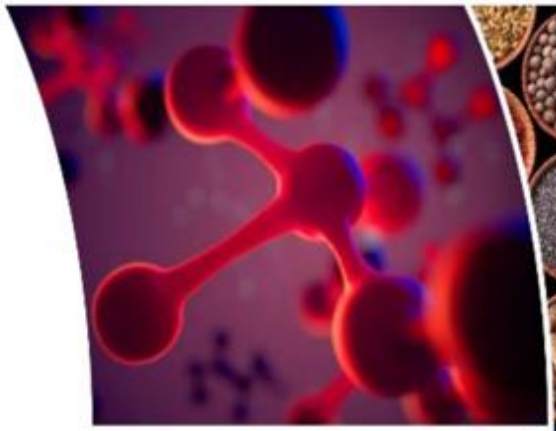
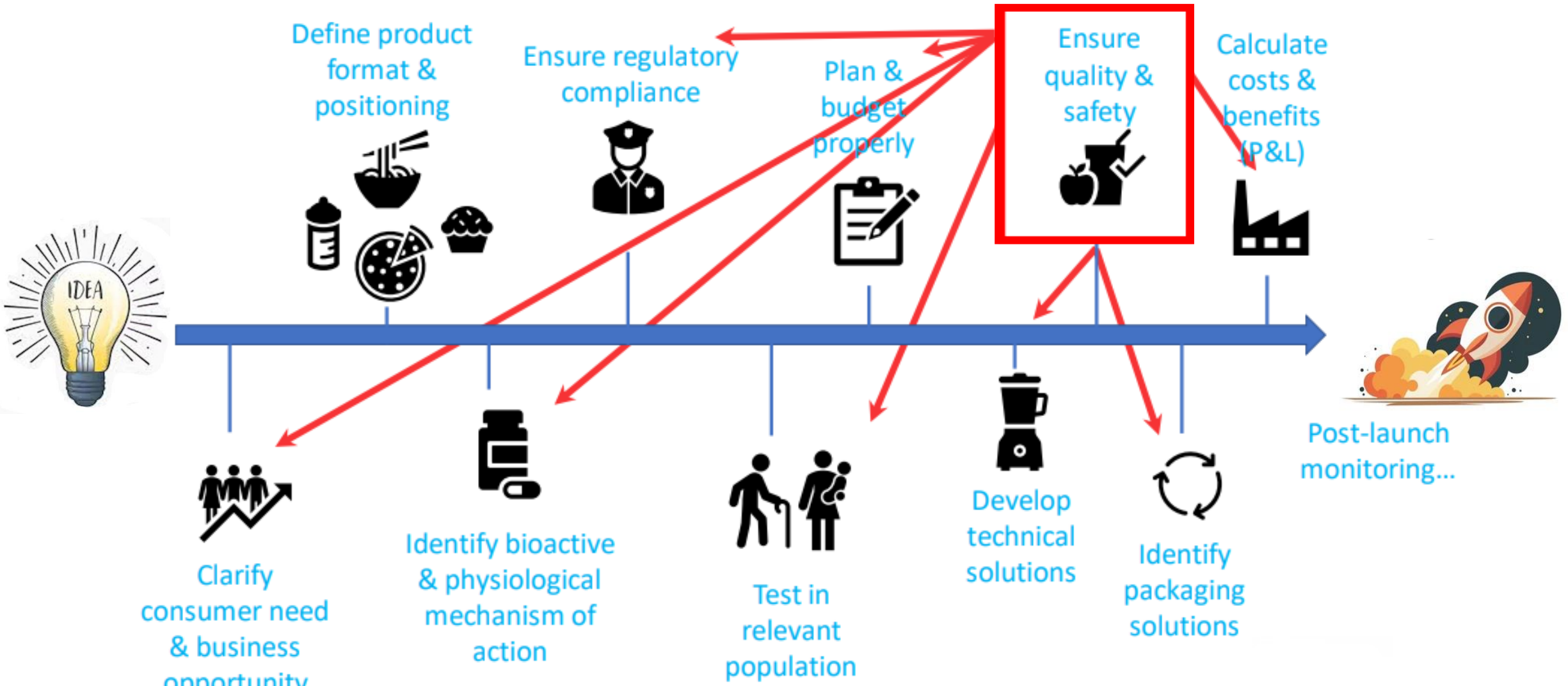


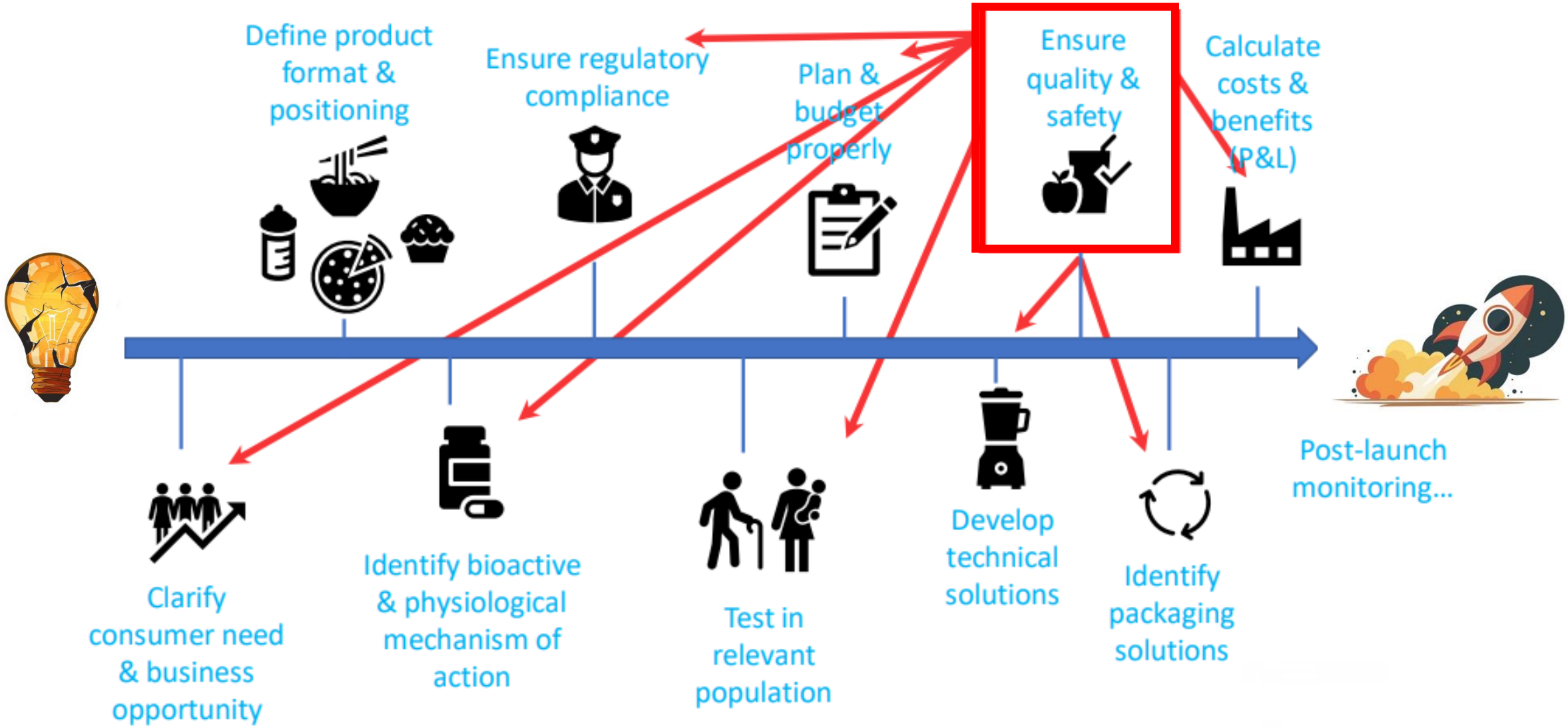
Entrepreneurship in Food
&
Nutrition Science

Course n°11 – Food Quality and Safety

From Idea … To Launch



From Idea ... To Launch



From Idea … To Launch

Quality & food Safety function:

A key partner for successful innovation

Manuella Santoro

- Quality Manager - Nestlé Research
- 22+ years of experience in Food Safety & Quality Management in Operations and R&D

QM Team Competences:

- Quality Management System
- Food Safety Management System
- Good Laboratory Practices
- Quality & Food Safety by Design
- Food Manufacturing

Focus:

Be the key partner for successful innovation.
Our team support all food innovation projects at Nestlé Research.

Agenda

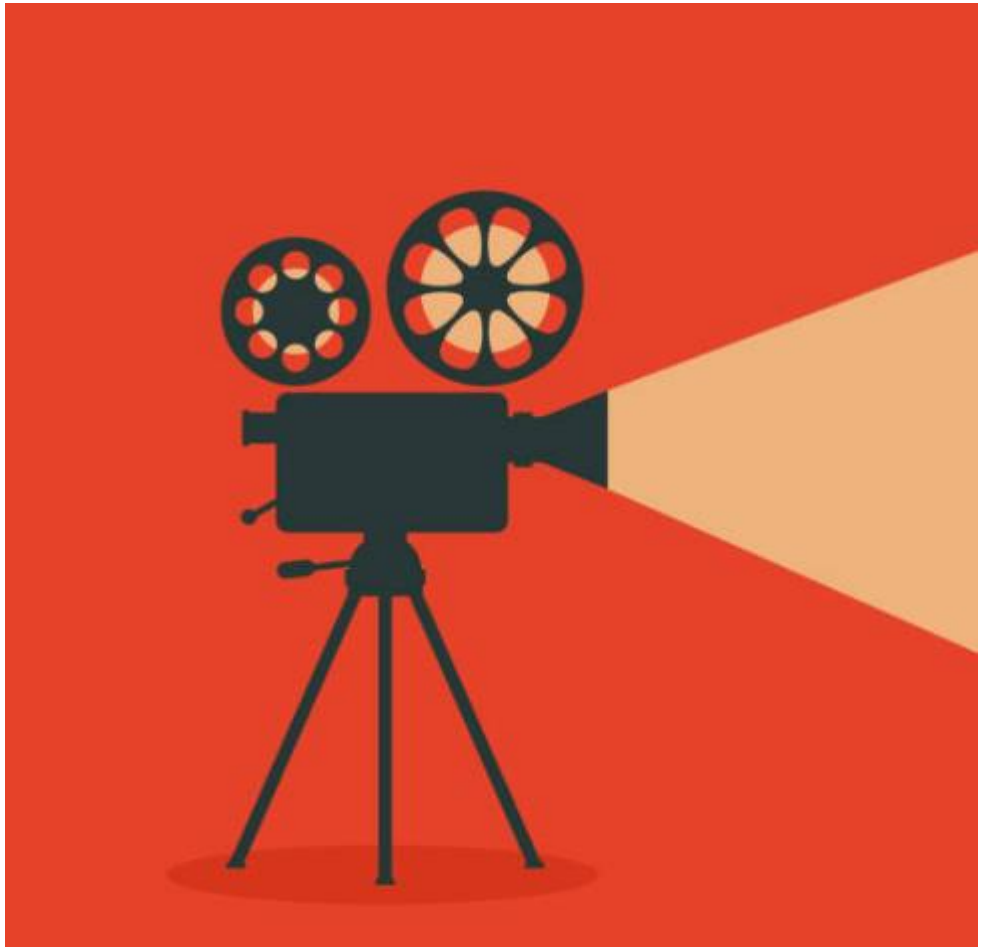
1- Introduction on Food safety & Quality

2- The different Hazards

3- HACCP

4- Let’s take an example together

1- Introduction on **Food Safety** & Quality



1- Introduction

1- Introduction

What do you keep
from this video

1- Introduction

Passion

It is more than Ticking a box

Trust

Responsability

Year after years

Consumer

Preference

Care

Knowledge

Sustainability

No waste

… in every corner of your company

1- Introduction

Food Safety
VS
Quality

1- Introduction

Food Safety VS Quality

Food Safety is the **absence, or safe acceptable levels**, of food hazards in food that may harm the health of the consumers

World Health Organization

The quality of an organization's products and services is determined by the **ability to satisfy customers** and the intended and unintended impact on the relevant interested parties

ISO 9000 - Quality management systems

EPFL

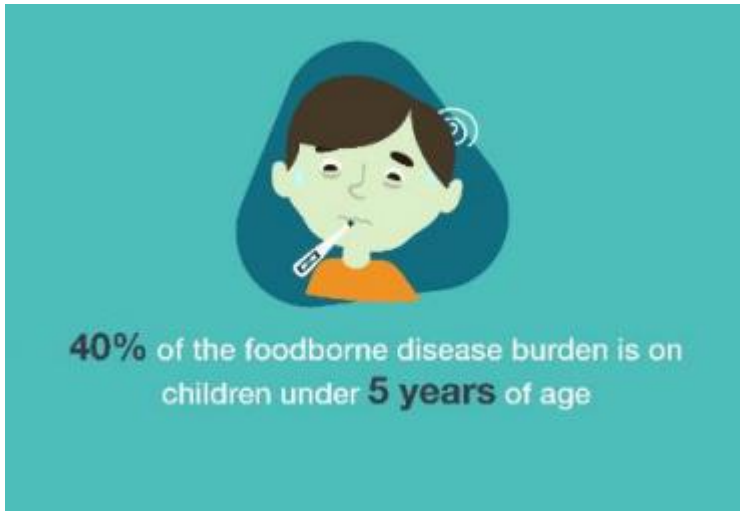
1- Introduction

You need food to live

Food can kill

1- Introduction

How many people around the world get sick every year after eating contaminated food?



1- Introduction

Behind the figures ...

Dying from something as basic as eating ...

Stories Archive - Stop Foodborne Illness

1- Introduction

Media headlines remind us everyday that the burden of **food-borne disease** persists

Parents warned: Baby milk formula recalled in salmonella outbreak - 7,000 TONNES affected

France dairy giant reveals salmonella outbreak extent

At least 83 countries have been affected by a salmonella outbreak at one of the world's largest dairy firms. More than 30 children have been poisoned in France alone.

216 Dead with 1,060 with Listeria in South Africa – People still getting sick from Polony

1- Introduction

The consequences of a food safety breach can be **devastating** for a business

Sunland shuttered: NM peanut butter plant involved in a nationwide salmonella outbreak last year closes its doors

Posted on October 10, 2013 by Doug Powell

Peanut Exec Gets 28 Years In Prison For Deadly Salmonella Outbreak

Listeriosis Class Action South Africa @ListeriosisA · Jan 16

People affected by South Africa's deadly #listeriosis outbreak must officially opt out of a #classactionlawsuit if they don't want to be part of it. Watch this bulletin from @eNCA.

China orders death penalty in deadly food scandals

Chinese police promote awareness of economic crimes near confiscated counterfeit food products in Beijing, China, Sunday, May 15, 2011. The headlines are unrelenting: toxic bean sprouts, filthy oil, drug-tainted pork. For months, Chinese media have been churning out a queasy-making multitude of stories about the dangers lurking in the nation's dinner bowls. (AP / Ng Han Guan)

- Business interruption
- Lawsuits
- Financial hardships
- Bankruptcy
- Criminal liability for food company executives

1- Introduction

Ensuring the food safety is crucial for :

- Safety of the consumer
- Consumer trust
- For legal compliance

2- The different **Hazards**

2- The different Hazards

4 types of hazards

Food safety is the absence, or the safe acceptable levels, of Hazards in food that may harm the health of consumer

World Health Organization

EPFL

2- The different hazards

Which allergens do you know

2- The different hazards

Although many foods or groups of foods can trigger an allergic reaction, 14 of them have been identified as the most common or serious causes of food hyper-sensitivity, as assessed by the European Food Safety Authority, EFSA:

Food Allergy and Intolerance Training

2- The different hazards

Allergen labelling (including by-Nature and potential cross-contacts) is a must to ensure proper communication of significant allergen risks to sensitive consumers.

If the allergen cross-contact risks change or if there is an additional newly introduced into a product, highlight this change to allergic consumers: e.g. by a NEW RECIPE flash on the front of the product pack.

2- The different hazards

Which Microbiological hazards do you know

2- The different hazards

Pathogen	*Type*	*Foods Implicated*	*Causes*	*Symptoms*
Bacillus cereus	Bacteria	Cooked rice, corn, potatoes	Temperature abuse, improper cooking	Diarrhea, cramps
Botulism	Bacteria	Canned vegetables, baked potatoes in aluminum foil, herb or garlic infused oils	Foods held at warm temperatures	Double or blurred vision, slurred speech, difficulty swallowing, muscle weakness
Ciguatera	Bacterial Toxin	Large reef fish, barracuda, grouper, red snapper, eel, amberjack, sea bass, and Spanish mackerel	Toxin concentrated in the viscera and organs of fish	Nausea, vomiting, diarrhea, muscle pain, numbness, tingling, abdominal pain, dizziness, and vertigo
Clostridium perfringens	Bacteria	Meat, poultry, foods held in danger zone	Improper cooling of cooked foods, Foods held in danger zone	Diarrhea, cramps, headaches, chills
Campylobacter jejuni	Bacteria	Poultry, contaminated water	Improperly cooked foods, cross-contamination	Diarrhea, cramps, headache, nausea
Cryptosporidium parvum	Parasite	Contaminated water, fresh produce	Improper hand washing	Diarrhea, cramps, nausea
Escherichia coli	Bacteria	Raw/undercooked ground beef, raw milk, alfalfa sprouts, unpasteurized fruit juices, dry-cured salami, lettuce, game meat, cheese curds	Undercooked meats, cross-contamination, unpasteurized fruit juices, infected food handlers	Hemorrhagic colitis, hemolytic uremic syndrome
Hepatitis A	Virus	Ready-to-eat foods, shellfish, fresh green onions, contaminated water	Improper hand washing, Handling food with bare hands, Infected workers, Infected shellfish	Fever, physical weakness, nausea, abdominal pain, jaundice
Listeriosis	Bacteria	Vegetables, unpasteurized milk, raw meat, ready-to-eat foods, deli meats	Unpasteurized milk, improperly cooked foods, cross-contamination	Meningitis Septicemia, miscarriage
Norwalk Virus	Virus	Raw oysters and shellfish, contaminated water and ice, ready-to-eat foods	Inadequate treatment of sewage, infected food handlers	Nausea, vomiting, diarrhea, abdominal cramps
Salmonellosis (Salmonella)	Bacteria	Meat, poultry, egg or dairy products	Improper cooking, cross-contamination, infected food handlers	Nausea, diarrhea, abdominal pain, fever, headache, chills
Shigellosis	Bacteria	Contaminated food and water	Improper hand washing, infected workers,	Diarrhea, fever, abdominal pain
Staphylococcus	Bacterial Toxin	Custards, ham, poultry, eggs, potato salad, cream sauces, sandwich fillings	Improperly refrigerated foods, unsafe food handling practices, food handlers with open cuts and sores	Vomiting, diarrhea, abdominal cramps
Vibrio	Bacteria	Raw, partially cooked oysters	Undercooked oysters, infected oysters	Diarrhea, cramps, nausea, vomiting, fever, chills
Yersiniosis	Bacteria	Raw milk, chocolate milk, water, pork, raw meats	Unpasteurized milk, undercooked foods, cross-contamination	Enterocolitis (mimics acute appendicitis)

2- The different hazards

Which Foreign bodies do you know

2- The different hazards

The Friday evening's dinner:

[Full story link]

2- The different hazards

Pindjur vegetable spread recalled in Canada over glass in product

By News Desk on February 2, 2023

Groupe Phoenicia Inc. is recalling Cedar Phoenicia brand Pindjur Vegetable Spread because of pieces of glass in the product.

A possible insect infestation has sparked the recall of packs of rice from London-based food supplier Aytac Foods.

The products were found to have been possibly infested by weevils, a type of beetle.

Smith's cheese and onion and original chips recalled over plastic piece contamination fears

Posted Thu 18 May 2023 at 10:45am

Mother finds lizard in baby formula

A tin of formula that a mother claims contained a lizard, possibly from Singapore.

2- The different hazards

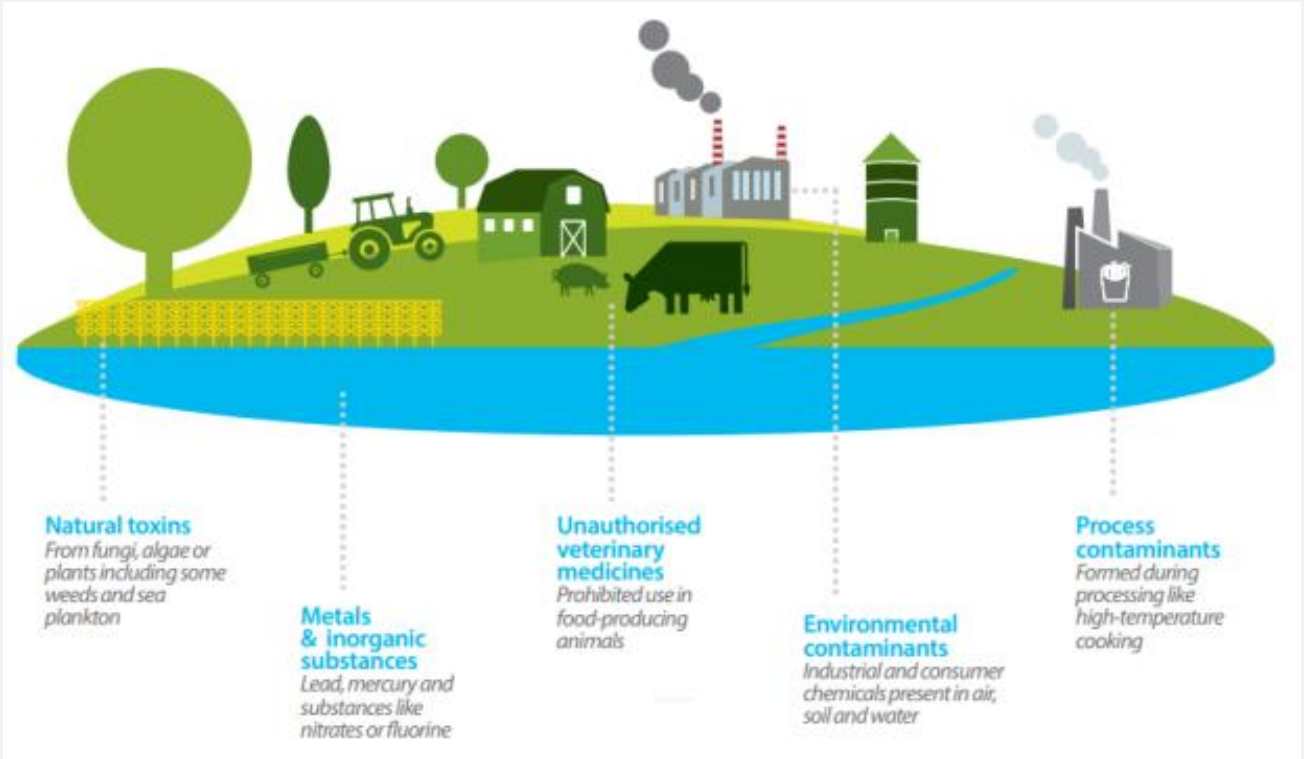
Mum issues tragic Cadbury Mini Eggs warning after daughter 'chokes to death'

2- The different hazards

Which Chemical hazards do you know

2- The different hazards

Chemicals can enter in food at any steps of the process by direct addition or simply by migration



2- The different Hazards

Let’s do a little

2- The different hazards

What's wrong ?

Issue:

- Mix of different nuts, with and without shells

Hazard:

- Allergens: different types
- Foreign bodies (shells)

Recommendation:

- Avoid cross-contact
- Remove shells carefully

2- The different hazards

What's wrong ?

Issue:

- Eating raw dough with raw egg and raw flour

Hazard:

- Pathogenic bacteria

Recommendation:

- Avoid eating raw ingredients
- Respect cooking instructions

2- The different hazards

What's wrong ?

Issue:

- Overcooked food

Hazard:

- Chemical process-related contaminants

Recommendation:

- Avoid overcooking
- Assess risk of heat-treated materials

2- The different Hazards

Any question

3- **HACCP**

3- HACCP

What does HACCP stand for

World Health Organization

A) Hazard Assessment and Common Controls in the Process

B) Hazard Analysis and Critical Control Points

C) Have a Cup of Coffee and Pray

D) Hazard Approval and Critical Control Planned

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3- HACCP

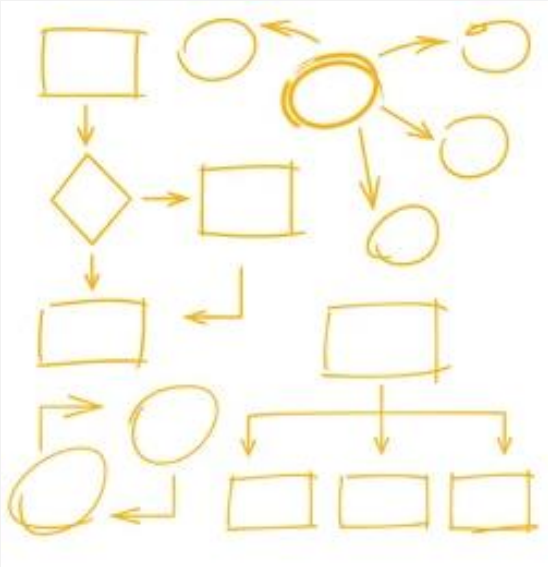
What does HACCP stand for

B) Hazard Analysis and Critical Control Points

Systematic process to identify and control potential hazards to ensure safe food

3- HACCP

Systematic **Preventive** approach to Food Safety

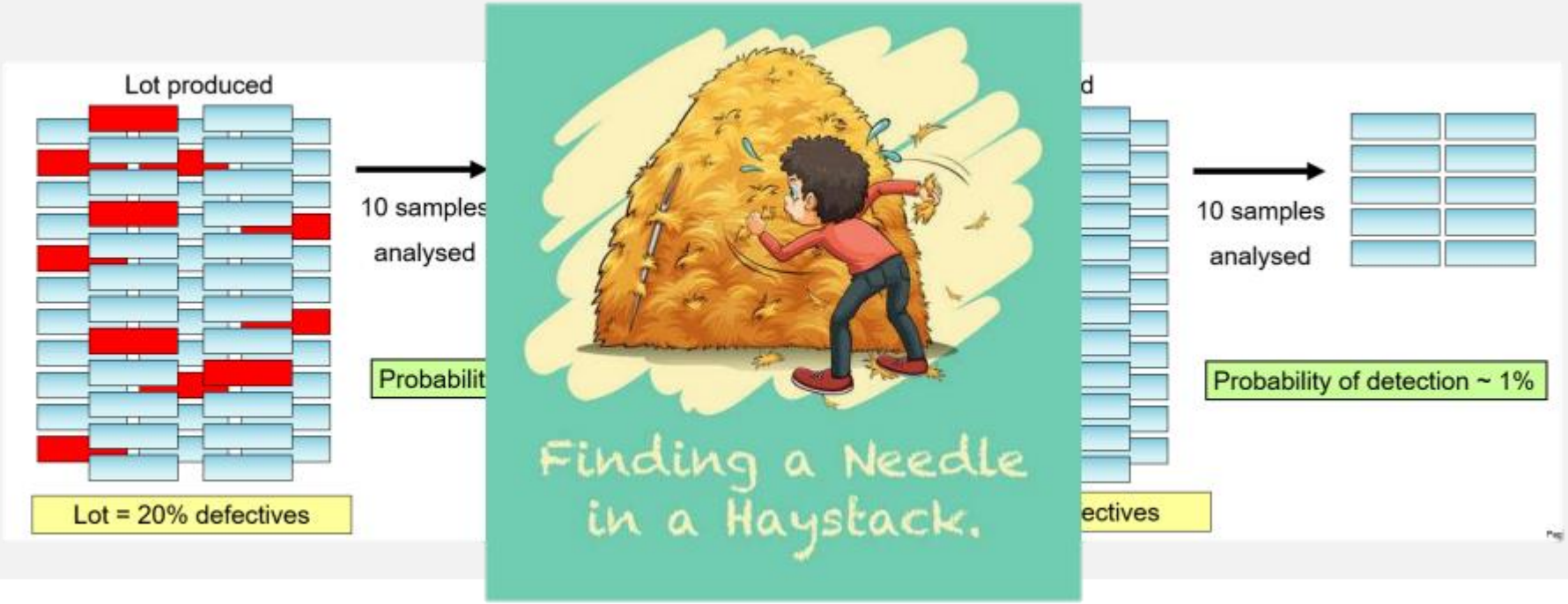


The safety of foodstuffs is neither guaranteed nor controlled by testing at the end

3- HACCP

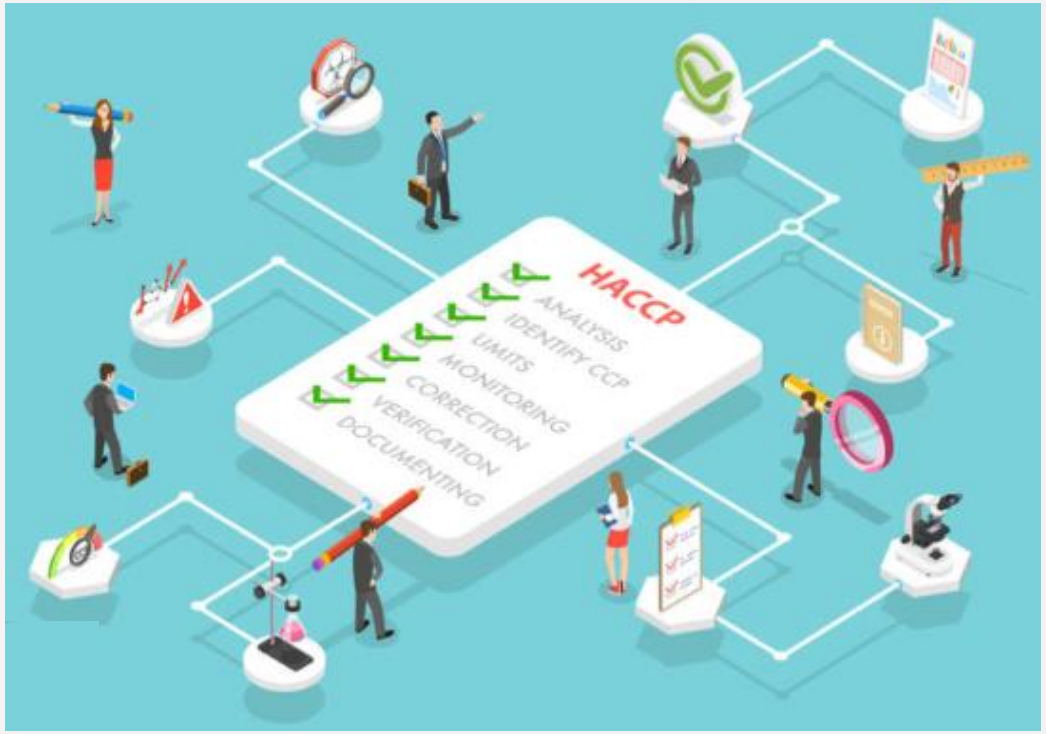
End product testing alone cannot ensure safe foods, due to sampling plan limitations

Testing is a verification of the effectiveness of food safety management systems, including prerequisite programs and control measures in place at suppliers.



3- HACCP


7 HACCP PRINCIPLES
Make Food Safety a Priority!
1 CONDUCT HAZARD ANALYSIS
2 IDENTIFY THE CRITICAL CONTROL POINTS
3 ESTABLISH CRITICAL LIMITS
4 ESTABLISH A MONITORING SYSTEM
5 ESTABLISH CORRECTIVE ACTION
6 VERIFICATION
7 DOCUMENTATION
One Education


HACCP
ANALYSIS
IDENTIFY CCP
LIMITS
MONITORING
CORRECTION
VERIFICATION
DOCUMENTING

3- HACCP

FARM to FORK approach

Hazard Identification

Critical Control Point

Contamination can occur at any point in the food chain and prevention and control strategies can be implemented at any point of the food chain

4- Let’s take an example together

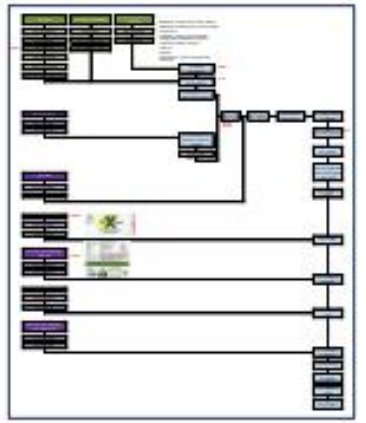
4- Let’s take an example together

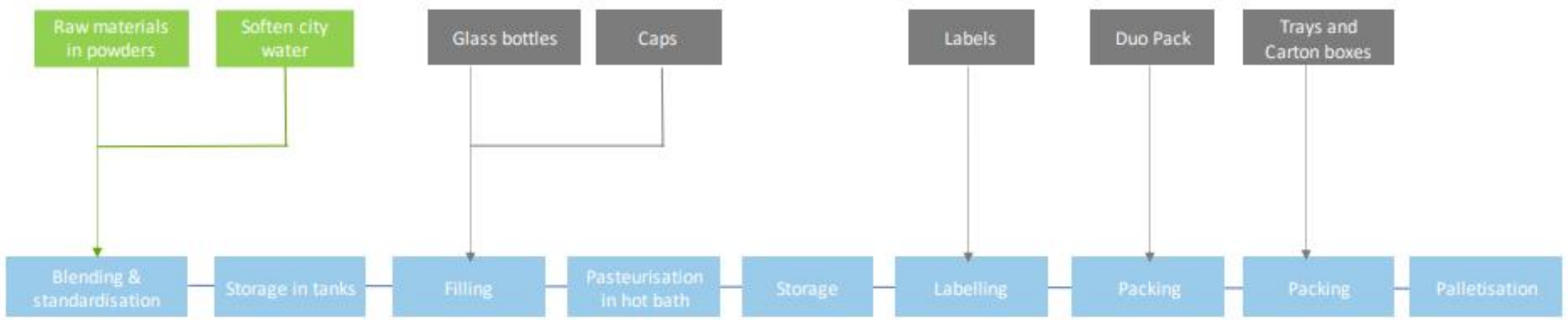
What would you start with

Concentrate to dissolve in hot or cold water, enriched with functional ingredients: natural olive leaf extract, vitamin B6 and magnesium.

4- Let's take an example together

Process





4- Let's take an example together

Any novel ingredient?
Which hazards in the ingredients?
Supplier specifications?

Any killing step?
Any likely post contamination?
Any possibility for growth or toxin production?

What's happening in the upstream supply chain?
At the retailer's level
At the consumer's level

4- Let’s take an example together

Ingredients

- List of raw materials and respective suppliers

4- Let's take an example together

Ingredients

Allergens:

- No allergen per nature
- No cross-contact at the coman
- Cross-contacts declared by suppliers of ingredients

→ "may contain soybean"

Microbiology hazards:

- HACCP → control measures
  - ➢ Heat-treatment (hot bath) killing vegetative pathogens
  - ➢ pH< 3.8 inhibiting growth of potential sporeformers

Chemical Contaminants:

- Compliance by vendors at RM level (EU Regulations): RMs already used in Nestlé factories in EU, or from suppliers in EU.
- CoA received for the batches used in the MVP

Physical hazards:

- HACCP - control measures:
  - ➢ Specifications and process at the supplier of glass bottles (presence of EBI detecting potential defects in bottles)
  - ➢ Sieves
  - ➢ Air rinser of bottles

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4- Let's take an example together

Ingredients

Product name:	Bonolive®
CAS number:	8060-29-5
Description:	Dry extract of *Olea europaea L. leaves* containing at least 40% Oleuropein
Extraction solvent:	Water/Alcohol
Additive and carrier:	None
Raw material/extract ratio:	10:1

Supplier: Bioactor

- **Already used in Clinical trials at NR**
- **In addition to CoA, chemical analyses were performed on the batch to be used for the MVP:**

Microbiology

Salmonella
Bacillus cereus
Coagulase positive *Staphylococci*
Enterobacteriaceae
Aerobic mesophilic count
Yeast & Moulds

Contaminants

Aluminum
Arsenic
Cadmium
Perchlorates
Lead
Mercury

- **Regulatory status:**

- Olive leaves are on the approved BELFRIT list (list of plants eligible for use in food supplements), Directive (EU) 2015/1535.
- In Europe, Bonolive® is considered as "Not Novel" for use in a dietary supplement.

- **Chemical food safety evaluation:**

"The dose level of 250 mg of Bonolive®/day for healthy adults does not represent a health concern".

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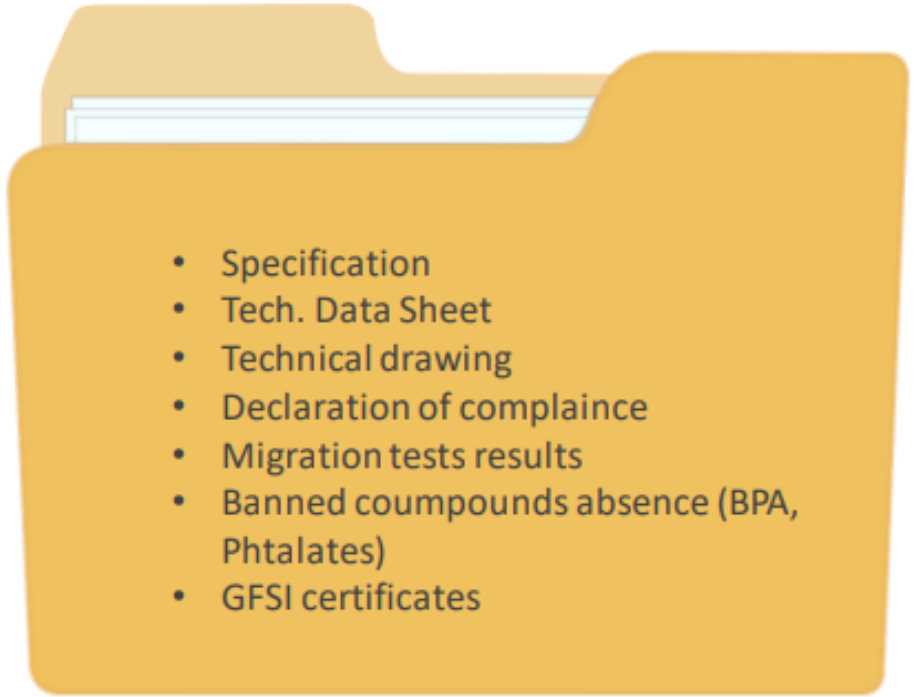
4- Let’s take an example together

Packaging materials

Packaging material	Supplier
Glass bottles	Stoelzle oberglass GmbH
Aluminum closures	AWK Werschlusse
Labels	Marzek Etiketten GmbH
Dual pack	Algo design
Corrugated Carton	Schelling AG
Carboard	Schelling AG



4- Let’s take an example together

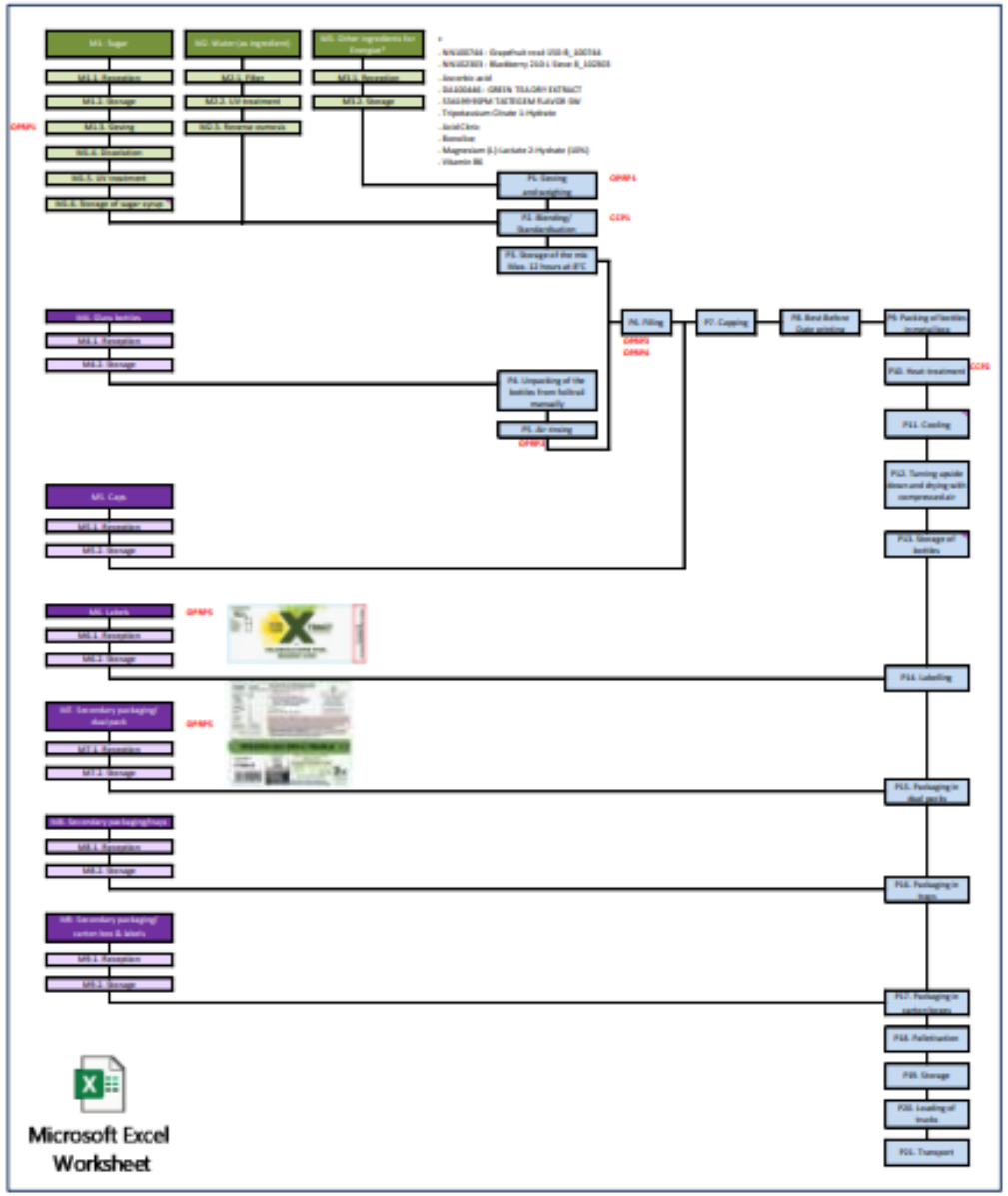
Artworks

4- Let's take an example together

HACCP

OPRP1: Sieving steps
CCP 1: Standardisation to reach pH <3.8 of the mix
OPRP2: Air rinsing of the empty bottles
OPRP3: Inspection and release of the filling line for absence of glass fragments
CCP2: Heat-treatment after filling and capping
OPRP4: Rinsing step after cleaning the filling line to remove chemical residues
OPRP5: Allergen labeling

Additional required element put in place before production



Entreneurship – what does this mean for food safety?

➔ Know your risks & never compromise on food safety

➔ Work closely with food safety experts

➔ Source from certified suppliers

➔ Produce in certified production sites


Q&A