

## Is HACCP a Difficult Food Safety System to Implement?

Beyza ULUSOY SÖZEN<sup>1</sup> and Canan HECER<sup>2\*</sup>

<sup>1</sup> İstanbul Bilgi University, Health Sciences High School, Department of Nutrition and Dietetics, Dolapdere, Beyoğlu, İstanbul, TURKEY

<sup>2</sup> Uludağ University, Karacabey Vocational School of Higher Education, Department of Food Technology, Karacabey, Bursa, TURKEY

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### ABSTRACT

HACCP system is a very important food safety tool that most countries throughout the world try to implement and make pressure for its adoption. The food safety literature demonstrates that a successful HACCP system involves a complex mix of managerial, organizational and technical hurdles. Even the largest food companies, equipped with important resources, technical specialists and management skills, may face difficult challenges implementing an HACCP system. These difficulties or barriers vary from country to country or from business sector to business sector. Some may be due to internal factors in a business' operations, like the knowledge level or available resources for the business. Others may be related to external factors, such as the accessibility of government or industry support. In the present study; implementation of the HACCP system globally and in our country was evaluated, challenges of the sector were faced on the basis of the main branches of the sector. With the aim of that, world literature was gathered and we seek to understand its implementation barriers of HACCP system.

**Key Words:** Food Safety, HACCP, Food Sector, Quality

## HACCP Uygulanabilirliği Zor Olan Bir Sistem Midir?

### ÖZET

HACCP, birçok ülkede uygulamaya konulan ve dünya çapında yaygınlaşan önemli bir gıda güvenliği sistemidir. Gıda güvenliği üzerine yapılan çalışmalar göstermektedir ki, işletmelerde HACCP sisteminin başarılı bir şekilde kurulumu yönetsel, organizasyonel ve teknik engellerin karmaşık bir karışımı olarak karşımıza çıkmaktadır. Önemli kaynaklar, teknik uzmanlar ve yönetim becerileri ile donatılmış büyük gıda şirketleri bile, HACCP sisteminin uygulanmasında sorunlarla karşı karşıya olabilir. Bu zorluklar ya da engeller ülkeden ülkeye veya iş sektöründen iş sektörü göre değişebilir. Çalışmalar neticesinde belirlenen tüm bu engeller için iç ve dış faktörler şeklinde gruplandırma yapılmıştır. Çalışanların ve yönetimin bilgi, tecrübe düzeyi, mevcut kaynakların kullanımı iç faktörlere örnek gösterilirken; resmi makamlar ya da sanayi bazında destek ve bilgi alışverişi dış faktörlere dahil edilmektedir. Bu çalışmada, HACCP sisteminin küresel boyutta ve ülkemiz koşullarında uygulanması değerlendirilmiştir.

**Anahtar Kelimeler:** Gıda Güvenliği, HACCP, Gıda Sektörü, Kalite

### INTRODUCTION

The most famous gastronome, Anthelme Brillat-Savarin, wrote in *Physiologie du Gout, ou Meditations de Gastronomie Transcendante* (1842) that; "Dis-moi ce que tu manges, je te dirai ce que tu es.": "Tell me what you eat and I will tell you what you are." This simple opinion expressed in the past but refers to today's industrialized eating habits and hazards in our eating. In recent years; surveillance and monitoring by a number of countries and the researchers indicates that foodborne illness is increasing around the world, unfortunately. So as Brillat-Savarin mentioned, we are not in a good position. Food borne illness is thought to be increasing for a variety of reasons. It is very common that the food should be safe from harmful substances from farm to fork. End point testing is not a good way to ensure food safety. The HACCP approach is to prevent hazards before they happen (Walker et al. 2003, McSwane et al. 2003). In the last decade, the HACCP system has been recognized as a cost-effective procedure for ensuring food safety. Today, this methodology is internationally accepted as a food safety tool which is applied during full food production process (Bertoloni et al. 2007). On the other hand, despite the orchestrated efforts of international institutions to drum up HACCP awareness and compliance, only food industries in more developed countries are currently apt to immediately implement this food safety tool. Because, as the researchers reported and the practical experience showed that, there are many barriers and difficulties to implement the system in food plants. According to Mortimore (2001), HACCP can be defined as a food safety approach whose implementation is quite demanding. To this extent, it has to be stressed how its

\* Corresponding author: hecer01@gmail.com

practical roll out requires a mix of managerial, organizational and technical resources to cope with the technical barriers it presents (Panisello and Quantick 2001). On the other hand, as Sun and Ockerman (2005) mentioned in their review that it is different to apply HACCP from big businesses to small businesses because the variations in size of the operations can be tremendous.

With this perspective, we seek to understand implementation barriers of HACCP system and gathered world literature reported on this case.

## **HACCP DEVALUATION BY INTERNATIONAL INSTITUTIONS EFFORTS**

The system grew out of a need to provide safe food for National Aeronautics and Space Administration (NASA), including the elimination of pathogens, toxins, and foreign objects from food and beverages. The application of HACCP was pioneered, during the sixties, by the Pillsbury Company with the cooperation of NASA, Natick Laboratories of the US Army, and the US Air Force Space Laboratory Project Group. Robert Muller from Pillsbury Company was the inventor of the HACCP standards used by the food industry. The original Pillsbury HACCP procedure has been built up with three components: 1. the identification and assessment of all hazards associated with the final foodstuff, 2. the identification of the steps or stages within food production at which these hazards may be controlled, reduced or eliminated: the Critical Control Points (CCPs) and 3. the implementation of monitoring procedures at these CCPs.

In 1993 the European Union issued Council Directive 43/93 (EU 1993), established a general requirement for all food business to adopt a risk based food safety management system with the principles of HACCP. However, each country in the EU interpreted the Directive into their national regulations in different ways. This led to widely differing levels of interpretation. Because of that Council Regulation 852/2004, with no option for national amendment, came into force across Europe in January 2006 (EU 2004). It requires all food businesses to implement a system based on HACCP principles. The application of HACCP has been incorporated into Codex guidance texts (Codex Alimentarius Commission 1997). Both the United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA) has adopted HACCP as the best program to prevent food borne illnesses (Eyck et al. 2006). According to the National Advisory Committee on Microbial Criteria for Foods, HACCP is defined as "a systematic approach to identification, evaluation and control of food safety hazards" and a HACCP plan is "the written document which is based upon the principles of HACCP and which delineates the procedures to be followed" (NACMCF, 1997). World Health Organization (WHO) has recognized the importance of the HACCP system for the prevention of food borne diseases (WHO, 1997).

Turkey has been a member of Food and Agriculture Organization (FAO) and Codex Alimentarius Commission since 1948. On the other hand, official ordinance regulations on food laws have been fulfilled according to the EU (Hascicek et al. 2004) and by the way Turkey food business was obligated to implement HACCP system in food law just like EU member countries. As Bas et al. (2007) mentioned that the use of HACCP, based on the internationally accepted seven principles as promoted by the Codex Alimentarius Commission, is rapidly increasing in Turkish food businesses.

## **WHAT IS BEING TALKED ABOUT HACCP IMPLEMENTATION BARRIERS**

Despite the huge benefits of HACCP method, the literature suggests that successful implementation has been limited by many factors. The success in developing, installing, monitoring and verifying a successful HACCP system involves a complex mix of managerial, organizational and technical hurdles. Even the big food companies, may face difficult challenges to implement an HACCP system. Therefore a small or medium-sized enterprise (SMEs) may feel that the difficulties of HACCP are insurmountable (Taylor 2001). Barriers of time, money and skilled personnel (Clayton et al. 2002, Hwang et al. 2001, Mortimore, 2001, Panisello et al. 1999) have been reported by researchers as common factors preventing HACCP implementation, especially in (SMEs).

The difficulties vary from country to country or from business sector to business sector. Some may be due to internal factors operations, like the knowledge level or available resources or some may be related to

external factors, such as the accessibility of government or industry support. As Herath and Henson (2010) mentioned, there are 20 potential barriers for implementation of HACCP. The difficulties were expressed with those statements: “implementation of HACCP impeded by internal budgetary constraints, problems obtaining external funding, current food safety controls considered sufficient, lot of changes to our production processes needed before HACCP could be put in place, the things needing to be done to implement HACCP overwhelmed us, other investments considered more important, lot of changes to our food safety controls needed before HACCP could be, wide-scale upgrading of the plant needed before HACCP could be put in place put in place, scale of operation is too small to have, not sure whether the implementation of HACCP would meet future regulatory requirements, uncertain about the potential benefits of implementing HACCP, HACCP difficult to implement because of internal organization of the company, concerned that HACCP would reduce our flexibility in production, thought it best to wait and see the experiences of other companies before implementing ourselves, did not really see HACCP as suitable for our plant, not sure whether the implementation of HACCP would meet our customer’s requirements, considered that costs of implementing HACCP likely to get cheaper over time, greater priority given to other issues than enhancing our food safety controls, food safety issues not considered sufficiently important to warrant the investment, HACCP goes against all of the ways in which we have traditionally done things”

Obstacles regarding HACCP implementation are widespread. Because of that there are numerous research papers dealing the ways of success to adopt the system in various food industries. In an attempt to bring the conclusions of the studies together, Jevsnik et al. (2006) reported the outcome of a meta-analysis. According to the results, around 50% of the hurdles related to training, human resources, planning, knowledge and competence, and management commitments. 10 of the 12 studies investigated in the meta-analysis reported barriers related to worker motivation, awareness, interest, and familiarity with food safety controls. Other barriers classified by Jevsnik et al. (2006) relate to poor planning of implementation, excessive documentation, knowledge and competence, external support and lack of resources. The other results of the meta-analysis has shown that among 21 elements, we can allocate seven elements (training, human resources, planning, knowledge and competence, management commitment) representing almost 50% of all identified barriers (Jevsnik et al. 2006).

Researchers reported that, in the catering, foodservice and retail industries the most common hurdles have been classified as lack of knowledge, training, high staff turnover, the large variety of products, change in potential demand, variability in workloads, and the large numbers of part-time workers (Jevsnik et al. 2007, Jevsnik et al. 2008, Adams, 2000, Panisello and Quantick 2001, Ward 2001). Studies in hospital food services, catering establishments, hotels, kebab houses, takeaways and restaurants, have determined that the basic reason of not developing food safety applications result from the lack of knowledge about these systems (Bas et al. 2007). Walker et al. (2002) quantitatively assessed the generic HACCP-PRP implementation in 102 small medium enterprises in UK. According to this study it was reported that 88% of SMEs believed that the minimal progress in implementing HACCP was due to the lack of time and expertise. Taylor (2001) observed that even a large food company, with its resources of money and expertise, might face significant hurdles in developing a successful HACCP system. The results of the study show that the possible factors influencing HACCP implementation in hospital kitchens in Taiwan include gender, age, and job position differences as well as differences in the confidence staff members feel in receiving support from staff in other departments and financial support from the hospital itself (Shih and Wang 2011). Raspor (2008) determined and reported that there is rather limited information about HACCP systems in Central-European countries. And they surveyed the situation of the introduction of HACCP methods in Slovenia. They investigated that in order to run these systems successfully, two basic conditions: suitable working environment from the hygienic, technical point of view and motivated, satisfied and qualified personnel must be assured.

Another important barrier for HACCP implementation is expensiveness of the system. Martin and Anderson (1999) evaluated the costs and time for full HACCP implementation. According to their study; in the short term, as market requirements for food safety not always were related to price improvement and the cost effectiveness not always was positive to the enterprise implementing HACCP. However, in the long term, this implementation might be the only way to keep plants as suppliers to the food market. Maldonado et al. (2005)

concluded that for the Mexican meat industry, investment in new equipment and microbiological tests of products accounted for most of the implementation and operational costs, respectively. Calatore and Caswell (1999) reported from studies in the seafood industry that many companies failed to have a reliable costs and benefits estimation of HACCP implementation beforehand. They concluded that the uncertainty on costs and benefits estimations could be a major restraint for planning HACCP adoption by individual seafood companies. In the study of Bas et al. (2007), time and money were identified as the greatest barriers to improve food safety. As they reviewed, similar problems have been reported by other authors (Mortlock et al. 1999, Panisello and Quantick 2001, Panisello et al. 1999, Ward 2001). Youn and Sneed (2002) identified lack of financial resources to devote to food safety was the biggest resource barrier.

As Salay and Caswell (1998) mentioned; HACCP implementation requires a complex interrelation among governments, industry and consumers but unfortunately, this responsibility is not always accomplished. Yapp and Fairman (2006) indicated a lack of trust in food safety legislation and enforcement officers. Hwang et al. (2001) found that Indiana school foodservice managers identified time to establish a HACCP program, time to run the program, and labor costs as being the three biggest obstacles. In addition, "lack of training funds, time to get used to running the HACCP program, and union problems" were the other identified obstacles. There is a big confusion between prerequisite programs and HACCP plan, their relations and how they should be managed (Vela & Fernandez, 2003). The main barrier to implementing a HACCP based food safety management system was the lack of prerequisite programs as concluded Bas et al. (2006).

Giampaoli et al. (2002) conducted a national study and found three types of barriers: resource management, employee motivation, and employee confidence. Employees are nervous about taking food safety certification examinations and often are not comfortable with the change needed for implementation of a program like HACCP. Various studies have shown socio-psychological factors to influence the implementation of HACCP programs (Ball et al. 2009, Ball et al. 2010, Clayton and Griffith, 2008, Gilling et al. 2001, Hinsz et al. 2007). Taylor (2008) identifies other psychological barriers such as lack of agreement and lack of self-efficacy. Similarly, in the study of Garayoa et al. (2011) it was reported that attitude barriers due to a lack of educative courses, sessions or meetings, making it more difficult for workers to adhere to this system.

Knowledge of the staff was found to be important for implementation. Vela and Fernandez (2003) concluded that; 46.6% of respondents claimed to have a good knowledge of HACCP while 6.6% admitted to having a poor knowledge. Another study has demonstrated that an increase in the knowledge of a food handler does not necessarily change their food handling behavior and is dependent upon their attitude (Clayton et al. 2002). Panisello and Quantick (2001) identified constant turnover of employees as a barrier. Bas et al. (2007) concluded in their study that 91% of food business directors agreed employees needed more training to improve food safety practices. According to their mention; their finding was consistent with the findings of Giampaoli et al. (2002), Hwang et al. (2001). As Bertoloni et al. (2007) mentioned that, HACCP can be hindered by lack of time, expertise, training, motivation, commitment and funding in SMEs. Hwang et al. (2001) also found that the availability of sanitation training had a positive relationship to implementing HACCP. Taylor (2001) considered the employment of experienced, technically qualified food staff as the most important factor influencing the implementation of HACCP system. Youn and Sneed (2002) identified lack of employee training was the biggest employee barrier. Lack of financial resources to devote to food safety was the biggest resource barrier. The survey results of Walker et al. (2003) in small-and medium-scale food producers underlined the lack of knowledge. Only 65% of producers kept any records. Their further results, based on questioning of managers, indicated that the basic lack of hygiene knowledge and understanding could prove to be a major barrier to the effective implementation of Bryan (1988) suggested that in the future the number of HACCP principles would increase from seven to ten or more. The ninth HACCP principle, according to him, would be education and training.

In Turkey the barriers were found similar as reported worldwide. The study of Karaman et al. (2012) indicates that the most important barriers for food safety systems implementation in the Turkish dairy industry are due to insufficient funds, plant conditions, and knowledge about HACCP practices. According to a recent questionnaire study of Bas et al. (2007) in 115 food plants of Ankara, 87% of managers agreed that insufficient support from the authorities was the biggest problem. The purpose of their study was to determine barriers for

HACCP and food safety programs in food businesses in Turkey and lack of understanding HACCP was identified as one of the main barriers. 63.5% reported that they did not really know what HACCP was while 23.5% reported that it was too complicated. Lack of knowledge about HACCP (83.5%), lack of time (88.7%), staff turnover (80.9%), lack of employee motivation (83.5%), complicated terminology (87.0%) and lack of personnel training (91.3%) was the other most common barriers in food businesses. In some milk plants in Izmir city, Turkey, it was documented that the critical factor cited by plant managers for not implementing a HACCP system was the high cost of implementation (Demirbas and Karagozlu 2007). On the other hand, the difficulties of HACCP in Turkish food businesses have been named as insufficient equipment and physical conditions of the food plant (Bas et al. 2006). Within another study performed by Bas et al. (2007), they concluded that the Turkish Government must develop new regulations on Turkish Food Codex and need to increase the level of control in food businesses with respect to adaptation law of European Union.

As Garayoa et al. (2011) expressed FAO/WHO report (2006) to achieve the successful implementation of HACCP, the concept must be understood first, by the managers of the establishments.

As a conclusion; it is accepted and reported that there some common and special barriers of implementing HACCP system for many countries. The difficulties vary from country to country or from business sector to business sector. Especially in Turkey, insufficient funds, plant conditions, and knowledge about HACCP practices are found to be the most encountered barriers to develop HACCP system.

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