

GLOBAL HARMONIZATION INITIATIVE: ON THE WAY TO A GLOBAL CONSENSUS ON SAFETY FOOD REGULATIONS

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Abstract

Nowadays, securing the global food supply for an increasing worldwide population is an extremely critical issue. While a record number of hungry people in the world contracts with the needless quantity of food wasted in all stage of the food supply chain, the rapid acceleration in the globalization of food supply has increased the complexity of food systems with an important impact on food safety, mainly, as a consequence of national discrepancies on food safety regulations.

Being aware of the need for a global harmonization of food legislation, a network of scientific organizations and individual scientists launched in 2004 the Global Harmonization Initiative (GHI). This article contains complete background information about GHI, its goals, its structure through 10 Working Groups, and its different activities and works to develop a global consensus on food safety laws and regulations to prevent the destruction of safe food consequence of regulatory discrepancies, and to eliminate hurdles to scientific advancement in food technology, increasing the safety, availability and quality of the food supply for consumers.

Key words: Food safety, Globalization of food supply, Harmonization global food regulations, Consensus-building concept, Global Harmonization Initiative working groups.

1. Introduction

According to a report published in 2009 by the Food and Agriculture Organization (FAO) of the United Nations, 1.02 billion people were victims of hunger in 2009, representing an all-time high in recorded world hunger statistics [1]. The increasing population and the global access to safe, nutritious and sufficient food is one of the main global food challenges in our days. The present world hunger situation contrasts with the enormous quantities of food wasted globally in all stage of

the food chain. For example, the amount of food lost or wasted every year is equivalent to more than half of the world's annual cereals crop (2.3 billion tons in 2009/2010) [2]. As toxicity depends on concentration, and as low concentrations of certain substances can have healthy or harmless effects (e.g. vitamins, selenium), a significant proportion of food waste is related to too strict regulations on contamination in food - and discrepancies in national regulatory thresholds for contaminants and chemical residues - it is necessary to adapt and re-evaluate legislation in order to avoid the destruction of large quantities of healthy food.

In the past decades, a rapid acceleration in the globalization of food supply has taken place, increasing complexity of food systems and with an important impact on food security and nutrition [3]. The World Health Organization (WHO) identified the rapid globalization of food trade as responsible of an increased potential for foodborne diseases [4], being food and waterborne diarrheal diseases one of the most common illnesses worldwide (between 2.2 and 4 million cases annually), and the leading causes of illness and death in less developed countries [5]. Additionally, as a consequence of national differences in food safety laws and rules, an uncertain global regulatory environment reduces investment in and adoption of new technologies designed to improve food safety and quality for consumers.

All these facts highlight the urgent need for global harmonization of food safety laws and regulations in an international framework. In an attempt to eliminate hurdles, a network of scientific organizations launched in 2004 a global initiative to facilitate harmonization of food safety regulations and legislation: The Global Harmonization Initiative (GHI). The main objective is to discuss, globally, the scientific issues that buttress the decisions made by individual governments and international regulatory bodies in order to achieve global scientific consensus on such issues. Harmonizing glob-

al regulations will facilitate the development and application of new technologies as well as encourage the food industry to invest in such technologies to ensure better safety and quality of the food supply for consumers.

2. The Global Harmonization Initiative

GHI was founded at the occasion of the 2004 Annual Meeting of the U.S.-based Institute of Food Technologists (IFT), as a joint activity of the International Division of IFT and the European Federation of Food Science and Technology (EFFoST). In October 2007, the initiative was registered as a non-governmental, non-profit association in Vienna, Austria, as "*GHI Association-Globale Harmonisierungs Initiative für Gesetze und Verordnungen im Bereich Lebensmittel*" [6]. GHI is a network of scientific organizations and individual scientists working together to promote harmonization of global food safety regulations and legislation to ensure the global availability of safe and wholesome food products to all consumers. GHI is today supported by more than two dozen international scientific organizations, academic research institutes and publishers.

This organization strongly believes that developing consensus on key food safety issues is imperative to sustaining the integrity of the global food supply, removing barriers to trade as different country-by-country import/export rules and requirements, removing differences between countries in food safety laws and regulations, preventing the needless destruction of food shipments that complied with the regulations of the country of production but not with those of the country of arrival, reducing the risk of foodborne disease and adulteration consequence of increasing complexity of distribution, and eliminating impediments and hurdles to scientific advancement in food technology. GHI's consensus-building concept was embodied in the first draft of the GHI charter in April 2005 [7]. GHI intends to provide a platform for individual food scientist and technologist worldwide to globally discuss and reach a consensus on the scientific issues that support decisions made by national governments and international regulatory bodies on food safety regulations.

2.1 GHI activities

To achieve global harmonization in concert with food safety and international public health authorities (e.g. the FAO, the WHO, the *Codex Alimentarius* Commission), offering industry, regulators and other stakeholders independent and authoritative information, a number of activities have been established by GHI.

The GHI Ambassador Program seeks to empower individual members to inform and invite scientist in their nations or regions to participate in the organization's

GHI activities. The Ambassadors' function makes it possible for issues to be discussed in local languages which are reported back to the organization in English. Up to now, GHI counts with 36 Ambassadors from 31 countries. The updated list of GHI Ambassadors is available in the latest GHI newsletter (<http://www.globalharmonization.net/newsletters>).

GHI Matters, the quarterly newsletter of the GHI, presents many articles on a variety of topics related to food safety, useful information for stakeholders, information about meetings, workshops and seminars in which GHI Officers play a significant role, and the agenda for future meetings with GHI involvement. The newsletters are available on the GHI website (<http://www.globalharmonization.net/newsletters>). The GHI website also presents background information about GHI, event calendar, presentations and publications, contact and additional information.

GHI, with the support of individual members and member organizations, convenes member meetings, and participates in workshops, seminars and symposia throughout the world. During these events, GHI members have the opportunity for collaborative work on the consensus-building process, discussing relevant food safety topics, evaluating critically existing regulations in the different areas of the food supply chain, contacting with additional scientific organizations and individual food scientists, technologists and engineers, to be invited to join the GHI, and providing educational outreach to key stakeholders.

In 2010, GHI's published its first book, "*Ensuring Global Food Safety: Exploring Global Harmonization*" [6]. This book presents an overview of the story and current state of international food law, the existing differences in regulations and their consequences, potential routes to obtain global consensus for regulations, and relevant information about GHI and its activities. A second book on global harmonization is under development with the working title "*Food Safety of Traditional and Ethnic Foods*".

2.2. GHI's Working Groups

GHI has developed its structure through a working group (WG) format. GHI WGs are the basis for the consensus-building process, and the key to the initiative's progress and growth. Currently, the initiative counts with 10 different WGs: (1) "Chemical food safety", (2) "Food contact materials", (3) "Genetic toxicology", (4) "High-pressure processing", (5) "Listeria in RTE food", (6) "Mycotoxins", (7) "Nanotechnology", (8) "Nutrition", (9) "Regulatory aspects of reducing post-harvest losses", and (10) "Food safety in relation to religious dietary laws".

Working Group on "Chemical food safety": Chaired by Dr Jaap Hanekamp, from The Netherlands. The aim of

this WG is to investigate and formulate chemical safety issues. Relevant issues for this WG include: a consensus on worldwide international standard acceptance for residues of pesticides, veterinary drugs, and contaminants from natural and industrial origins in food, the toxicological relevance of low-level exposure of chemicals, the restrictive use of limiting scientific methodology by official regulatory bodies, the standardization of authorized additive exposure, the application of scientific risk assessment methodology to address the question of safe maximum residue levels of antibiotics in food, and the economic impact and the regulatory implications of chemical food safety issues.

Working Group on “Food contact materials”: Chaired by Mr Eric Partington from the UK, this WG explores and discusses food contact materials issues, such as the safety and quality of food packaging, processing machines, containers, and any materials or articles in contact with food along the whole food-chain, to promote a balanced approach to solving health and environmental problems of common global concern. This WG pays special attention to the implications of developing harmonized regulations for controlling food packaging, as well as analytical challenges and innovation in foodstuffs packaging.

Working Group on “Genetic toxicology”: Chaired by Dr Firouz Darroudi from The Netherlands. Genetic toxicology studies the effects of chemicals on genetic material, and aims to devise a quick and efficient strategy for detecting chemical mutagens/carcinogens. Man is susceptible to the carcinogenic and mutagenic effects of chemicals present in our environment including water and the food chain. It is essential to identify the mutagenic and/ or carcinogenic chemicals in our environment including those that are already present and those that are being introduced; the study on the types and magnitude of genetic effects, and their impact on health; and the development and validation of new *in vitro* models and biological assays to evaluate low level exposures to potential genotoxic and non-genotoxic carcinogens. The objective of this WG is to achieve a global consensus on these issues, including toxicity testing protocols.

Working Group on “High-pressure processing”: Chaired by Dr Hosahalli S. Ramaswamy from Canada. High-pressure processing (HPP) is a method of preserving and sterilizing food, in which a product is processed under very high pressure, leading to the effective elimination of pathogens in the food. Besides the non-thermal pasteurization treatment, sterilization can be achieved by pressure-assisted thermal sterilization (PATS) which significantly reduces the degradation of quality resulting from the regular thermal treatments. Unfortunately, the regulatory requirements for HPP are still lacking and there are big differences between countries. For that reason, this WG seeks to develop

consensus on the adequate process conditions to ensure the safety of HPP foods, and facilitate the application of this proven food safety technology.

Working Group on “Listeria in Ready-to-Eat (RTE) food”: Chaired by Dr Cynthia Stewart from the USA. *Listeria monocytogenes* is a pathogenic bacterium that is ubiquitous in the environment and has been isolated from water and food processing environments. It is known to be a foodborne illness that can cause serious illness and potentially death in contaminated food. Currently, there are significant differences in food safety requirements for *L. monocytogenes* in RTE food, as well as in the microbiological methods used between countries. For instance, whereas the US requires the absence of this pathogen in 25 grams of food, the EU has set a maximum level of 100 colony-forming units per gram of food. This WG aims to develop a scientific consensus on the safe maximum level of this pathogen in food, as well as what test protocol should be used to determine that level. This information is essential for international trade of RTE foods.

Working Group on “Mycotoxins”: Co-Chaired by Dr. Naresh Magan from the UK and Dr. Mark Shamtsyan from Russia. Mycotoxins are toxic metabolites produced by moulds that contaminate various agricultural commodities (maize, wheat, barley, oats and rice) either before harvest or under post-harvest conditions. Harmonized mycotoxins regulations would help to implement measures to reduce the global mycotoxin problem. Different issues are addressed by this WG, such as mycotoxin quantification based on mould type, the experimental study of the influence of climate changes of the production of mycotoxins by key spoilage fungi, or the production of low-cost mycotoxin-destrating enzymes.

Working Group on “Nanotechnology”: Co-Chaired by Dr Frans Kampers from the Netherlands and Dr An-I Yeh from Taiwan. Nanotechnology, a field of applied sciences and technologies involving the control of matter on the atomic and molecular scale, normally below 100 nanometers, has generated much discussing regarding its potential benefits in food and feed sector (the application of nanomaterials in food products and packaging), but possible risks in terms of the impact on human health and environment need to be considered. This WG collects and assesses the available scientific evidence in a range of areas related to the nanotechnology, to explore the global safety and regulatory issues associated with the application of nanotechnology to food systems.

Working Group on “Nutrition”: Chaired by Dr Vishweshwaraiah Prakash from India, this WG seeks to launch the “Nutrition White Paper”- a global, consistent nutrition policy, with an action plan on nutrition and recommendations for harmonization of dietary

guidelines. From a global policy point of view, three objectives have been fixed: (1) global harmonization of labeling and nutrition & health claims, (2) elimination of differences in international nutrition regulations, legislation and guidelines, and (3) harmonization of education for nutritional health and training standards.

Working Group on “Regulatory aspects of reducing post-harvest losses”: Chaired by Dr Kenneth Marsh from the USA. Between harvest and consumption, there are qualitative and quantitative losses in horticultural crops. Not only biological and environmental factors are responsible of post-harvest losses, also socio-economic factors (inadequate marketing system and transportation facilities, government regulations and legislation variation from one country to another, lack of information, etc.) [8]. The main objective of this WG is to achieve a global consensus on regulatory aspects of reducing post-harvest losses.

Working Group on “Food safety in relation to religious dietary laws”: Co-Chaired by Ms Isabella van Rijn from The Netherlands and Dr Ismail Odetokun from Nigeria. It is well known that most religions have their own religious dietary laws and the consumption of certain types of food is forbidden. Nowadays religious practitioners have access to a great range of religious food products originating from all over the world. However, the producers of these religious foods often do not practice the same religion, or sometimes practice no religion at all, which may cause problems in the implementation of the religious dietary laws. Legislation on religious food (e.g. Halal, a term that is used to indicate whether a product can be used or consumed by a Muslim) is lacking, causing confusion with retailers and consumers. This WG aims to develop a white paper to stimulate worldwide consensus on religious dietary laws in relation to Food safety.

3. Conclusions

- As a result of a rapid globalization, global harmonization of food safety legislation is a challenge and a real necessity to ensure food security, food safety and nutrition on a global scale.
- GHI works to develop a global consensus on food safety regulations and legislation, to prevent the needless destruction of food, consequence of critical gaps and regulatory discrepancies, being more attractive for food industry to invest in food safety research and new tools to increase the safety, availability and quality of the food supply for consumers worldwide.
- Although there is still a long way to the worldwide harmonization of food safety regulations and laws, the GHI and its WGs contribute in a relevant way to the world dialogue, promoting harmonization of

scientific methods, regulations and standards, for a cohesive international framework.

4. References

- [1] FAO. (2009). *The State of Food Insecurity in the World 2009*. Economic crises - impacts and lessons learned. Rome: Food and Agriculture Organization of the United Nations.
- [2] FAO. (2011). *Global food losses and food waste - The environmental crisis: The environment's role in averting future food crisis*. Rome: Food and Agriculture Organization of the United Nations.
- [3] FAO. (2004). *Globalization of food systems in developing countries: Impact on food security and nutrition*. Rome: Food and Agriculture Organization of the United Nations.
- [4] WHO. (2004). *Global Burden of Disease: 2004 update*. <URL: http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/index.html. Accessed 28 June 2013.
- [5] WHO. (2002). *Global strategy for food safety: Safer food for better health*. Geneva: World Health Organization of the United Nations.
- [6] Boisrobert C., Stjepanovic A., Oh S., and Lelieveld H. (2010). *Ensuring global food safety: Exploring global harmonization*. Academic Press/Elsevier.
- [7] Lelieveld H., Keener L., and Boisrobert C. (2006). *Global harmonization of food regulations and legislations - the global harmonization initiative*. New Food 4, pp. 58 - 59.
- [8] Kader A. A. (2005). *Increasing food availability by reducing postharvest losses of fresh produce*. In: Mencarelli, F., and Tonutti, P. (eds.), *Acta Horticulturae* Nr. 682: Proceedings of the 5th International Postharvest Symposium, 682, 651 - 657. ISHS, International Society for Horticultural Science, Leuven, Belgium.