



Advancing Food Safety in Saudi Arabia

Addressing Chemical and Microbial Risks in the Food Supply Chain

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The SFDA is working to enhance food safety in Saudi Arabia and ensure that all food consumed within the Kingdom meets the highest standards for safe and healthy human consumption. The food we consume goes through a long chain that stretches from the farm to the kitchen table. During this journey, food can be exposed to many chemical and microbial risks, which can impact its quality and be harmful to human health. One of the key roles of the SFDA is to identify weaknesses within the food chain, anticipate where risks may occur and take measures to ensure only safe food is consumed. This article details the SFDA's efforts to mitigate contaminants in the food chain, and provides a background to the SFDA's programmes, risk analyses and laboratory facilities that address emerging contaminants.

Contaminants

There are different chemical and microbial contaminants that can enter the food chain. The most common microbial contaminants are Salmonella and E. coli. These are types of bacteria that can cause food poisoning. Salmonella may be present in raw poultry, eggs and beef, as well as on unwashed fruit and vegetables. Common chemical contaminants include pesticides from agriculture, heavy metals absorbed by plants via the soil, residues from veterinary drugs and mycotoxins from improper storage.

Preventing the presence of these contaminants includes identifying risks at every stage of the farm-to-fork journey, including cultivation, manufacturing, packaging and transportation.

SFDA Programmes

The SFDA is able to anticipate these risks and has various programmes in place to guard against them in order to ensure the food chain is free from contaminants.

- **SFDA Compliance Programme:** This programme makes sure food producers and importers are complying with food safety regulations. The SFDA takes samples of products from food production sites and ports of entry and sends them to its laboratories for analysis to assess the presence and concentration of contaminants. This is an ongoing programme that is conducted regularly.
- **SFDA Monitoring Programme:** This programme monitors the safety of food products sold in the market. The SFDA takes samples of products sold in stores, restaurants and other food outlets and analyses them in SFDA laboratories to identify the presence of contaminants.

Based on these programmes, the SFDA sets regulations to reduce the exposure of consumers to contaminants. Regulations include setting a maximum level of exposure, while enforcement actions may include fines and bans.

Risk Analysis

As part of its monitoring work, the SFDA conducts risk assessments to determine the extent to which consumers are exposed to contaminants. In order to successfully regulate food safety, a strong and effective risk analysis model is required. Risk analysis includes three important aspects, all of which are conducted by the SFDA when it comes to food safety:

- **Risk Assessment:** This is where the extent of the risk is assessed. The risk assessor is typically a scientist who collects data from the laboratory, conducts statistical analyses and provides a scientific opinion on the presence of a contaminant. The assessor will recommend certain actions that could be taken, such as shutting down a factory or banning certain food imports. The decision on the course of action to take will then move to the risk manager.
- **Risk Management:** This is where decisions are taken on how to manage the risk. The information provided by the risk assessor will be used by the risk manager to determine an appropriate course of action to address the risk.
- **Risk Communication:** This is where the decision to address the risk is communicated to the public and other relevant entities.

These aspects are connected and circular. Following the communication stage, feedback from the public can help to inform future decisions and lead to reassessments of recommendations and decisions.

SFDA Laboratories

The SFDA has a number of laboratories that are responsible for analysing food samples. These laboratories are connected through the National Food Laboratory Network. The network is managed and organised by the SFDA's Reference Laboratories, which help address chemical and microbial risks by developing and implementing methods of analysis, conducting proficiency tests, providing reference material, conducting research in related fields, and aiding and guiding laboratories within the network.

Emerging Contaminants

In addition to long-standing and well-known contaminants impacting the food chain, certain emerging contaminants are coming to the fore and receiving more attention. The SFDA is responsible for guarding against these emerging risks. According to Dr. Abdullah M Alowaifeer, executive director of the SFDA's Reference Laboratories, "The two major threats facing humanity in the area of food safety are antimicrobial resistance, and microplastics and nanoplastics."

The SFDA is investing more resources in these fields to address issues. The authority is upgrading laboratory facilities and research capacity, developing new methods for protection and enforcing stronger regulations to protect consumers against emerging threats.

Antimicrobial Resistance

Antimicrobial resistance is an ongoing and growing challenge. Resistance to antibiotics is developing due to the overuse of antibiotics both for human health and in agriculture. It is expected that Salmonella and E. coli will become more resistant in the future due to the overuse of drugs. Regulatory bodies worldwide are taking stronger action regarding the use of antibiotics.

One of the roles of the SFDA is to set regulations to minimise the development of antimicrobials. The authority studies microbes at the genomic level to identify the types of genes that allow bugs to become more resistant. According to Dr. Alowaifeer, "Studying microbes at the genomic level is the future of food safety. It allows you to anticipate resistant bugs, understand how microbes are developing resistance, and helps you to trace back and make linkages between products, farms and countries."

Microplastics

Microplastics and nanoplastics are contaminants at risk of entering the food chain worldwide. Due to the overuse of plastics and poor methods of disposing them, plastics can end up entering the food chain. It is estimated that humans are exposed to around 5 grams of plastic per week in the food they consume – equivalent to 20 kg over a person's lifetime.

Food regulators are paying increasing attention to this threat and working to limit the presence of microplastics and nanoplastics in the food chain. This is a significant challenge, and wide-ranging collaboration among industries across the plastics, recycling and food supply chain is needed.

One solution is stronger regulation by governments to minimise the use of plastics. The EU and the UK, for example, have introduced regulations to ban single-use plastics. Saudi Arabia is in the process of regulating this area as well. The SFDA aims to lead the way in terms of minimising the presence of plastic particles in food, and the authority's Reference Laboratories are working on new methods to determine plastic particles in the food chain more accurately.