

# Ensuring Food Safety in Sri Lanka: Dietary Exposure and Related Risks

Recommendations of the Working Group on Food Safety under the  
Technology Development and Innovations Arm (TDIA),  
National Science Foundation, November 2022

Working Group appointed by the Board of Management, NSF

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## 1.0 Introduction

With the diversification and internationalization of the food industry and with increased focus on human health, food safety policies and regulations are being implemented country-wise based on globally shared scientific evidence. In Sri Lanka, The Food Act of 1980 and regulations set thereafter has placed the primary responsibility for ensuring the safety of food on commercial food enterprises that produce, process, distribute or prepare food for the consumer. The regulatory limits are established based on Good Agricultural Practices (GAP) and/ or Good Manufacturing Practices (GMP). The topic of food safety has been discussed at various forums by the NSF since 2010. The most recent was the Thematic program on Food Safety in 2019, that identified several areas of concern, such as the need for policy amendments to recognize food safety in the Agricultural and environmental policies. The emphasis then was mostly on pesticide residues in food and the need for strict regulations. Most often the limits established on food safety are indirectly linked to the actual risk posed by the population to chemicals and microorganisms. As such to estimate the magnitude of risk to human health, caused by a food component, risk assessment studies that include dietary exposure to the chemical or microorganism need to be investigated.

Internationally, dietary exposure and related risks to health are best assessed by Total Diet Study (TDSs) methodology, that is currently on-going in many countries. Most often the country's focus has been on contamination of foods with heavy metals and pesticides (Lee *et al.*, 2015 and Jayasinghe *et. al*, 2018)

TDSs have been widely used to assess the dietary exposure, in terms of chemical concentration, of the component in a particular food product while considering the safety threshold of the component in human body. It is often used as a risk assessment tool to evaluate exposure to hazardous elements. Many countries perform TDSs to screen for chemicals in foods and analyze exposure trends to hazardous elements. TDSs differ from traditional food monitoring in two major aspects: chemicals are analyzed in food in the form in which it will be consumed, and it is cost-effective in analyzing composite samples after processing multiple ingredients together. Total diet studies differ from other surveillance programmes since it addresses contaminants and nutrients in the diet rather than individual foods and exposure assessment causes long term average intake by population.

The objective of this working group was to understand the issues related to food safety, review the current extent of exposure of the population to hazards (Chemical and Microbiological) from documented sources, and provide recommendations and modalities to address food safety issues at national level.

## 2.0 Food safety and the Sri Lankan scenario

A number of challenges in food safety issues has been identified in recent times (Consumer Affairs Authority, 2019-2022). Coconut oil imported to the country, was found contaminated with Aflatoxin, above permitted levels (Samarajeewa, U., 2021). Less data is available on the locally produced coconut oil, sold in the open market. Similarly, coconut refuse is added to animal feed and is known to contain aflatoxin, thus it becomes a potential contaminant in cow's milk as aflatoxin M (Lakshman, *et al.*, 2022). Similarly, the presence of class 2A and 2B carcinogenic compounds, namely 3-MACP and GEs, are known to be formed in palm oil and other during refining and deodorizing (Gesteriro, *et al.*, 2019.). The presence of these components has not been investigated in Sri Lanka. Heavy metals are important environmental pollutants threatening the health of human population and natural ecosystems. Application of imported low priced fertilizer may have also affected our food production and supply, increasing contamination with heavy metals. Heavy metals can affect the quality of agricultural soils, including phytotoxicity and transfer of heavy metals to human diet from crops. Excessive usage of poor-quality fertilizer, industrial and municipal waste are the potential contributory factors to toxic metals in soil and ground water. The heavy metals of most concern are Cd, As, Pb. (Mahendranathan and Priyashantha, 2019).

Climate change has been challenging to the farmers, causing poor drying conditions and storage of food produce, thus reducing shelf life. The emergence and re-emergence of foodborne pathogens has been a serious concern globally among food manufacturers, consumers and regulatory agencies as this threatens public health and safety. Gram negative and positive bacteria, viruses and parasites have become serious concerns during the past few decades.

Identification and characterization of foodborne pathogens are routinely carried out in developed countries, however, little attention has been provided for identification of these emerging and re-emerging causative agents in Sri Lanka.

Food- or water-borne diseases are one of the key issues in food safety assurance in Sri Lanka with increasing incidence levels, partly due to rapid expansion of unsafe retail food establishments over the last few years (ITI, 2021-2022). Major food borne infections recorded in Sri Lanka as per the Epidemiology Unit of Ministry of Health (2017), are *Campylobacter* (in raw milk, raw or undercooked poultry and drinking water), Enterohaemorrhagic *Escherichia coli* (in unpasteurized milk, undercooked meat and fresh fruits and vegetables), *Vibrio cholera* (in contaminated food and water), Hepatitis A (in raw/ undercooked sea-food) and *Listeria monocytogenes* (in unpasteurized dairy products, vegetables and fresh/frozen chicken).

Adulteration of foods is common, to gain market advantage, without realizing the consequences. The adulteration of black tea with sugar, glucose, sodium bicarbonate and ferrous sulphate to improve colour of tea leaves (Gunathilaka and Warnasooriya, 2021) is known.

Microplastics (small plastic pieces < 5 mm) that can be harmful to marine and freshwater organisms, may also enter our food chain (Dharmadasa *et al.*, 2021). The risk of microplastics to be found in table salt is questionable. Two main salterns of Sri Lanka, out of three are located in areas, (Puttalam and Mannar) where the sea is mostly polluted. Therefore, there is a high possibility of salt produced in Sri Lanka to contaminate with microplastics. Sources cited for microplastic pollution, are dumping of plastic waste into the oceans that degrades slowly and the use of microbeads as exfoliants in beauty products. Because of their tiny size, these pollutants escape water filtration systems and end up either in the oceans or in other water bodies and cause serious environmental and food safety concerns.

## Issues and concerns

1. Currently, the country implements a scientific approach to food safety based on ISO 22000, HACCP, GMP and GAP to reduce risk of individual foods, manufactured by food industry. Internationally, BRCGS and FSSC are in place, and required for international trade and most local industries have yet to work towards implementing these requirements.
2. The food safety regulations of the country are governed by the Food Authority, while voluntary standards of SLSI guide the food industry, to eliminate or reduce the risk of both chemical and microbiological hazards. The food safety levels are those essentially based on recommended EU or CODEX standards where the potential risk to the local community may not have been identified. No dietary exposure to hazards has been conducted locally, hence the potential threat of the hazard, and its presence is unknown. The country's regulations follow a preventive method for managing food hazards, with unknown risks.
3. All food safety issues related to the country are not exposed to the relevant authority, for example exported products that will be consumed by the population, do not undergo rigorous testing in terms of food safety, and these products will be required to adhere to the relevant standards.
4. In most instances, lapses in food safety (microbiological aspects in cooked foods) reported by media and others, are not followed up to find root cause the incidence. Hence, there is less guarantee for the occurrence of the same incident in the future. Such incidents are not shared for the benefit of other industries in the same field.
5. No evidence is available on the safety of consuming certain foods e.g. Excessive use of herbal/ medicinal plants leaves without the right dosage, reducing anti-nutritional factors in foods, plant toxins, leads to a food safety issue.
6. When traditional foods are prepared by industry for trade, e.g. Drying fish, where salt is a natural preservative, the most appropriate preservation techniques are violated, with the

understanding that low salt products are good for human health. Therefore, the food preservation technique cannot guarantee a good quality product. Natural preservative techniques in food technology should be adequately recognized.

7. Misleading information on labels, without adequate claims about its therapeutic effects, expiry date determined without proven scientific background, are some examples. Allergens in foods are also not recognized and labeled, as done in international trade.

## Recommendations

1. Food production, marketing processes and the export of food products are primary functions of the Agricultural sector of the country. Practices in strengthening the food safety system, along the food chain, should be clearly defined in the policy of the agricultural sector. Understanding the economic, social and cultural values of food safety, the policies of the Agricultural sector should encompass the food safety functions and take prior responsibility of the country on food safety issues, backed by the policies of the environmental sector. The fertilizer and pesticide application and potential health hazards of pesticide residues and toxic elements entering the food chain should be identified along with global trade requirements. The role of the health sector should be to function as a regulatory body for food safety related to public health.
2. Sri Lanka as a country that imports and exports food products, it is critically important to remain aware of the latest advances and in response the range of challenges and opportunities in the food safety value chain. Looking through the optics of the recent Food safety framework, it is essential to match international research and practices to help strengthen food safety requirements. Tracking of the new hazards along the food chain along with a benchmark, through a review study of food safety best practices by projected aspirations and actual performances.

3. Undertaking internationally recognized Total Diet Studies (TDS) methodology as a tool to for ensuring food safety in the country. TDS is the most cost effective way to estimate dietary exposures to food chemicals for various population groups and to assess their associated health risks. It provides a scientific basis for assessing food safety risks and regulating food supply. It can also facilitate risk managers to focus their limited resources on food chemicals that may pose the greatest risks to public health.

In TDS, foods commonly consumed are purchased, prepared as normally consumed, i.e. table-ready forms, in a manner consistent with cultural habits, and then analyzed for a range of substances. Analytical results on the concentration of substances in food are combined with the food consumption data to obtain dietary exposure. Dietary exposure estimated is then compared to the relevant safety reference for the food chemical of concern for assessing the associated health risks.

It is proposed that TDS should be undertaken by the country scientific organizations/ Department of Agriculture jointly with the regular Census and Statistics survey carried out once in every four years, thus facilitating the data to be analyzed based on dietary exposure. Most urgently needed are capturing the heavy metal contamination in foods and aflatoxin levels.

4. From the perspective of the food industry, GFSI (Global Food Safety Initiative) recognizes the FSSC 2000 scheme, which contains additional requirements than of ISO22000, including the Pre-Requisite Program (PRP), or universal procedures used to control the operating conditions in food factories and the specific requirements of the FSSC ensures consistency, integrity and management of the system itself. The BRC standards also recognized by GFSI introduces the product safety culture, food fraud and food defense prevention plans which are now important components of food safety in international trade. Food industry to upgrade their food safety systems to meet current requirements, while SMEs could at least follow the Standard Operational Procedures and Pre-requisite Programmes specified therein.

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