FOOD SAFETY BETWEEN OBLIGATIONS AND OPPORTUNITIES

gruppo tecniche nuove

SMART PACKAGING HUB
your food & beverage partners

index

On the cover:
Detail of the chocolates packaging line (Source: Cama Group)

summary

In order to ensure food safety for consumers and to safeguard the agri-food industry from recurrent crisis, the European Union - and Italy as a member country - has over time adopted a comprehensive strategy called “from field to table”. This strategy defines the intention to supply safe and sound at all elements of the supply chain, while defining a comprehensive regulatory system and integrated control strategies. In this paper the issue will be discussed in terms of industrial packaging, which is also subject to very stringent rules and important challenges. It will also illustrate the significant contribution to food safety by an industry leader, through the use of advanced technology.

targets

INTRODUCING A SYSTEMIC APPROACH TO FOOD SAFETY

DEVELOPING THE ISSUES OF TRACEABILITY, SUSTAINABILITY AND REGULATORY FRAMEWORK CONNECTED TO FOOD SAFETY

PRESENTING THE CONTRIBUTION OF A MARKET LEADER OF FOOD PACKAGING, SUCH AS THE CAMA GROUP

Introduction

The World Health Organization (WHO) estimates that every 44 minutes a person falls ill from food contaminated by various agents, including viruses, parasites or chemicals.

Consequently, the issue of food safety is a priority when considering packaging, as it accompanies products to the end of its life. This is all the more crucial in our industrial society where food not only has to be packaged for consumption, but also for transport, storage and large-scale distribution.

Food Contact Materials, while allowing manipulation and protection during production, transport and sale become as important as an “ingredient” of food; they must therefore to be subjected to the same safety analysis.

Furthermore, packaging also has an informative function vis-à-vis the consumer, communicating shelf-life once opened, expiry date, ingredients and allergens, manufacturer’s data and batch/lot data, to support product traceability.

A Systemic Vision for Food Safety

In food safety, packaging demands a systemic vision. , which has to meet specific safety requirements before a product reaches the market, during its use by the consumer and after consumption. Besides having to be safe for staff involved in production, conversion, merchandising, use and disposal or recovery, it has also to be environmentally sustainable; and, last but not least, it has to meet regulations related to food safety and traceability.

PEOPLE SAFETY: FROM PROTECTION TO TRACEABILITY

Food packaging must prevent the migration of unwanted substances into food, thus preventing any modifications of its physio-chemical composition that causes a deterioration of its original characteristics.

Analytical tests to verify food-contact compliance and appropriate toxicological, microbiological and organoleptic risk assessments are carried out (according to Article 3 of t 2004/1935/CE Regulation), in particular as regards materials such as cardboard and plastic. The general task of evaluating substances for use in food-contact materials is carried out by EFSA scientific panel (European Food Safety Authority).

For food-contact materials it is mandatory to issue a document of compliance (DoC) each time the material of the packaging is modified. In Italy, with reference to the Ministerial Decree 21/3/73 articles 6 and 7, the issue of a document of compliance is mandatory and shall go with each single lot leaving the factory.

The increasing importance of traceability should be highlighted too, both regarding the information given to the consumer, and that covering the production chain.
The target is to deliver to the consumer an unchanged/unmodified product, thus avoiding any contamination. This principle is followed from the production line, for example by isolating it if it is intended for food for coeliacs and is of primary importance during packaging.

ENVIRONMENT SAFETY: SUSTAINABILITY

Food packaging that is safe for the environment will not cause negative effects on ecosystems and, once its function has been fulfilled, will not become waste, but can instead be reused, recycled or recovered in its entirety.
In particular, Directive 2008/98/CE states that packaging has to be specifically designed to prevent the production of waste.
In 2021, according to data from Conai (National Packaging Consortium), Italy sent 10.550 million tonnes or 73.3% of the packaging placed on the market, for recycling, a slightly rise compared to a record figure in 2020, when the percentage reached approximately 73%, – over the 65% of the total recycling rate that Europe demands from its member States until 2025. 2021 was a year with a strong recovery of consumption, with over 14 million tons of packaging placed on the market (approximately 8.5% more than in 2020).

Food packaging should be designed based upon the principles of a circular economy; therefore it should be:

- **reusable – each of its components should be reusable as raw material in new production cycles. In the case of food packaging, it should be reusable as paper and cardboard, which means items made in conformity with the EN 643 standard;**
- **should the material not be reusable, it should at least be compostable, i.e. capable of decomposing in industrial composting plants, under specific conditions, to obtain quality compost that is free of environmentally unsound components. Articles must meet the requirement of UNI EN 13432.**

BUSINESS SAFETY: THE REGULATORY FRAMEWORK

The "Hygiene Package" (General Food Law), in force since 1st January 2006, changed EU rules on hygiene and official food control. All EU member States have adopted the same hygiene criteria in food production.

The general principles of the EU legislation are:

- **Integrated controls all along the food chain;**
- **Action based on Risk Assessment;**
- **Primary responsibility attributed to the sector operator for each product they produce, process, import, market or administer;**
- **Traceability of the products along the supply chain;**
- **Active role of consumers in food safety.**

In particular, there exist a number of tools that companies con deploy to comply with the regulations.

One example would be on-site audits, which are the first major tool to prevent risks and sanctions, as they offer strategic information about the company,

its manufacturing, processing, storage procedures and about the products it manufactures. Thanks to these data, and by means of suitable checklists, possible corrective or improvement measures can be efficiently and quickly identified.

Gap-analysis reports of production, processing and storage processes against the requirements of current regulations are another preventive tool that help shield companies from unpleasant consequences, both in terms of product safety and business continuity.

A periodic analysis of supporting documentation (safety data sheets, declarations of conformity, etc.) helps ensure regulatory compliance to avoid sanctions.

Finally, comprehensive investment in training and information along the entire production, processing and merchandising chain of food-contact materials, is an essential pre-requisite to help ensure safety.

Summary of the Contents of the Main European and National Standards Currently in Force to Ensure Food Safety	
law n° 283 year 1962	covered hygiene discipline of production and sale of foodstuff and beverage, allowing food fraud to be prosecuted, in order to protect public health. The law contains various provisions concerning the methods for taking samples and carrying out laboratory analyses, product preparation systems, packaging and labelling, the granting of health authorisations, advertising and presentation in trade. Only article 2 concerning the sanitary authorisation was repealed: in fact, a preventive inspection is no longer an obligation.
Regulation CE n° 178 year 2002	lays down the general principles and requirements of food law, establishes EFSA, and sets procedures in the field of food safety.
Regulations CE n° 852, CE n° 853 e CE n° 854 year 2004 ("Hygene Package ")	The package identifies the operator of the food industry as responsible for food safety and defines a product traceability. In particular, rule 852/2004 lays down the principles of the HACCP system (Hazard analysis and critical control points), like: • The package identifies the operator of the food industry as responsible for food safety and defines a product traceability. In particular, rule 852/2004 lays down the principles of the HACCP system (Hazard analysis and critical control points), like: • Identifying any danger that shall be prevented, eliminated or reduced to acceptable levels; • Identifying critical control points in those steps where it is essential in order to prevent or eliminate a risk or to reduce it to acceptable levels; • Laying down, within critical control points, those critical limits that differentiate acceptability or non-acceptability as regards preventing, eliminating or reducing identified risks; • Laying down and applying efficient survey procedures on critical control points; • Determine corrective measures to be taken and risk analysis and assessment as well as process control methods that can ensure a suitable prevention of hygiene issues and, in any case, an acceptable ability to identify the issues and a quick solution.
Regulation 625/2017	provides for official controls and activities carried out to ensure the enforcement of the legislation.
Regulatory Framework CE 1935/2004	Shows general requirements of food contact materials, objects and machines.
Regulation CE 2023/2006	Includes good practice to make food contact materials and items

Ensure Food Safety through Packaging: Case Study Cama Group

With a turnover expected to reach over 100 million Euro per year, Cama Group is leader secondary packaging (and some more) of food using cardboard.

With significant investments in technological research and know-how, it has several offices around the world, directly alongside multinationals and large local companies.

To Cama Group, food safety means concrete actions on several fronts:

- **Preserving a product's quality while managing its handling as precisely as possible, both for naked product and for a product in a flowpack, made to fight chemical, microbiological, physical, structure and feeling modifications;**
- **Avoiding product contamination; to Cama Group this means making machines accessible and open for cleaning. This is much easier on the new BTG (Break-Through Generation) machines, which are covered later;**
- **Ensure product traceability, mainly through bar code reading;**
- **Enabling quality control through the most advanced vision systems, applied to robots operating along the line.**

BTG MACHINES TO REDUCE CONTAMINATION RISKS

Break-Through Generation (BTG) systems from Cama Group ensure the highest hygiene standards on the market, thanks to the following features:

- **No hollow sections closed off;**
- **Smaller horizontal surfaces;**
- **No accumulation of water, dust and dirt;**
- **Easy detection of contamination.**

The systems feature a flexible, compact structure, which, thanks to a modular design, allows machines to be adapted the layout requirements of a specific plant. The design also integrates the electrical cabinets and wiring into the structure of the machine itself (Integrated Cable Routing, ICR).

This design approach not only optimizes floor space use, but also ensures substantially improved accessibility and safety, of the «Easy Entry» type, which means that no access is «at risk».

BTG also uses components that reduce energy consumption and an unambiguous easy-to-follow identification system for the swapping of components for format changes. This system offers:

- **“user-friendly”, quick replacements without tools;**
- **Reduced restart time after a replacement.**

ROBOTIC SOLUTIONS FOR HANDLING, QUALITY CONTROL AND TRACEABILITY

Robotic applications made by Cama Group offer customized handling solutions to handle each product in the best possible way, while preserving its quality.

The robots can handle even the most fragile products and the special smart vision system can optimize the management of a product while automatically selecting pieces based on size and a pre-set incoming speed. For example, specific pick & place operations can be carried out, such as placing the product inside a box from

above, touching it as little as possible. Generally speaking, robotized automation improves flexibility and productivity in the food industry, while making complex procedures simpler, such as packaging for online sales. Moreover, robots are equipped with specific vision systems to identify different product types, selecting them autonomously, pre-configuring their loading into the packaging with qualitative as well as quantitative distinctions.

Visual solutions can be implemented not only to guide a robot, but also for quality control on incoming goods (in order to identify products not compliant in terms of integrity or look) and on outgoing items (to detect damaged packaging or incomplete closing) and for traceability purposes too.

In addition to the use of vision systems, end-of-line quality control can also be carried out using X-rays that detect any metal parts (or special silicone suction cups used for handling) inadvertently left in the boxes.

The degree of implementation and integration of quality control systems depends directly on a customer's requirements and is developed together with the client. Traceability practices, that are becoming more and more important, include the reading of codes, text strings and other OCR routines, and the application of a secondary packaging code though a label printer or by printing it on the packaging itself. Once this code is applied, it is necessary to acknowledge the efficacy of the printed text (clearly legible and correctly oriented) before sending data to the data centre storage.

Cama Group can manage the entire process directly, thus ensuring that the product is exactly as planned and that all information along the chain can be recalled.

CASE STUDY: MONOBLOC UNITS OF ROBOTIC LOADING AND CLOSING OF CHOCOLATES

One of Cama Group's solutions, in which the various aspects mentioned above were applied, concerned the automation of a chocolate production line at a major food company. The line was previously totally manual and exhibited a high error rate.

The aim was to make cardboard boxes, put chocolates inside them and close the boxes at a rate of approximately 500-600 products per minute. Furthermore, all of the elements that could come into contact with the food – from the box to the grease used on the machines – needed to meet safety requirements. Finally, the machinery, the suction cups and the conveyor belts all had to be completely sanitised.

Packaging of chocolates, detail of the product (Source: Cama Group)

Cama Group was able to supply a compact line equipped with intelligent vision systems that were used for both for handling and for very accurate quality control regarding the size of chocolates and the correct closure of the top icing – verifying that chocolates had not melted together due to the icing.

Monobloc robotized loading and closing unit (Source: Cama Group)

Final Key Points

- Food safety is both a legal requirement and a means to stay competitive
- It means people, environment and business safety
- Automated packaging lines through robots, vision systems and up to traceability solutions help ensure the compliance with legal requirements.
- With its comprehensive solutions, Cama Group is the ideal partner for secondary packaging: from handling to cleaning and from traceability to quality control.

Conclusion

As we have seen, very precise legislation assigns the careful and precise control of the correct application of food safety and quality requirements to all players in the agri-food chain, in the knowledge that this is also a tool for enhancing the value of the product and protecting the professionalism and responsibility of the producer.
Safety is a wide field that includes aspects such as product traceability and environment sustainability.
In the product-packaging sector, ongoing technological evolution, through automation of production lines and constant innovative research, is not only able to increase efficiency and productivity, but also to ensure the compliance of very precise regulations and ultimately, to enhance consumer loyalty and a product competitiveness.

gruppo tecniche nuove