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Food Safety Challenges, Research Programs and Opportunities in Iran

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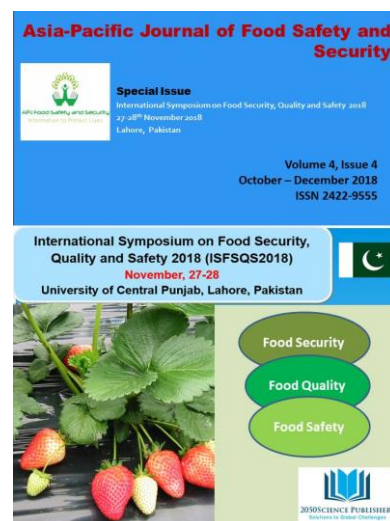
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Highlights

- Food safety programs in Iran
- Food shortage and security
- Iranian agriculture and food research programs

About Authors

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Abstract

Providing health and adequate food for people and all individuals, in another word, “food safety” and “food security” has also become a top priority in Iranian agriculture and food industries and throughout the society because of the ever-growing population, food shortage, and limited supply of resources. According to the healthy rules and obligations, for the well-being of the society, all the food sectors assume responsibility for production of safe and health food protected from microbial and chemical contaminants during all stages of the food chain, from production to consumption. Moreover, the Iranian authorities involved in food control have committed to a process of self-evaluation, supported technically by FAO and WHO, aiming at analyzing their performance, identifying strengths and weaknesses and improve future planning with research and analysis. However, it is an important concern with high challenges in countries like Iran where different steps of food chain including the production, handling, storage, and distribution involve various sectors and take place over wide areas and in diverse climates. In this presentation, Food safety challenges in Iran will be discussed and the research programs and opportunities to implement the scientific discipline and appropriate food safety measures while oversee agricultural production as well as the manufacture of packaging, chemical additives and business regulation will be evaluated.

Keywords: Food safety, Food security, Agriculture and food production, Research and development.

Introduction

Food safety as an essential public health issue is of particular concern in Iranian society with increasing importance, public interest and growing affair in agriculture and food industries. Food safety system evaluates and covers all points of the food production system to control any food borne illness risks and eliminate the hazards. Providing health and adequate food for people and all individuals, in another word, "food security" has also become a top priority in Iran because of the ever-growing population, food shortage, and limited supply of resources. Moreover, it seems very important to support the development of research projects and science-based knowledge to improve the safety and nutritional quality of food without sacrificing flavor, acceptability, and affordability.

According to Iranian authorities involved in food safety and food control, FAO and WHO provide the frame for outstanding cooperation and dialogue at the country, regional and global levels for building effective food safety systems. The Ministry of Health and the Executive Committee of the Food Health and Safety Symbol are supporting the production of special brands which are consisting of natural ingredients instead of the artificial additives. They are also following special strategies to change people’s dietary habits to the healthier ones. For instance, they support the addition of vitamins, calcium and the other useful elements to the products. They also encourage the dairy and non-dairy companies to produce more probiotic/prebiotic

food products.

This study focuses on food safety and security regulations and states in Iran, while the research programs in this area will be overall discussed to implement the scientific discipline and appropriate food safety measures.

The history of food safety in Iran

The first Food Safety Law was established on the 1967, based on that each food factory must be approved by the Food Safety Department as to good manufacturing practices (GMPs), good laboratory practices, and generalized system of preferences. It is also a rule for each food factory to employ a food technologist at the B.S.-degree level or higher that is responsible for quality control in the factory and approved by the Food Safety Department. Later on in keeping with World Health Organization (WHO) aims, the supervisory administration for food, drink, cosmetics, and sanitary stuffs started teaching HACCP in 1994 to promote and encourage the development and use of HACCP systems. The first food safety meeting and related workshops were held in August 1996 in Tehran, Subsequently, many HACCP workshops were held in different cities in 1996 and 1997 while the Institute of Standard and Industrial Research of Iran (ISIRI) published standards of practice (SOPs). To harmonize food safety and HACCP systems in different organizations, the Food and Drug Administration of the Ministry of Health established of the National Committee for Coordinating and Planning HACCP Implementation in March 1999 consists of experts from different responsible organizations and ministries. It is hoped that these will improve food safety throughout Iran.

Food safety and security concept in the constitution

The constitution of the Islamic Republic of Iran is a declaration of the social, cultural, political, and economic foundations of the Iranian society based on principles and norms that reflect the heartfelt desire of the community. Chapter 4 of the constitution concentrates on economy and financial affairs, in that the article 43 focuses on the topics which concern the food safety and security as following:

“In order to secure the economic independence of society, to uproot poverty and deprivation, to fulfill the needs of human beings in the process of growth, while also maintaining liberty, the economy of the Islamic Republic of Iran will be based on the following criteria:

- Providing the essential needs: housing, food, clothing, health, medical care, education, and the necessary provisions for the starting of a family for all.
- Using science and technology, and training skilled individuals to meet the needs of the nation for advancement and development of the country's economy; and
- Emphasis on increasing agricultural, livestock, and industrial productions that fulfill general needs and take the country to a stage of self-sufficiency, and emancipate it from dependence.

This article of the Iranian constitution demonstrates the prominence of food safety and security in the rules and constructions of the society and the importance of research projects and science based knowledge to improve the quality of these subjects.

Overview of food safety in Iran

The government of Iran is committed to establishing and implementing appropriate food safety measures, including HACCP systems for various food products. Like in many other countries, development of food safety standards is handled by governmental bodies such as Ministries of Agriculture, Health, Hygiene and Medical Education, Institute of Standards and Industrial Research, Iran Veterinary Organization (I.V.O) etc. In the meantime research continues on the promotion of national food quantity and quality with aim of protecting consumers' health through a safe and quality food supply. Of course the role of private institutes and universities should be underestimated in shared research and education programs.

The institute of Standards and Industrial Research of Iran was established in 1960, some of its responsibilities are:

1. Defining, developing and publishing national standards as the sole official reference in the country;
2. Promoting national standards;
3. Supervising on compulsory standards.

Food, agriculture, microbiology and biotechnology are the most active managements of the institute with chemical, microbial and other specific laboratories and skilled personnel across the country. Food management division supervises laboratories of sugar, cans, drinks and additives, cereals, nuts and dry fruits, meat products, animal and poultry feeds, oils, fats and dairy products. Microbiological management division controls the laboratories of meat products, dairy products, canned foods and cans, cereals, confectioneries, hygiene and medical equipment, drinks.

Food safety as part of food security

The World Health Day 2015 focused on Food Safety and it was highlighted that food safety should accomplish food and nutrition security. Food safety considers and involves all points of the food production system where food borne illness risks can be controlled. Food availability (food security) is the reliable access to a sufficient amount of food that is safe, wholesome, and nutritious. The ability of a person to purchase sufficient quantity and variety of food is influenced by both the available income and the cost of food. The state of the growth of total net expenses and food costs as well as the proportion of the food costs in Iranian families living in cities and rural and urban areas compared their total costs are shown in Figures 1-3. Considering the state of food security based on Smith & Subandoro's Index (indicated as Table 1), the figures show low food insecurity (30-50%) in Iran, although the rural areas are in a higher risk. The per capita comparison of food, energy and protein consumption in Iran and the world is shown in Table 2. As depicted in the table, Iran's supply of food, energy and protein is higher than the World's and Asia's, however; it is still much lower than Europe and North America. The average of energy and protein supply in Iran compared with the World (2011) is also shown in Table 3. Source: FAO, 2013

As illustrated in the table the countries dependency on energy and protein supply through

chicken and wheat is much higher compared to the World's. On the other hand, this dependency on meat, rice sea food and milk is lower than the world's.

Food safety research programs

Food un-safety and insecurity continues to be a major development problem across the globe including Iran. Both food safety and security are essential goals that need to be met to protect and improve human health and nutrition with the aim of protecting consumers' health through a safe and quality food supply.

Main food safety issues and programs in Iran have to focus on bacterial pathogens, pesticide residues and mycotoxins. Transmission of pathogens to food occurs at various levels: in the field; during harvesting, processing, and shipping; or in the home. They welcome research and training on these topics in particular to elaborate on control measures including good hygienic practices, implementation of certified food safety management systems and setting of appropriate criteria.

Among different organizations and universities, The Research Institute of Food Science and Technology (RIFST) as a national pioneer research organization makes every endeavor to accomplish its mission in terms of food safety and security in the national level through applied and technological research projects. The department of Food Quality Control and Safety at RIFST intends to assure the healthiness of food products as well as reducing the risks and pollutants threatening consumers. To reach these goals the department is commissioned to design and update the mechanisms involved in food quality control and wholesomeness as well as developing approaches for immediate detection also codifying and editing patterns and standards in food quality. The department intends to reach the following goals:

- Using analytical methods such as biosensor, aptasensor and chromatography for quality control of food;
- Improving food standards at national, regional and international levels;
- Optimizing the production of organic and safe food;
- Conducting research on food contaminant recognition system.

Conclusion

The government of Iran is committed to establishing and implementing appropriate food security and safety systems for various food products. This study shows that Food safety issues are under a major focus by the responsible organizations and authorities. Iran's supply of food, energy and protein is higher than the world average; however, it is still much lower than Europe and North America. Moreover, despite significant strides in microbiological food safety, continued effort is required to combat this complex human health issue. Research program as well as social commitments and efforts are necessary to overcome the development challenges posed by food safety/security.

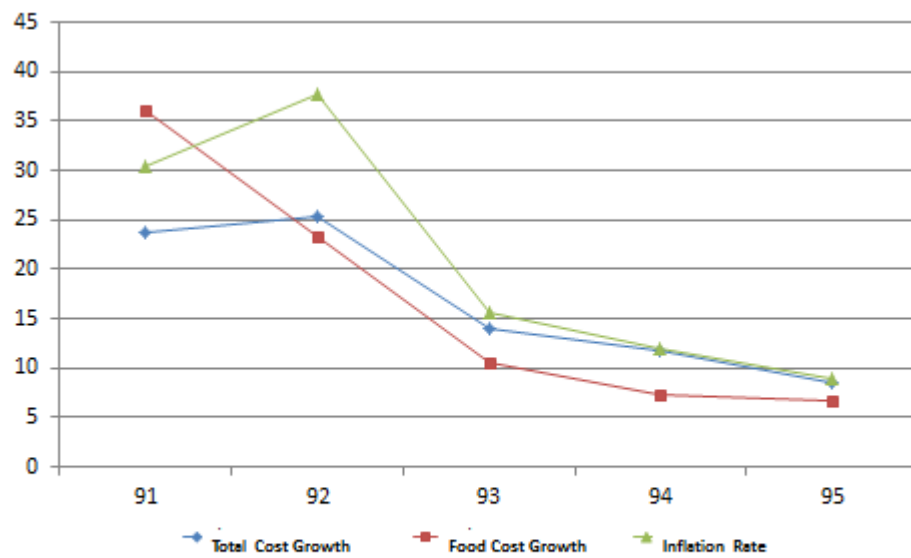


Fig. 1. The State of the Growth of Total Net Expenses and Food & Tobacco Costs in Iranian Families Living in Urban Areas Compared with Inflation Rate of the Country

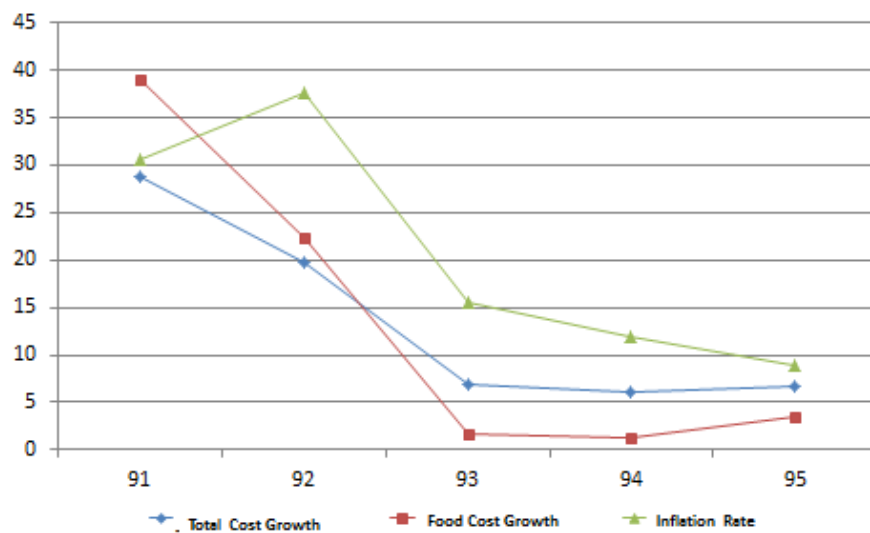


Fig 2. The State of the Growth of Total Net Expenses and Food & Tobacco Costs in Iranian Families Living in Rural Areas Compared with Inflation Rate of the Country

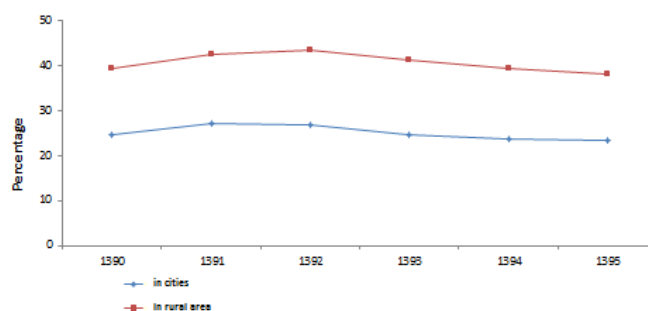


Fig 3. The proportion of the Food & Tobacco Costs in Iranian Families Living in Cities and Rural Areas Compared their Total Costs

Table 1. State of food security based on Smith & Subandoro's Index

State of Food Security	The proportion of food expenses to total costs	
Very high food insecurity	More than 75%	1
High food insecurity	65-75%	2
Medium food insecurity	50-65%	3
Low food insecurity	30-50%	4

Table 2. The per capita comparison of food, energy and protein consumption in Iran and the world

Per capita supply of protein (in kg. per year)	Per capita supply of Energy (in kg. per year)	Per capita supply of food (in kg. per year)	item	No
76.3	2,758	635.1	Asia	1
92.7	3,212	813.5	The Americas	2
101.8	3,372	941	Europe	3
103	3,213	897.8	Oceania	4
68.7	2,615	583.5	Africa	5
108.6	3,617	995.1	North America	6
86.2	3,027	749.1	South America	7
86.3	3,102	695.6	West Asia	8
106.2	3,523	982.5	Western Europe	9
95.4	3,074	859.7	China	10
101.3	3,359	892.7	Russia Federation	11
60.1	2,460	481.1	India	12
64.7	2,428	504.5	Pakistan	13
104.8	3,681	944.5	Turkey	14
88.4	2,719	591.7	Japan	15
102.6	3,556	810.6	Egypt	16
87	3,122	592.5	Saudi Arabia	17
83.8	3,149	620.8	Jordan	18
61.4	2,489	441.2	Iraq	19
58.9	2,107	341.9	Afghanistan	20
86.4	3,059	814	Iran	21
80.3	2,869	686.5	World's average	22

Table 3. The average of Energy and Protein Supply in Iran Compared with the World (2011)

Average state of Energy and Protein Supply in the World				Average state of Energy and protein Supply in Iran				items
Daily Protein Supply Proportion in	Daily Energy Supply Proportion in percentage	Protein Supply (per gram)	Energy Supply (kcal/capita/day)	Daily Protein Supply Proportion in percentage	daily Energy Supply Proportion in percentage	Protein Supply (per gram)	Energy Supply (kcal/capita/day)	
19.80	18.34	15.9	526	41.62	38.88	36	1,189	wheat
12.70	18.97	10.2	544	6.24	9.16	5.4	280	rice
11.46	6.03	9.2	173	4.51	1.54	3.9	47	meat
6.23	1.99	5	57	10.64	2.98	9.2	91	chicken
6.48	1.19	5.2	34	2.66	0.52	2.3	16	Sea food
10.21	4.85	8.2	139	6.36	2.71	5.5	83	milk
3.36	1.22	2.7	35	1.85	0.69	1.6	21	egg
0.00	9.76	0	280	0.00	8.67	0	265	vegetable oil
1.37	3.24	1.1	93	2.89	6.74	2.5	206	fruits
8.84	8.16	7.1	234	9.94	8.99	8.6	275	vegetables
4.98	2.23	4	64	7.05	3.17	6.1	97	grains
0.00	7.98	0	229	0.00	8.93	0	273	sugar
14.57	16.04	11.7	460	6.24	7.03	5.4	215	other
100.00	100.00	80.3	2,868	100.00	100.00	86.5	3,058	total

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