The evaluation of the developments in food safety systems formation in the world for dairy industry from the standpoint of Turkey

Hodnocení vývoje tvorby systémů potravinové bezpečnosti ve světovém mlékárenském průmyslu z hlediska Turecka

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Abstract: Food safety is important due to new protection measurements applied in the growing world trade as much as the raise and continuity of life quality. In recent years, the countries have begun to face with important problems both in domestic consumption and exportation, because of the sensitivity of consumers on the safety of food products. Regarding this, in the dairy industry, which is an important sub sector of the food industry, the food safety issues has begun to gain importance in developing countries like the developed ones as a result of the world trade. Therefore the aim of this study can be stated as examining the food safety systems for dairy industry and comparing them with Turkey.

Key words: dairy industry, food safety, HACCP, Turkey

Abstrakt: Význam potravinové bezpečnosti roste jak vzhledem k novým ochranným opatřením aplikovaným ve stále rostoucím světovém obchodě, tak také vzhledem ke kontinuálnímu zvyšování kvality života. V posledních letech řada zemí čelila významným problémům jak v domácí spotřebě tak při exportu, poněvadž citlivost spotřebitelů vůči bezpečnosti potravinářských produktů roste. V souvislosti s tím také nabývají v rámci mlékárenského průmyslu, který je významným pododvětvím potravinářského průmyslu, na významu, hlediska potravinové bezpečnosti důležitosti jak v rozvojových, tak ve vyspělých zemích, které se podílejí na světovém obchodu. Cíle této studie proto je zkoumání systémů potravinové bezpečnosti ve světovém mlékárenském průmyslu a jejich komparace se situací v Turecku.

Klíčová slova: mlékárenský průmysl, potravinová bezpečnost, HACCP, Turecko

Food safety has begun to take place among the important and prioritized topics for the world's food production and trade. In this state, like the other food products, the development in dairy industry, that has an important place in food industry, has grown rapidly. Due to safe nourishment and international trade, these developments concern Turkey as well. In Turkey, the structural features of dairy industry and the other problems stemming from its connections with agriculture sector maintain as bottlenecks in providing and maintaining food security. Furthermore, the dairy industry has a very heterogeneous structure. Besides a little amount of big companies, it consists of small family companies. Therefore, the application of food safety systems to Turkey's dairy industry may encounter with some problems. Thus, the main purpose of this study is to debate and to evaluate applicability of the food safety systems used in the world's dairy industry for Turkey. This study first reviews the legal framework and applications of food safety systems used in dairy industry in the world and discusses the legal framework and applications of food safety systems in Turkish dairy industry and then evaluate process of food safety systems formation from various views in accordance with the developments in the world.

FOOD SAFETY SYSTEMS IN WORLD DAIRY INDUSTRY

The legal framework of food safety systems in world dairy industry

In many countries food safety is arranged by several and comprehensive laws and regulations. Especially in developed countries the definitions of security requested for the food products has become very strict. This situation generates an answer to the increase in food originated diseases and increasing sensitivity of consumers about the effects of food products on health. At the same time, it is arised due to permission of non-tariff barriers tenancy in food products trade by the international agreements. Growing importance in technical impediments in food product market enforces less developed or developing countries, which export food products to developed countries, to be more delicate in production for foreign markets. For all these reasons, food security has grown in importance (Arıkbay 1998).

In the last decade, food scandals occurred mostly from animal originated products, in developed countries like EU countries, USA and Japan have made the consumers lose confidence in food industry; and revealed the inadequacies of traditional methods on food production, processing and marketing and a system necessity for food safety (Arıkbay 2002). Nowadays; in providing the food safety, comprehensive strategies like Good Manufacturing Practice (GMP), Hazard Analysis at Critical Control Points (HACCP), Hindrance Technology (HT), Pointing Microbiology (PM) and Food Safety Objects (FSOs) almost all are used.

Among these systems, the use of HACCP is considered in many countries as the most active and economic way of producing safe food and struggling with food safety problems. This approach is based upon, risk evaluating based on scientific structure and preventing them before they exist instead of the final production test that gives no opportunity to determine the health risks sufficiently and on time (Heeschen et al. 1997). Although HACCP is developed for the space studies in the beginning, later by extending its scope, it has been applied to many food products and to the dairy industry that has a priority in sectors about food safety. Nowadays, in developed countries at first, it's a legal obligation to apply the HACCP principles in dairy industry of many countries.

On the other hand, international organizations those trying to regulate the international food product trade like World Health Organization (WHO), Food and Agriculture Organization (FAO), World Trade Organization (WTO), Codex Alimentairus Commission (CAC) and International Epidemic Animal Disease Office make various regulations related with food (DPT 2003). These efforts arise the standardization of the food safety applications in world scale and hence, wherever the consumers live or wherever they go, they must have the same high safety (Dougherty et al. 1999; CAC 2003).

An important constitution for food safety at international level is the agreement determining the hygiene rules on WTO's food trade and Sanitary and Phytosanitary Measures (SPS), and Agreement on Technical Barriers to Trade (TBT) that is related with technical barriers. These two agreements are regarded as the basic milestones in regulation of international food trade about food safety (DPT 2003). Every country signing the SPS Agreement are given the right of "*to determine their appropriate safety levels and take measurements for this*" in forming the food safety measurements. But there is a requirement for appropriate protection levels determined by the countries for food safety to be at acceptable risk level (GATT-SPS 1994). TBT Agreement, that regulates the food standards excluded in SPS Agreement and including the topics like labeling and packing, intends to prevent the technical regulations in order not to create barriers in international food trade (GATT-TBT 1994).

Today, EU countries and the USA are in the lead, countries which became partly to WTO Agreements as developed countries status, are trying to benefit from preventive measures in the food safety by playing an active role in SPS and the other WTO committees. On the other hand, WTO agreements mean to carry the non-tariff barriers as extend to "reciprocal treaty" into international platform for developing countries (Soydal 2000).

Both SPS and TBT agreements show CAC, cooperating with FAO and WHO, for food norms as a reference. CAC, established by FAO and WHO in 1963, has been preparing related texts like food standards, guidelines and codes of practice under joint FAO/WHO Food Standards Program. The main aims of this program are to protect health of consumers, to ensure fair practices in the food trade and to promote the coordination of entire studies carried out by the international, governmental and non- governmental organizations related with food standards (CAC 2003). CAC carries out all these duties through many committees; and in dairy trade the international standards are determined by related Codex Committees. These committees are Codex Committee on Milk and Milk Products (CCMMP), Codex Committee on Food Additives

(CCFA), Codex Committee on Food Hygiene (CCFH), Codex Committee on Pesticide Remains (CCPR) and Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF) respectively (Smith, Hogan 1998). CCMMP; being the most important one and as a FAO/WHO National Experts Committee aiming to determine the principle codes related with Dairy Products, is established before CAC (1958), but later (1993) has been integrated into the CAC. New Zealand, who shows a considerable progress in dairy products safety, is the hosting country. This country puts forth efforts for fair international food trade stated in WTO agreements by taking an active role in Codex Committees together with Australia. The aim of the Committee is to prepare international standards, codes and the other guidelines for dairy productions (FAO 2003).

The main food safety criterions for the dairy productions are low bacteria amount, low amount or none of pathogens affecting the human health negatively, of veterinary drugs remains prevention, minimum pollution from chemical pollutants and microbial toxins and etc. Particularly, low number of somatic cells those are considered to be a food hygiene elements has become an important criterion in international milk and dairy productions trade (Smith, Hogan 1998). The Commission encourages HACCP and the applications of complementary food safety management systems (IICA 2003). However, there are some problems in practice. In the following section, practices related with food safety in world dairy industry and the problems mentioned above are issued and examined.

The practices related with dairy industry in the world

Nowadays, demands of the consumers in developed countries for the activities of public and private sectors improving food safety; especially the collaboration between these two has increased. Collaboration issues are ranging from the determination of obligatory state standards to education, from providing the production guidelines to voluntary certification services. The governments and industrialists in the countries like EU, USA, Australia and New Zealand in which the dairy industry is developed, have been made important progresses in providing food safety for dairy productions. In these countries, food processors and retailers increasingly encourage security through the food chain by demanding food safety guarantee from their producers (Unnevehr, Roberts 2002).

The private sector in the world dairy industry is applying the advanced hazard management and control processes partially for the market demands, and partially for legal regulations. The system of HACCP that used widely due to two reasons above in dairy industry of developed countries (Vela, Fernandez 2003) has become obligatory in legal meaning in the dairy industry of many developing countries due to globalization and national and international agreements. But it is not possible to put these laws into practice in these countries which have weak dairy industry. And in these countries a few applications of HACCP are usually emanated from the demands of the buyers in the importer countries.

The formation and application of HACCP plans may be hard and slow even in developed countries due to structures of region, sector and establishments (Vela, Fernandez 2003; Untermann 1999; Panisello et al. 1999; Camino et al. 2000; Taylor 2001). Today it is understood that HACCP can be an effective instrument in industry growth and prevention of food originated diseases only if it is understood and applied correctly (Motarjemi, Kaferstein 1999; Mortimore 2000). Achieving success in HACCP applications is depending on the priority of four basic elements; desire, education–instruction, the existence of sources and external pressure, of the system in establishment (Panisello, Quantick 2001). In these sense, a great progress has to be made in order to form HACCP application conditions. In these countries, in which small establishments are working under primitive conditions both in dairy farming and dairy industry, the application of HACCP is difficult to achieve meaning the liquidation of the small establishments (Rehber, Ulusoy 1998; Hockmann, Pieniadz 2003).

The experiences of developed countries displays the importance of preliminary condition programs in order to establish and run HACCP carefully; along with being safe, necessary conditions are indicated for complete and proper production (Motarjemi, Kaferstein 1999; NACMCF 1998). Besides that, it is clear that FSO's, those become common in developed countries at first and then all over the world will be increasingly important in risk management in dairy industry. FSO's are focused on public health risks instead of reducing pathogens amount as the final target and determine measurable public health targets for controlling the hazards in foods (Campbell-Platt 2002).

In food safety issue, consistency of the developing countries to these systems applied in developed countries has a critical importance for sustainable dairy industry in globalizing world. Dairy sector displays a difference from the other sectors in neces-

sity of integrating the precautions being applied at farm level to the risk management run by the milk process establishment. The key point is to evaluate whether the accumulated and combined effects of all measures including general hygiene measures, both at farm and plant level, actually result in products that meet the FSOs (Heggum 2001).

THE FOOD SAFETY SYSTEMS IN DAIRY INDUSTRY IN TURKEY

Legislation related to the formation of food safety in the dairy industry in Turkey

In Turkey, legislation norms used in legal system are; law, decree in force of law, international agreement, governmental decree; regulation, by-law and directive (Gökçe et al. 1999). The rules related to dairy industry and meanwhile the legislation that arrange the formation of food safety process, take place in food laws which is a part of the Turkish legal system.

The studies on food laws have begun in 1930's with enacting the General Hygiene Law of number 1593 about food control in Turkey. After, the concept was broadened with the Food Materials Regulation coming into force in 1952 and until 1955 Food Legislation is implemented with this law together with the regulation and Food Additive Materials Circular enacted later (Demirci, Kurultay 1999). During this period, various institutions like the Ministry of Agriculture and Rural Affairs, the Ministry of Health, the Ministry of Industry and Trade and the Turkish Institute of Standards (TSE) have had efforts on food legislation. However, as the legislation in force did not fit to the advances in technology, food control activities could not attain the target level of efficiency.

Besides, in the meantime it is recognized that, in order to resolve the present problems on food, the authority, facilities and resources should have been gathered in one unit. In this sense, in order to fulfill the obligations of GATT, Uruguay Round and the Customs Union with EU, the Act number 560 on "The Production, Consumption and Control of Foods" in 28 June 1995 and the Act number 4128 on "Penalization Decisions" in 7 November 1995 were enacted.

The act number 560, framework law, contains all stages of food chain from production to consumption. The most important change that the decree brought is the establishment of one law for food. Basically, it transfers all the food-related services to the Ministry of Agriculture and Rural Affairs and the Ministry of Health (Haki, Mert 1999). The new food law, entered in force by the beginning of year 2000, obliges, instead of the limited level of control on food stuffs carried out only at the last product stage; to execute controls at all of the stages from the production of the raw material, to processing, storage, transfer and marketing. According to the decree, any plant where the foodstuffs would be produced is required to meet certain technical and hygienic conditions and to maintain them along with the production process.

Also a stipulation about the convenience of raw and auxiliary materials and the additives those are used during the production of food material has been brought to the Turkish Food Codex (Bilişli 2000). The Turkish Food Codex Regulation, prepared based on the article 7 of the decree number 560, has entered into force on 16 November 1997; and "The Regulation on the production, consumption and control of the Foods" has entered in to force on 9 June 1998. With the product specific directives based on the Turkish Food Codex, it is intended to provide practical convenience to the industry executive, and therefore to unfair competition (DPT 2003). Of the product-specific directives based on the Turkish Food Codex, five are either directly or indirectly related to the dairy industry. By chronological order, these are:

1. "Directive on Raw Milk and Heat Treated Drinking Milk" published in the Official Journal on the 14 February 2000
2. "Directive on Fermented Milk" published on the 3 August 2001
3. "Directive on Condensed Milk and Milk Powder" published on the 29 December 2001
4. "Directive on the Sampling Methods for Condensed Milk and Milk Powder" published on the 20 March 2002
5. "Directive on the Method of Analysis for Condensed Milk and Milk Powder" published again on the 20 March 2002.

All these directives are prepared considering the practices in developed countries, and within the framework of the EU norms.

Practices of food safety systems in Turkey within the framework of the food legislation and the dairy industry

The first and the most critical objective in food industry are to provide the reliability of the end product in terms of healthiness. Thus, in any food producing plant, a "Food Safety" program and system, definitely, must be established and practiced. However,

the fulfillment of the expectations of the consumers in the international quality management systems, granting sufficiency in all aspects and at all units of the institution, and making this assessable by other institutions are very important. The means used for this purposes are models that are standardized by ISO-9000 series. When the total quality management tools for food industry are considered as a whole, a rough classification may be done as follows:

a) Food Safety Program (a1-GHP, GMP, a2-HACCP)
b) Quality Assurance System (ISO 9000)
c) Environmental Management System (ISO 14000)
d) Specification for Occupational Health and Safety Assessment System (OHSAS 18001)
e) Standard on Social Accountability Management System (SA 8000).

When the above listed systems' place within the Turkey's new Food Legislation is examined, the result would look like the following:

a) GHP: Alongside the hygiene of the plant, machinery, raw material and personal, GHP includes, cleaning and disinfecting codes. These issues, in a summarized form, are placed in chapter seven (article numbers 14–15) of "the Turkish Food Codex Regulation" (16 November 1997).

b) GMP: Within the Turkish food legislation, issues covered by the GMP are clearly defined in the "Regulation on Food Production and Marketing Places" (10 July 1996).

c) HACCP: Issues included within HACCP system are summarized in the chapter seven (article numbers 16-17) of the Turkish Food Codex Regulation (Karaali 2000). In this Regulation, even if not directly called as HACCP, statements like "the determination and auditing of the critical control points" permit us to infer that the HACCP application is made obligatory in the plants (Mahmutoğlu 2000). In fact, to allow for the food safety, all of the "good practice systems" (like GMP and GHP) are needed in order to support the application of HACCP plans. Likewise, employing series of ISO 9000 standards, widely used all over the world, in the management of HACCP is said to ensure the production of safe products complying with specifications consistently (Özcan 1999).

In Turkey, according to "the Regulation on the Production, Consumption and Control of the Foods" published on the 9th of June 1998 and to the changes made on this regulation on the 9th of June 1999, in order to provide food safety throughout the food chain and to develop the food control systems, all the food production plants should apply HACCP system, being those producing risky food like meat, milk and sea food, the primary sectors. Clearly, this applies to the dairy industry as well.

The regulation forces the application, within two years, of HACCP system, in all the food processing plants bigger than 60 horsepower (by the 9 June 2001). A gradual adoption to the system is suggested, and the plants under 60 horsepower are obliged to integrate into the system in four years of transition period. In fact, this strategy is a part of the policy, followed worldwide to ensure food safety (Topal 2001). Because of the legal obligation imposed, the HACCP system has a special importance for Turkey, compared to other systems of standards. The documentation of the practices imposed in this standard reduces, to a grate extend, the false interpretation and application of the system requirements, which is a main problem for many companies today (Çakırlı 2002).

EVALUATING OF THE PROCESS OF FOOD SAFETY SYSTEMS FORMATION IN TURKEY'S DAIRY INDUSTRY IN THE FRAME OF DEVELOPMENTS IN THE WORLD

The laws, regulations about food industry in Turkey and notifications made for milk and milk products have been prepared by using EU, FAO, FDA, CAC food standards and food laws of some countries. In spite of this, there are still some problems in adaptation to regulations and notifications because of the structural features of dairy industry in Turkey. In this section of the study, some suggestions have been brought by discussing the application problems those might be met in establishments processing dairy productions.

Dairy industry provides its raw material from animal husbandry sector. One of the biggest problems of dairy industry is the inappropriateness of the raw material to expected quality and hygiene conditions. The formation of food safety systems begins from production stage. Since the cold chain is not formed during the transportation period from farm to plant, it causes milk to become improcessable by being spoiled in a short time. It turns out to be the biggest problem not to provide necessary hygiene during the transportation period of milk from farm to plant in the formation of food safety systems in industry. The industrialists face with a raw material not appropriate for hygienic conditions before processing it. In Turkey, while the milk production is being made carefully in the establishments those have very modern opportunities, it's not possible to mention about the production appropriate for health and hygiene conditions due to the old technology applied in many

small establishments. If the situation in the world is examined; in the countries of developed animal husbandry and those food safety systems applied effectively, milking is made in modern conditions and milk is transported appropriate for hygiene conditions from producer to plant. But in Turkey milk is usually contaminated during milking and this state makes the food safety systems applied in the world, difficult to apply for Turkey.

The low rate of cooperating and contracted farming rasing in agricultural sector in Turkey is a difficult situation for the integration of animal husbandry and dairy productions industry. The application of the regulations from food safety point, meaning the success of the criterions stated in the regulations, integration of the milk industry with animal husbandry sector have to be made well both with cooperatives and contracted farming model. It's obvious that in Turkey, increase in the role of cooperatives in the milk collecting, carrying and processing chain, making the producer associations functional will help processing more healthy, hygienic and safe milk and dairy productions. Besides, moving of the milk processing establishments to contracted production, will give the chance of controlling the farm those make contracted production for them. If this happens, the hygienic conditions at level of farm which is the first stage in food safety formation will be carried out, as for this, will make convenience in application of food safety systems in Turkey.

After the milk comes into establishment, analyses required for safe and of good quality milk and dairy productions like somatic cell amount, total living bacteria amount, antibiotic remnant amount have to be made. In Turkey, it's impossible to mention the making of detailed analyses showing the hygienic conditions of milk in dairies in which old technology is applied. In the establishments working under primitive conditions in Turkey, mostly the dry substance amount and fat rate are taken into consideration, even in many milk processing establishments, without considering these criterions, milk is processed only according to its sensorial features. Making of these analyses is obligatory for the formation of food safety systems. In small establishments it's an unsolved problem how and by whom these analyses will be made and controlled. Besides, establishments using old technology have serious problems about the hygiene of production place and hygiene knowledge level of the staff.

As expressed in the previous sections, the application of HACCP system is legally obligatory until 9 June 2001 for the establishments over 60 HP, until 9 June 2003 below 60 HP. Some of the big establishments are making preparations to move to this system but most establishment have not done it yet. Most of the small establishments have no information about changes, innovations and obligations appeared in the law. Besides that, application of HACCP in establishments processing milk and dairy productions will bring an additional cost to the establishment. Besides bearing this cost and applying this system is very hard for the small establishments, their information absence about the system decreases the application chance.

Besides the capacity being small, technical experience inadequacy also impedes the setting of HACCP system in small establishments. For example in the USA, technical support programs were made for very small establishments, free phone information service was formed for questions, a network responsible for giving information and making technical guidelines for these small establishments were set up and many activities like that were made by the Ministry of Agriculture. In Turkey, food law was made suited to EU laws and applying HACCP system became obligatory. But no technical support and education has been given to establishments processing milk and dairy productions from the Ministry of Agriculture. But, control mechanism required by the law; need physical possibilities, with enough amounts of educated staff and management of control mechanism enforces coordination and centralization.

In dairy industry consisting of many small dairies in Turkey, widespread education and awareness studies have to be made about food safety systems topic. Staffs have to be trained about the topics in the law by the Ministry of Agriculture and studies about applying these systems in establishments have to be sped up. For this, courses have to be given related to GMP, GHP, HACCP and ISO certifications and information meetings have to be arranged. The successful application of these systems might be possible by making controls and analyses at specific points beginning from raw material until the final stage of consumption with the education of farmers, managers of milk and dairy plants, marketing experts and consumers and at the same time, the setting autocontrol systems of the establishments.

CONCLUSION

The developments related to food safety in the world have also reached to serious levels in milk and dairy productions industry, whose importance is not denied like the other sub branches of the food

industry. Appeared as consumer focused in developed countries of high purchase power and made the food safety systems obligatory, these developments interest Turkey closely due to the international relations and trade. In fact, there is a rapid development in recent years in Turkey especially about the formation of legislation. But it's obvious that Turkey, who has increased its work on catching the world trend is face to face with some problems about applying the law in milk and dairy productions. The heterogeneous structure of dairy industry is the main reason of structural originated problems in applying food safety systems. Nevertheless, for the discussed industry, it seems possible for these problems to be solved by taking the model of some precautions taken in the other countries those have made progresses in forming food safety systems. The most important step is to maintain the education and information succession and taking the control stages into application. An effective control mechanism with the information flow and education for establishments and the staff education at Ministries whose rendered liable by the law, is considered as an appropriate food safety infrastructure in Turkey to be formed for the milk and dairy productions.

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