concept of sustainable development has begun to be of great importance for the whole world and products. The most common definition of sustainable development; is to meet the needs of the present generation without removing the ability of future generations to meet their own needs (Jeffery, 2006). In the light of the generally accepted views on sustainable development, there are three important elements in the conceptual framework to be developed. As seen in Figure 1, these are indispensable elements such as environmental science, nature and natural resources, economy, society and culture (De Kruijf and Van Vuuren, 1998; Harris, 2000).



**Figure 1.** Basic principles of sustainable development  
(De Kruijf and Van Vuuren, 1998)

An international agreement on "Animal and Plant Health" was made by the World Trade Organization on 1 January 1995 (WTO, 1998). With the agreement, it has been decided to make regulations on food safety and animal and plant health in order to protect international standards (Sayin et al., 2004). The first point of the agreement is "Hazard Analysis at Critical Control Points" in food, the other is "Good Agricultural Practices" (Sayin, 2002).

It is concluded that Good Agricultural Practices (GAP) are one of the methods of achieving sustainable development. Indeed, GAP include measures food safety, protecting the environment and soil, and the health, safety and welfare of cultivators and agricultural workers (Hurma et al., 2010). For this reason, GAP is very important in terms of both quality and efficient agricultural production and safe food consumption. With GAP, the health of consumers will be preserved as the profit and competitive power of producers will increase. As GAP is beneficial to producers, consumers and the environment, it also

benefits to create new market opportunities for farmers and exporters. As a matter of fact, when the seller makes a qualified deal with the producers, the demand is increased with the confidence of the consumer. In addition, due to compliance with legal regulations, the obstacles in domestic and international marketing are eliminated (Sayın et al., 2004). Manufacturer's products are easier to market with good agricultural practices certificate. Consumer confidence in the certified product increases the demand and price (Roheim et al., 2012). Certified products were usually recognized and highly valued by consumers. Market that focus on the safety of certified farm-raised fish would possibly keep its demand steady (Haghiri et al., 2016). Also, sustainable and environmentally sensitive production is achieved with good agricultural practices.

### **Good Agricultural Practices in Turkey**

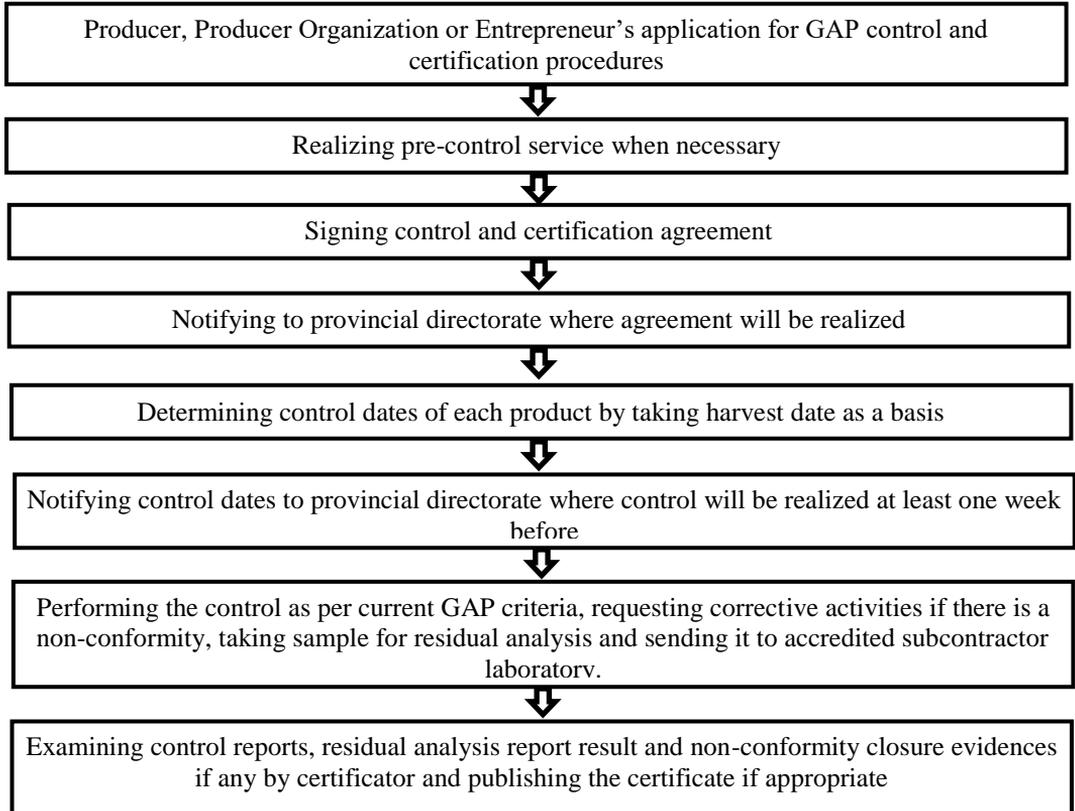
The "Regulation on Good Agricultural Practices" numbered 25577, which was firstly issued in Turkey on 08.09.2004, constituted the legal infrastructure of the Good Agricultural Practices (GAP). Currently, GAP is carried out in our country in accordance with the provisions of the Regulation on the GAP, published in the Official Gazette dated 07.12.2010 and numbered 27778. The last change in the regulation was announced on 28.05.2014 by the Official Gazette No. 29013. GAP regulation has been turned into more comprehensive standards after revised in December 7, 2010. In the recent change in regulations, it was announced by on May 28, 2014 on official gazette No: 29013 (Anonymous, 2016a). GAP in Turkey, Ministry of Food Agriculture and Livestock which gives control and the authority of certification to private audit firms carries out the operation, applications to be monitored for agricultural production. Scope of the Regulation, audit firms applies to the Ministry under the titles in which they determine subunits. Their respective owners are given the authority to certify after examining the application by a committee established by the Ministry.

According to the regulation in the Official Newspaper; The GAP and GLOBALGAP certification activities require basically the same conditions, although their functions are different. However, GLOBALGAP is a document that must be obtained by organizations wishing to participate in the international marketplace, while the GAP is a document that must be purchased by domestic market operators. There are three types of certification options in the GAP, including individual certification, group certification and equivalence. While individual certification applies to a single manufacturer in the real world, group certification is a document that must be obtained for all producers, producer associations, cooperatives, operators and group members. The group manufacturer must be a legal entity that must prove itself. In addition, the group must establish and implement an improved quality management system for GAP. Benchmarking is the recognition of countries like GLOBALGAP, which have developed in accordance with their own conditions, or similar standards, as GLOBALGAP certification. Austria, England, Chile, Japan, Spain, New Zealand and Germany are countries with full benchmarking. There is currently no such equivalent for Turkey (Anonymous, 2016b).

In terms of production marketing within the scope of GAP in Turkey, it is determined that, it is the criteria in domestic and foreign markets, and that the producer and retailers can sell their products without intermediaries by making direct agreements. Although the certification costs for producers and exporters and the implementation need to be invested for some amount initially, cost advantage can be achieved in the long run. Since the accreditation procedures of the products covered by the GAP are in competence with

international norms, non-tariff barriers in export are handled and it is expected that the GAP will be widespread particularly in all agricultural products including export-oriented aquaculture products (Öner and Işın, 2010).

The process steps of the firm that gives the certificate of GAP in the livestock and aquaculture sector in our country are shown in the Figure 2.



**Figure 2.** Good agricultural practice procedures (Anonymous, 2016c)

### Good Agricultural Practices in Turkey's Aquaculture Sector

With the lack of stock management and the use of developing technology in uncontrolled fishing, Worldwide, wild fish catches are either stable or declining (Murawski, 2010). With capture fishery production relatively static since the late 1980s, aquaculture has been responsible for the impressive growth in the supply of fish for human consumption. Aquaculture is the fastest growing food-producing sector in the world (FAO, 2016). Aquaculture has an important role to eliminate hunger and malnutrition in the world by providing fish, which commonly are rich sources of protein, essential fatty acids, vitamins and minerals, and by providing incomes and employment opportunities (Subasinghe et al., 2009). In 2015, a large part of the total production of aquatic products in our country was obtained from aquaculture (BSGM, 2016). For this reason, the sustainability of fisheries has attracted significant public attention.

Manufacturers who wish to undertake Good Agricultural Practices (GAP) activities in aquaculture must comply with the "GAP Criteria" of the Republic of Turkey Ministry of Food Agriculture and Livestock. The GAP inspection and certification procedures are carried out by the inspection and certification organizations that the Republic of Turkey Ministry of Food Agriculture and Livestock has authorized to work. The production process of the producers is controlled by these organizations and the products, produced in accordance with the GAP criteria, are given "Good Agricultural Certificate". Producers who wish to make aquaculture activities within the scope of the GAP also implement the criteria for obtaining the GAP certificate and start the necessary control and certification processes by contracting with an authorized organization (Anonymous, 2016d). Currently, GAP in aquaculture is carried out in our country in accordance with the provisions of the Regulation on the GAP in Aquaculture, published in the circular dated 01/07/2011 and numbered B.12.0.TUG.0.02.010-06-02951-14137 (Anonymous, 2017a). At the moment, there are 32 inspection and certification institutions authorized by the Ministry (Anonymous, 2017b). Some of these institutions are involved in the certification process for aquaculture.

GAP covers all production and marketing stages extending from hatchery to the table in water products. Before making decision, product or agricultural activities which as previously grown should be known their effects on human health and environment should be evaluated, if there are uncontrollable risks these fields should not be used in GAP. Producers should make risk assessment before making decided to produce. Risk assessment should be made by considering ground water level and quality, existence of sustainable water resources, first usage of pools, being involved with parasite and other parasitals and effect on adjacent areas (Anonymous, 2017a). Production should be made very carefully for protection of fish health, decrease of addiction to medicine and supplying animal health. For this reason, the first thing to do is fulfill necessary procedure after making decision in GAP, is to apply for organizations authorized for GAP and provide the production process to be recorded. Traceability and record keeping is obligatory for documenting the product. All procedures made during production should be recorded by producer and should be kept for controls to be performed later. In these records; there should be some information about product range, product's geographical region, reason of applying medicine, technical permission, chemical name and amount of used chemical, application tools, applicator's name and after how many days the harvest will be done, its method and amount. Water analysis system should be established to evaluate water resources in the best way and provide required water of fishes. When looking at risk assessment principles, water resource should be analyzed at least one time a year in terms microbial, chemical and mineral pollutants. In direction of "Integrated struggle technical instructions" for fighting against disease, especially cultural precautions, mechanical struggle, biological struggle or biotechnical methods should be applied. As a last resort, chemical struggle should be made. Harvest should be made in hygienic conditions. Training should be given to workers who are using, carrying and applying the chemicals. However, when necessary care is given to these matters, it is certified with GAPS by organizations authorized by Republic of Turkey Ministry of Food Agriculture and Livestock. Products produced with GAP, are reliable products to be always preferred by consumer. GAP is a mark of relevant product (Anonymous, 2017c).

Because, the criterion for a producer with an GAP certificate are; Not harming human health, avoiding chemical, physical and microbiological residues, Not polluting the

environment and not harming the natural equilibrium, not adversely affecting the workers in production and living things in the environment during production. For this reason, some privileges are granted to the GAP certified products. The GAP is not a necessity, it is a system that enhances competitive advantage and advantage in marketing. Another advantage is that producers can benefit from attractive support due to positive discrimination.

Some important control points to be considered by the companies that will be producing under GAP in aquaculture (Anonymous, 2017c):

- Aquaculture facility must be operated in accordance with all relevant laws.
- Hatcheries shall be able to demonstrate that the broodstock is obtained through a breeding program. Wild caught broodstock is not used to production except for genetic improvement.
- The origin of eggs and broodstock must be known and recorded.
- Quality egg or fry should be used, used variables should be clean from virus and resistant to disease and pests.
- It should be possible to prove that the fish in farm are not transgenic fish.
- All diseases seen in the facility must be recorded.
- Maximum densities shall not be exceeded. Stocking data must be recorded.
- Feed must be suitable for the species farmed. Documentation of the used feed must demonstrate its application.
- The content of the feeds given to the fish must be clearly stated and certified.
- Batches of feed from feed manufacturer must be traceable.
- It should be a product and safety information card for all chemicals in the facility.
- Drugs approved by the relevant competent authorities should be used in the facility.
- There must be documentation that the entire production period of the fish has passed GAP approved company.
- All kinds of wastes in the farm should be collected and transported to the dedicated location.
- Facilities must provide cleaning and hygiene conditions.
- Environmental impact assessment and risk assessment must be done.
- The biodiversity plan must be included in the Biodiversity Risk Assessment.
- An effective predator control plan must be in place. Documented anti predator methods must be in place.

Recently, few companies authorized to issue certificates relating to aquaculture are available our country. In Turkey, there are aquaculture facilities having good agricultural practices certificate given by the related companies. The GAP in our country is practiced on marine and freshwater fish, such as trout, sea bream, sea bass, and common sea bream. With the legal regulation of the Ministry, Çamlı Yem Besicilik has become the first firm being certified with GAP in Turkey in scope of aquaculture with Pınar Balık brand (Anonymous, 2017d). A trout plant with a capacity of 400 tons/year in Afyonkarahisar and a plant with a production capacity of 50 tons/year of common sea bream in Muğla have been produced within the scope of good agricultural practice (Anonymous, 2017e).

Currently, a company located in Izmir is producing sea bass/sea bream within the scope of good agricultural practices (Anonymous, 2017f). These companies can change every year as GAP certifications are provided for a period of time. But, it is not said that the application is sufficient in aquaculture sector. In the sector, it, however, needs to be done a healthy and environmentally sensitive production for sustainable aquaculture. Consumers want to be guaranteed no longer that any production was produced friendly practices with environment and food hygiene in terms of security risk. Therefore, good agricultural practices are also needed to recognize to consumers in fisheries sector as well as others.

## DISCUSSION

For the reasons such as developing technology, globalization, increase in income and education level, countries have started to give more importance to the concept of reliable food. For this reason, a number of initiatives have taken place in the national and international context. One of these initiatives, GAP, offers reliable products to consumers without harming the environment and nature. GAP is also implemented in some of the aquaculture products grown in Turkey, but it is not considered sufficient. GAP should be supported for the purpose of increasing export of fishery products and for smooth international export. However, as in other sectors, the adoption and use of information and technology by producers is also very important for increasing productivity and ensuring sustainable development. On the other hand, as mentioned in other studies, it is known that having agricultural publication training, together with age, education and income level are very effective in the adoption of innovations such as GAP. In addition, the use of mass media in this regard is also thought to be of great benefit. Since agricultural supports promote and encourage innovation, the situation of benefiting from the support and the objectives of the business are of great importance for the GAP.

**Acknowledgements:** This article has been presented in International Symposium on Fisheries and Aquatic Sciences (FABA 2016) as a summary.

## REFERENCES

- Anonymous, (2016a). <http://www.tarim.gov.tr/Konular/Bitkisel-Uretim/Iyi-Tarim-Uygulamalari> (Accessed: 17/11/2016).
- Anonymous, (2016b). <http://belgelendirme.ctr.com.tr/itu-globalgap-belgelendirmesi.html> (Accessed: 17/11/2016).
- Anonymous, (2016c). <http://belgelendirme.ctr.com.tr/> (Accessed: 20/11/2016).
- Anonymous, (2016d). <http://www.tarim.gov.tr/Konular/Good-Agricultural-Practices/Companies-Authorized-For-GAP-Certification> (Accessed: 04/12/2016).
- Anonymous, (2017a). <http://www.tarim.gov.tr/Konular/Bitkisel-Uretim/Iyi-Tarim-Uygulamalari/Su-Urunleri> (Accessed: 14/01/2017).
- Anonymous, (2017b). <http://www.tarim.gov.tr/Konular/Good-Agricultural-Practices> (Accessed: 14/01/2017).
- Anonymous, (2017c). <http://www.tarim.gov.tr/Sayfalar/Detay.aspx?OgeId=237&Liste=Mevzuat> (Accessed: 01/02/2017).
- Anonymous, (2017d). Akuakültür'de ilk "İyi Tarım Uygulamaları" sertifikası Pınar Balık'ın!. <http://www.camli.com.tr/tr/haber/akuakultur-de-ilk-iyi-tarim-uygulamalari-sertifikasi-pinar-balik-in> (Accessed: 01/02/2017).
- Anonymous, (2017e). Balıkçılıkta iyi tarım dönemi. <https://dogruhaber.com.tr/haber/61110-balikcilikta-iyi-tarim-donemi/> (Accessed: 01/02/2017).

- Anonymous, (2017f). Republic of Turkey Ministry of Food, Agriculture and Livestock, (Accessed: 01/02/2017).
- BSGM, (2016). Su ürünleri istatistikleri. Gıda Tarım ve Hayvancılık Bakanlığı, Balıkçılık ve Su Ürünleri Genel Müdürlüğü, Ankara, 20 pp.
- De Kruijf, H.A. & Van Vuuren, D.P. (1998). Following sustainable development in relation to the north-south dialogue: ecosystem health and sustainability indicators. *Ecotoxicology and Environmental Safety*, 40, 4-14.
- FAO, (2016). The state of world fisheries and aquaculture. Contributing to food security and nutrition for all. Food and Agriculture Organization of the United Nations, Rome, 200 pp.
- Haghiri, M. (2016). Consumer choice between food safety and food quality: The case of farm-raised Atlantic salmon. *Foods*, 5(2), 22.
- Harris, J.M. (2000). Basic principles of sustainable development, Vol. 1. Ed.: Kamaljit S. Bawa ,Reinmar Seidler. Eolss Publishers Co. Ltd., Oxford, United Kingdom.
- Hurma, H., Yılmaz, F. & Demirkol, C. (2010). İyi tarım uygulamalarının tüketiciye yansımaları: Tekirdağ ili örneği, *Türkiye IX. Tarım Ekonomisi Kongresi*, 645-652 pp, Şanlıurfa.
- IUCN (International Union for Conservation of Nature and Natural Resources), (1980). World conservation strategy: living resource conservation for sustainable development. World Conservation Union, United National Environment Programme, and World Wide Fund for Nature Gland, Switzerland. 77 pp.
- Jeffery, J. (2006). Governance for a sustainable future. *Public Health*, 120: 604-608.
- Murawski, S.A. (2010). Rebuilding depleted fish stocks: the good, the bad, and, mostly, the ugly. *ICES Journal of Marine Science*, 67, 1830-1840.
- Öner, G. & Işın, Ş. (2010). Globalgap eşdeğerlik sertifikasyon sisteminin dünyadaki örnekleri ve Türkiye'de uygulanabilirliğin irdelenmesi. *Türkiye IX. Tarım Ekonomisi Kongresi*, 637-644 pp, Şanlıurfa.
- Roheim, C.A., Sudhakaran, P.O. & Durham, C.A. (2012). Certification of shrimp and salmon for best aquaculture practices: Assessing consumer preferences in Rhode Island, *Aquaculture Economics and Management*, 16(3), 266-286.
- Sayın, C. (2002). Yaş meyve ve sebze dış ticaretinde sağlık düzenlemeleri ve EUREPGAP uygulamaları. Panel sunuş notları, Elmalı, Antalya.
- Sayın, C., Mencet, M. N. & Taşçıoğlu, Y. (2004). Avrupa Birliği'nde EUREPGAP uygulamaları ve yaş meyve ve sebze ihracatımıza olası etkileri, Türkiye VI. Tarım Ekonomisi Kongresi, 16-18 Eylül, Tokat.
- Subasinghe, R., Soto, D. & Jia, J. (2009). Global aquaculture and its role in sustainable development. *Reviews in Aquaculture*, 1, 2-9.
- WTO (World Trade Organization), 1998. Understanding the WTO Agreement on Sanitary and Phytosanitary Measures. May, 1998. [https://www.wto.org/english/tratop\\_e/sps\\_e/spsund\\_e.htm](https://www.wto.org/english/tratop_e/sps_e/spsund_e.htm) (Accessed: 13/01/2017).