FOOD SAFETY FOCUS ON INDIA: A GROWING MARKET
SPECIES IDENTIFICATION: DNA MEAT TESTING TO SECURE THE SUPPLY CHAIN
FSSC 22000: NOW INCORPORATES FOOD PACKAGING
PROCESS AND PRODUCT CHANGES REQUIRE HACCP RE-VALIDATION
DEAR READER,

Welcome to Hot Source, the new food industry newsletter that provides you with the latest supply chain news. Written and researched by industry experts, our editorial will keep you up to date with regulatory news, emerging markets, industry developments and case studies focusing on food quality, safety and sustainability.

From testing and selecting the best crops, partnering with the best manufacturers and processors, transporting products safely and selling to consumers, Hot Source covers the issues you should be aware of. In this first issue we look at the regulatory requirements and updates to FSSC 22000, the US Food Safety Modernisation Act and HACCP Re-validation. We also cover the issues surrounding both viruses and arsenic in food, and review India’s developing food safety standards, as well as its potential for food sourcing and retailing.

Globalisation means opportunities for the food value chain to grow and expand its reach into new markets. Draw on our international market experience, expertise and in-depth industry understanding to help grow your business.

For the complete range of SGS services and support visit: www.foodsafety.sgs.com.

SGS Agriculture and Food Team

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SPECIES IDENTIFICATION: DNA MEAT TESTING TO SECURE THE SUPPLY CHAIN

Since the detection of horsemeat in beef burgers by Irish food inspectors last month, the scandal has now spread to 13 European countries. Retailers have removed beef products from their shelves as concern over the contamination and the origin of the horsemeat has escalated.

Unlike recent food safety scandals concerning dioxin, BSE, melamine and dicyandiamide, the detection of horsemeat in convenience foods is not currently considered to be a food-safety issue. The problem is more a fraudulent misuse of the labelling system for economic gain. Misleading the consumer in this way contravenes European legislation and a criminal investigation is underway.

DNA TESTING FOR MEAT

DNA testing is now being conducted across Europe on meat, both in the supply chain and in existing products to check for the presence of horsemeat. Species identification analysis is already conducted by SGS on meat and fish products, to client requirements. Testing services can be used to identify:

- Pork
- Beef
- Horse
- Duck
- Turkey
- Chicken
- Seafood
- Fish

In Europe’s ongoing meat contamination problems, food-safety may be an indirect issue. It raises the question of whether the horsemeat was intended for human consumption. If, as some commentators believe, the horsemeat was not intended for human consumption, it may contain the veterinary drug phenylbutazone, which is used as a sedative for domestic and sporting horses, and could have contaminated meat products. Phenylbutazone is harmful to human health. This possibility, as well as other questions concerning the origin of the horsemeat, mean this labelling fraud could also be a food-safety issue.

TESTING FOR DRUG TRACES AND MARKERS

SGS has state of the art laboratories across the globe that are equipped and strategically located to provide independent analytical and inspection services. In addition to species detection and identification, our food safety analysis includes medication residues and markers:

- Phenylbutazone ‘bute’.
- Anti-coccidials.
- Other potentially harmful veterinary drugs.

PROTECTING THE CONSUMER

European authorities have decided that 2,500 tests of processed beef products will be analysed for horse DNA in March and will be reported on in April. Another 4,000 samples of horsemeat will be analysed for phenylbutazone. This measure could take a further two months. Ministers of Public Health have agreed that the European Commission recommendation on labelling the origin of all processed meat, should be accelerated and published as soon as possible.

SUPPLY CHAIN SECURITY

To promote security across the food supply chain, our network provides supplier audits, product inspection, product sampling as per official methods, mystery shopping and control on sales points to mitigate risks. Our training services are designed to improve hygiene and sanitary risk management related to the food industry. This helps organisations to implement long term comprehensive food safety systems.

Certification services, such as FSSC 22000 (Food Safety System Certification), IFS (International Featured Standard), BRC Global Standard for Food Safety (British Retail Consortium) and SQF (Safe Quality Food) confirm system compliance.

A TRUSTED PARTNER

SGS is committed to keeping you informed of regulatory news and developments. Leveraging our global network of laboratories and food experts, SGS provides a comprehensive range of food safety and quality solutions including analytical testing, audits, certifications, inspections and technical support. We continually invest in our world class testing capabilities, state-of-the-art technology and expert resources to help you reduce risks, improve food safety and improve quality.

For further information please visit our website www.foodsafety.sgs.com.

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FOOD SAFETY FOCUS ON INDIA: A GROWING MARKET

Open to foreign direct investment and with growing food and agriculture sectors, India offers a wealth of opportunity to the food industry. However, as a developing nation, its food safety regulation is only now coming into focus and undergoing extensive improvement.

Consumers, regulatory bodies and the government are all driving food safety improvement. Historically, food safety in India has been regulated by a wide variety of legislative orders and acts, but this ad hoc approach is becoming more streamlined and effective. Nevertheless, logistical challenges remain.

ACTIVE FOOD SAFETY STANDARD ENFORCEMENT

The Food Safety & Standards Authority of India (FSSAI) is responsible for active enforcement of the national laws and regulations that govern the retail supply chain and its food processors. It has replaced a fragmented structure that relied on multi-level, multi-departmental control, and now delivers a single line of command, as well as a more visible and recognisable oversight organisation.

In an effort to improve food safety standards and open the country for international business India’s Food Safety & Standards Act 2006 (FSSA) consolidates the country’s existing laws into one cohesive Act and is the building block upon which the FSSAI is based.

To ensure the availability of safe, wholesome food for human consumption, the FSSA sets down scientific standards for food articles, to regulate their manufacture, storage, distribution, sale and import. It integrates the licensing provisions in the following food product related Orders:

- Fruit Products Order, 1955.
- Prevention of Food Adulteration Act, 1954.
- Vegetable Oil Products (Control) Order, 1947.

- The Solvent Extracted Oil, De Oiled Meal and Edible Flour (Control) Order, 1967.
- Any Order under the Essential Commodities Act, 1995, relating to food.

IMPROVED OPPORTUNITY

The FSSAI’s role as the single point of reference for all matters relating to food safety and standards, regulations and enforcement means not only better service to all stages of the food value chain, but also an improved response to strategic issues such as health foods, nutraceuticals, GM foods and facilitating international trade.

Enforcement of the FSSA is the responsibility of state governments and union territories (UT). However, the FSSAI is also working to shift the emphasis from enforcement to self-compliance, through adoption of food safety management systems. Introducing consistency between domestic and international food policy measures will help to raise standards without reducing the safeguards to public health and consumer protection.

Consumers will benefit too, as better regulation increases confidence in the quality and safety of food.

As India seeks to increase its export market and deals increasingly with traders already conversant with the stringent regulatory conditions of the USA, Europe and Japan, so the implementation of international standards will become commonplace. Food processors and exporters will have to embrace regulation to ensure continuity of trade.

RETAIL RESPONSIBILITY

Retailers can ensure compliance with food safety standards by ensuring that their suppliers, manufacturers, packers and growers maintain proper systems that meet the requirements of the FSSA. This can be achieved either by in-house verifiers, or as may be more practical for India’s independent business model, by an experienced third party testing and inspection company like SGS.

Chapter IV, paragraph 23 of the FSSA states that no person shall manufacture, distribute, sell, or expose for sale, nor dispatch or deliver to any agent or broker for the purpose of sale, any packaged
food product that is not marked and labelled in the manner specified by regulation. It is therefore the retailer’s responsibility to ensure compliance of all products. Imported goods intended for retail sale are subject to all provisions of the Standards of Weights and Measures (Packaged Commodities) Rules, 1977, at the point of import.

Introducing a consistent, effective management system coupled with a supplier inspection and verification programme will demonstrate compliance and improve standards.

NEW MARKET, NEW CHALLENGES

Agriculture is India’s third largest industry employing almost half the country’s working population and accounting for 18.1% of GDP. On the whole, it is not widely organised and relies heavily on small growers, transporters and traders to supply both domestic and export markets. As one of the world’s biggest producers of tea, fresh produce, grains and oilseeds, its producers and transporters are rising to the challenge set by export standards.

With a traditionally local focus, the supply chain is both long and low-tech, raising issues that have already been overcome in other markets, such as risk of contamination and damage during delivery.

CONTAMINATION RISKS

To meet growing demand for food production, farmers in India use a range of fertilisers and pesticides. As a result, the agro-chemicals used to grow produce, as well as the veterinary drugs/antibiotics commonly used in animal farming are often found in trace quantities in the final product, and thus enter the food chain.

International traders need to be aware of these risks and work with growers and processors to introduce, implement and verify production processes and policies. A testing programme from SGS can verify the presence of these substances and help to ensure the quality and safety of products. Ignorance is no defence; ensure products meet the quality standards of their destination market.

Additionally, as a developing nation with vast differences in geography and geology, contaminants and impurities can also be picked up from the environment. When transporting or storing commodities, it is essential to prevent insect related risks and damage. We perform fumigation services in ports and logistics centres worldwide; our skilled and mobile teams deliver effective and reliable interventions. Accordingly, our services comply with stringent legislation, quality and safety standards.

CLEANLINESS – CAUSE FOR CONCERN

At over 3 million km2 India is the seventh largest country in the world. This scale, combined with the road, rail and air infrastructure of a developing country, means that the physical supply chain that moves products to warehouses, processors and on to retail premises is longer than usual.

Travelling great distances and through numerous facilities creates an unusually high risk of contamination, adulteration or infection by pathogens. The monitoring and upkeep of hygiene and other safety measures becomes difficult.

India’s agriculture sector relies heavily on small farmers, local transport companies and distribution chains. There is relatively little co-ordination across the whole country. Many operators, each needing to make a profit and serve local markets, often lack the facilities and other resources to maintain the food safety, hygiene and handling conditions that are expected of an organised, efficient transportation operation.

Without appropriate intervention, the food chain suffers from high rates of wastage and lost market value as food is mishandled, contaminated and/or damaged before it reaches its destination. Globally, it is estimated that during transportation some 10% of grain and 40% of fresh produce is lost and does not reach end consumers.

In response to the country’s changing food safety landscape and the pressing need for temperature controlled supply chain facilities, SGS has opened its first integrated food safety and cold chain facility in Mumbai. The first facility of its kind in the area, it is strategically located close to markets, port and city. Pre-cooling, sorting & grading and ripening can all be catered for. Additionally, our FSSAI approved laboratory is nearby. This means faster turn around times and reduced risk of contamination.

FSSAI APPROVED LABORATORIES

SGS in India has FSSAI approved laboratories at Ahmedabad, Cochin, Indore, Chennai, Kolkata, Bangalore, Gandhidham and Gurgaon for testing Agri & Food products.

SOLUTIONS FOR SUCCESS

The issues are not insurmountable, and the FSSAI has the power to enforce hygiene, quality and safety standards but the solutions require investment to help bring this valuable market up to internationally acceptable standards. SGS is uniquely positioned to help primary producers, processors, exporters, retailers, catering establishments, hotels and restaurants to implement food safety and quality programmes.

At SGS, our industry expertise and experience delivers efficient services to help safeguard quality and safety throughout the whole food supply chain, from raw and semi-manufactured foodstuffs, to final products in all principal food segments. We deliver comprehensive and cost-effective control solutions including audits, testing, inspection, technical solutions and training. In addition to investment in cold chain facilities and FSSAI approved laboratories we can also conduct field trials and a full range of seed services.

Find out more about SGS Food Safety Solutions.

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FSSC 22000: NOW INCORPORATES FOOD PACKAGING

FSSC 22000 is being updated. The Foundation for Food Safety, which owns the scheme, is in the process of obtaining GFSI recognition of its 2012 version of FSSC 22000, which includes food packaging.

Since the publication of PAS 223 by BSI many food packaging manufacturers have started to apply the PAS within their organisations alongside ISO 22000. However, the PAS 223 – ISO 22000 combination does not meet the Global Food Safety Initiative (GFSI) requirements.

In response the Foundation for Food Safety has developed FSSC 22000 for Food Packaging Material Manufacturing. This updated FSSC 22000 scheme, which covers four packaging sectors: plastic; paper and board; metal; and glass, has been submitted to GFSI for benchmarking prior to acceptance.

MORE THAN 3,000 FSSC CERTIFICATES ISSUED

Since the launch of FSSC 22000 in 2010 more than 3,000 certificates have been issued to food manufacturers and a further 200 to packaging companies.

These certificates have been issued worldwide by the 70 plus licensed certification bodies, all of which are accredited by their national accreditation body, or are in the process of being accredited (see figure 1).

The global distribution of the certificates is clearly seen in the accompanying chart which demonstrates the growth in recognition of the ISO based standard.

To date, SGS has issued more than 800 FSSC certificate in 40 countries. FSSC

FIG. 1 FSSC 22000 Sites Worldwide
22000 certification allows an organisation to meet the requirements of several global retailers or major branded food companies under a single, internationally recognised food safety management system.

**FSSC IN THE MAKING**

Unique among GFSI standards FSSC 22000 has been developed by the independent not-for-profit Foundation for Food Safety and is based on ISO 22000 and PAS 220. Based in the Netherlands, the Foundation has its roots in the National Board of HACCP Experts. This group of food safety experts represented all parties in the Dutch food chain and published one of the first globally recognised HACCP standards in 1996.

The existing FSSC 22000 scheme calls on the food safety management system requirements of ISO 22000 enhanced with the specific requirements of Prerequisite Programmes as set out in ISO/TS 22001/PAS 220 for food manufacturing and processing.

**GLOBAL MISSION FOR FOOD SAFETY MANAGEMENT**

The Board of Stakeholders that administers FSSC 22000 includes representatives from food manufacturing and distribution, standards bodies and certification bodies. The Board’s mission is to deliver globally leading, independent, non-profit ISO based and GFSI-accepted food certification scheme for the whole food supply chain.

**GFSI RECOGNITION FOR SCHEME OWNERS**

A significant element of GFSI recognition is the requirement for the scheme owner to put in place a robust integrity programme. This ensures that the scheme can maintain delivery of credible protection of food safety to end users, regardless of the accreditation of the individual certification bodies.

All certification bodies must demonstrate compliance with ISO 17021 and ISO 22003 to their accreditation body. This ensures independence and impartiality in their management and processes as well as demonstrating auditor competence.

An adequate and systematic mechanism to plan and conduct effective audits is also key to the function of the certification body.

As a further safeguard, the Foundation has implemented a systematic review of selected audits by independent experts. This enables proper validation of the delivery process with feedback to the certification bodies and the Foundation, thereby enabling a culture of ongoing programme improvement.

**FOOD SAFETY EXPERTISE**

As a world-leader in food safety audits and certification, we have an international, multi-lingual network of specialists ready to share their expertise and help you raise standards. We can ensure that your food safety solutions and systems are in line with the latest thinking and best practice, so that quality and safety become synonymous with your brand.

Find out more information about SGS Food Safety Solutions.

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PROCESS AND PRODUCT CHANGES REQUIRE HACCP RE-VALIDATION

Food safety, products and processes are always changing. To keep pace with these changes and demonstrate continued commitment to food safety through HACCP compliance, establishments need to re-evaluate their food safety management systems.

Hazard Analysis and Critical Control Points (HACCP) plans must undergo at least an annual review and update. However, a HACCP revalidation is also triggered by changes to either a product or processing method that could affect the hazard analysis.

Failure to keep HACCP plans up to date can have disastrous consequences, not only for business, but also for consumer health. In recent incidents the failure to re-validate a HACCP plan following process and/or equipment changes resulted in the production of unsafe food. This was then distributed as normal, with terrible consequences; people reportedly died, many more became ill, and there were widespread product recalls.

WHEN SHOULD RE-VALIDATION OCCUR?

HACCP re-validation is no different to the initial validation, but can be triggered by events including:

- Product or process changes.
- System failure.
- Changes to a product’s distribution system.
- Updates/corrections to customer handling instructions.
- New scientific or regulatory information.

Under the principles of HACCP an establishment is required to validate the effectiveness of its HACCP plans in controlling food safety hazards identified within the hazard analysis. To effectively re-validate the plan, all elements need to be revisited. An HACCP plan comprises several elements:

- Hazard analysis.
- Supporting documentation.
- Prerequisite programmes.
- Historic monitoring and testing records.

The task is not to monitor operations, or verify whether work has been completed according to the plan but to validate that an establishment’s plan can and will work. The focus of re-validation is to collect and provide scientific basis for decisions made during the development or reassessment of a HACCP system and provide evidence of hazard control. At the same time, the establishment will continue to operate within the existing HACCP plan. The re-validation does not occur in isolation, but alongside the establishment’s day-to-day operations for concurrent implementation.
HACCP REVALIDATION PROCESS

There are two distinct elements to the validation/re-validation process:

- **SCIENTIFIC/TECHNICAL EVIDENCE FOR THE HACCP SYSTEM**
  Scientific and technical documentation should be collected and presented to support the critical control points and demonstrate compliance to current best practice and legal requirements. This material could include articles from peer-reviewed scientific journals, a documented study, published guidelines or in-house data. It should identify the hazard (biological, physical, radiological and/or chemical), the level of hazard prevention required, all critical parameters/conditions, how it will be achieved and how implementation and its success will be monitored.

- **ON-SITE VALIDATION**
  Demonstrate the control measures identified in the scientific/technical documentation. In-plant observations, measurements, microbiological tests and any other information that demonstrates the critical control measures written into the HACCP system. The establishment needs to gather enough data to be able to demonstrate that the process can be operated effectively on a daily basis.

WHO CAN CONDUCT REVALIDATION?

A qualified HACCP Auditor must conduct re-validation but the multi-disciplinary HACCP team that is responsible for developing, implementing and maintaining the HACCP system should support them.

DEMONSTRATE COMMITMENT TO SAFETY

HACCP certification instantly demonstrates to customers your commitment to producing or trading in safe food. This evidence based approach can be particularly beneficial when you are subject to inspection by regulatory authorities or stakeholders.

Our global network of food experts carries out HACCP audits and helps you focus on the hazards that affect food safety and hygiene. It is then possible to systematically identify where the hazards are, by setting up control limits at critical points during the food production process.

Find out more information about SGS Food Safety Solutions.

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UPDATE ON THE US FOOD SAFETY MODERNISATION ACT

2012 was to be a busy and significant year for the US Food Safety Modernisation Act (FSMA). Signed into law in 2011, the last 12 months have seen the majority of its programmes drafted but unfortunately because of government review procedures no major programme has been implemented yet.

Tasked with developing some 90 rules, guidance documents and reports to meet the new FSMA requirements the Food and Drug Administration (FDA) has made some progress. Most notably, back in February the FDA published the Record Access Guidance and Interim Rule and in October the Biennial Facility Registration system was launched.

RECORD ACCESS RIGHTS
Record access guidance allows the FDA access to records including: manufacturing, raw materials (ingredients and packaging) receipts, product distribution, testing, recalls and reportable foods, customer distribution as well as complaints and adverse events in all registered facilities. If requested these records must be provided to the FDA within 24 hours. Failure to do so can result in the suspension of a facility’s registration, recalls, injunctions or product seizures.

SHIPPING INTO AND ACROSS THE US
Biennial Registration for all facilities opened on October 22, 2012 and all renewals must be submitted by December 31, 2012. Failure to re-register through this process may result in suspension of registration, as of January 1, 2013. Facilities whose registration is suspended cannot ship products into the USA, nor can they ship goods within the country.

Other FSMA rules, guidance documents and reports achieved by the FDA include:

- Publication of three final rules in the Federal Register.
- Publication of 11 draft and final guidance documents in the Federal Register with a further 2 in clearance.
- Completion and submission of five reports to Congress.
- Publication of notices on state and local food defence capacity and the implementation of FSMA re-inspection fees.
- Anti-smuggling strategy published jointly with the Department of Homeland Security.
- Product tracing pilot studies conducted.
- Memorandum of Understanding signed with the US Department of Agriculture to establish an FSMA implementation grant programme for small-scale produce growers.

In addition, the FDA has made very substantial progress on other major FSMA deliverables, including:

- Four major frameworks for proposed rules and accompanying regulatory impact analyses are now under review at the Office of Management and Budget (OMB), covering: preventive control standards for animal food facilities; foreign supplier verification requirements for importers.
- Proposed rules to establish an accredited third party certification programme and transport safety standards are close to completion within the FDA.
- An advance notice of proposed rulemaking on intentional adulteration drafted and close to completion within the FDA.

While the OMB is still reviewing three major rules, a further two are nearing completion and the FDA has delivered:

- Record Access Guidance and Interim Rule – February 2012.
- Report to Congress on US FDA Foreign Offices – February 2012.
- Sprout Safety Alliance Development – February 2012.
- High Risk Facility Definition – March 2012.
- More Data Elements for the Reportable Food Registry – June 2012.
- Increase Category information for Registration – August 2012.
- Biennial Facility Registration – October 2012.

On 4 January 2013 the US FDA issued the proposed preventive controls for human food and the produce safety standards. US FDA will receive comments to these proposals until 16 May 2013.

Some 48 million people (1 in 6 Americans) get sick, 128,000 are hospitalized, and 3,000 die each year from foodborne diseases, according to recent data from the Centres for Disease Control and Prevention. The FSMA will better protect public health by strengthening existing food safety systems and proving oversight of producer and processor compliance.

Find out more information about SGS Food Safety Solutions.

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1 Progress on FSMA, Changes within the FDA Foods Program, and on Partnerships
2 Record Access and Guidance for Industry
3 Registration
4 Preventive Control for Human Foods and Produce Standard
FOODBORNE VIRAL INFECTIONS: PREVENTION IS BETTER THAN CURE

Almost every week a new foodborne illness outbreak is reported in the media. Many of these are caused by the viral infections norovirus (NoV) and hepatitis A (HAV). Unlike bacterial infections, once present in food, viruses will neither modify the taste nor the appearance of a product. As a result viral infections can more easily go undetected.

Many foodborne outbreaks caused by viruses occur worldwide every year. In the US alone there are estimated to be 9.2 million foodborne illnesses related to norovirus each year and the 19 member states of the European Union (EU) reported a total of 697 norovirus outbreaks in 2008. In outbreaks that have been verified, norovirus was the most frequent cause, followed by HAV. In the EU, viral agents were responsible for 11.9% of the foodborne outbreaks reported to the European Food Safety Authority (EFSA) during 2007 and were identified as the second most common causative agent group, after Salmonella1.

UNDETECTED VIRAL INFECTIONS

Viruses can be very infectious. Norovirus inoculums as low as ten viral particles may be sufficient to infect an individual. Enteric viruses, like hepatitis A and norovirus, can survive for long periods in food and water.

Generally, viruses are more resistant to chemical and UV disinfection, filtration and pasteurization than microorganisms but they may be removed by ultrafiltration membranes or inactivated by prolonged heating or optimal UV treatment. However, they survive reasonably well in adverse conditions, microbial proteolysis and fermentation. As they are resistant to several food processes, consumption of processed food products may lead to new human outbreaks. Additionally, infected people also represent a risk as foodborne outbreaks are often linked to food handlers.

REGULATORY STEPS TAKEN

To help overcome the risks associated with food-borne viruses, regulatory officials have developed and continue to pursue several measures:

- European Commission Regulation (EC) No 2073/2005 of 15 November 2005 indicates that “Foodstuffs should not contain micro-organisms or their toxins or metabolites in quantities that present an unacceptable risk for human health”, underlining that methods are required for foodborne virus detection.

- An expert working group, created by the European Committee for Standardisation (CEN), is expected to publish a standard method for the detection of norovirus and hepatitis A virus in food products (shellfish, fruits and vegetables, surfaces and bottled water). The standard method will include qualitative and a quantitative measures.

- The CODEX Committee on Food Hygiene (CCFH) is working on a guideline for the application of general principles of food hygiene for the control of viruses in food, which is ready for adoption.

- EFSA published a report in 2011 ‘scientific opinion on an update on the present knowledge on the occurrence and control of food-borne viruses’.

Viruses may contaminate food at all stages of the food supply chain and transmission may occur by consuming food either contaminated during production (primary production, or processing), or contaminated by infected food handlers. They do not multiply in foods, but may persist for extended periods of time as infectious particles. Therefore, the EFSA panel recommends focusing controls on preventive measures to avoid contamination rather than trying to remove or inactivate viruses from food.

GET THE BEST SUPPORT AVAILABLE

Foodborne viruses are a real concern. To help organizations meet diverse regulation requirements and support their internal risk assessment studies, SGS has developed analytical methods based on the expected CEN standard. As validated methods are available for many types of food and environmental samples, our analytical services help food companies measure viral risks and integrate foodborne virus testing into their analytical surveillance plans.

Find out more information about SGS Food Safety Solutions.

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ARSENIC IN FOOD

Arsenic is a naturally occurring compound. Colourless, odourless and tasteless, arsenic is commonly found in food and its raw ingredients. However, scientific literature indicates that its consumption, in high quantities, can be linked to skin lesions, cancer and diabetes.

NATURALLY OCCURRING, BUT...

Arsenic exists naturally in our environment and can be found in the air we breathe, the water we drink and the ground we walk on. But today the amount of arsenic from anthropogenic sources, released into the environment as a by-product of agricultural and industrial processes, is increasing. Its presence in food is therefore no surprise, and entirely natural at low levels. Today we discriminate between two forms of arsenic. Inorganic arsenic is more toxic than organic arsenic and more closely associated with the potential for long-term health effects.

Experts at the European Food Safety Authority (EFSA) identified the following foods as having the highest total arsenic levels (organic and inorganic levels combined):

- Cereal and cereal products, with particularly high concentrations in rice and rice-based products.
- Fish and seafood.
- Food products or supplements based on algae, especially hijiki.
- Bran.
- Germ.

Most crops absorb arsenic from the soil and water in their environment. However, rice, which grows in flooded conditions, absorbs and stores arsenic more readily. Brown rice especially, contains high levels of arsenic, particularly in its inorganic forms. This can pose an increased risk for specific population groups for which rice is a staple food, especially where the cooking water is also contaminated.

Similarly, rice is a key ingredient in many pre-prepared baby foods. Statistically, children under three years of age are the group most exposed to arsenic. Their diet and relatively low body weight means they are exposed to an average of two to three times the levels of inorganic arsenic ingested by adults.

Fish and seafood are known to be high in arsenic, but mainly in its organic form. This difference in content versus severity demonstrates the need for new analyses taking into account the speciation of arsenic and not just the total content.

SPECIATION AND EVALUATION

Studies into arsenic in food have been restricted by a lack of speciation data. Of more than 100,000 arsenic concentrations submitted to EFSA for evaluation, some 98% were reported as total arsenic but only a few broke figures down into organic and inorganic.

European authorities have adopted EFSA’s 2009 report and maximum limits for inorganic arsenic are planned to be introduced for rice and rice-based infant food. The introduction of maximum limits for cereals, algae and food supplements is also under discussion.

In the US the Food and Drug Administration has been measuring total arsenic concentrations in food products since 1991, but has yet to establish a specific standard. A guideline for arsenic (total) in crustacean and molluscs of 76ppm and 86ppm respectively, was introduced in 1993, but it is currently examining the risks associated with long-term exposure.

CODEX has a standard for total arsenic in various foods (fats, margarine, olive oil, vegetable oil, mineral water and salt), but the issue of organic against inorganic has not yet been addressed.

STATE-OF-THE-ART TECHNOLOGY

To detect and distinguish between species the most effective method combines HPLC, a powerful separation technique with inductive coupled plasma-mass spectrometry (ICP-MS). In LC-ICP-MS the compounds are separated by HPLC and the resulting fractions ionised and detected by ICP-MS.

LOW LEVEL EXPOSURE IN EVERYDAY LIFE

In low doses, arsenic is not harmful to humans. However, exposure to higher doses over longer periods may produce negative side effects, with dietary exposure having a more significant impact on human health than environmental exposure. Long-term inorganic arsenic consumption is linked to skin lesions, cancer and diabetes. Organic forms are less toxic, but data on toxicity and occurrence is lacking.

Improved quality and data management, coupled with better risk assessment and technical documentation guided by the EN 50581 standard, should improve compliance rates and reduce the risks that the supply chain is exposed to.

SAFETY FIRST

The presence of arsenic in food and water is unavoidable, but food producers should be aware of legislation and the impact of the more toxic inorganic arsenic on raw materials and ingredients.

Find out more information about SGS Food Safety Solutions.

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OUR WHITE PAPERS - LEARN MORE ABOUT FOOD QUALITY, SAFETY & SUSTAINABILITY

UNDERSTANDING SUSTAINABILITY IN FISH AND SEAFOOD

Recently published, SGS’s white paper ‘Understanding Sustainability in the Fish and Seafood Industry and the Related Certification Schemes and Consumer Guides’ explores the industry’s approach to sustainability and generating consumer conference. This paper discusses the current state of global seafood stocks and how to meet current demand without endangering their future, including the difficulties in reaching a harmonised understanding of sustainability across the industry. Seafood is essential to the world’s ability to feed the human population; adopting a long-term vision and investing in sustainability can only help to define its future.

Download your copy of: ‘Understanding Sustainability in Fish and Seafood: White Paper’.

MANAGING PERFORMANCE IN FOOD SUPPLY CHAINS

SGS has recently published the white paper ‘Managing Performance in Food Supply Chains’. It discusses the impacts, opportunities and challenges arising from managing food supply chain performance and protecting both producer and supplier reputations. In addition, it provides an overview of steps that can be taken to prevent adverse food supply chain related incidents and to increase the performance of supply chains. Taking these actions has the additional benefit of protecting and enhancing the reputation of the organisations involved.


To view more white papers from SGS experts please visit the SGS White Paper Library.

SGS FOOD WEBINARS

For a complete list of SGS seminars, courses and webinars, please check our events calendar.

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SGS FOOD EVENTS MARCH - JULY 2013

For more events, please check the online events calendar.

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<td>Boston</td>
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Please contact: food@sgs.com

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