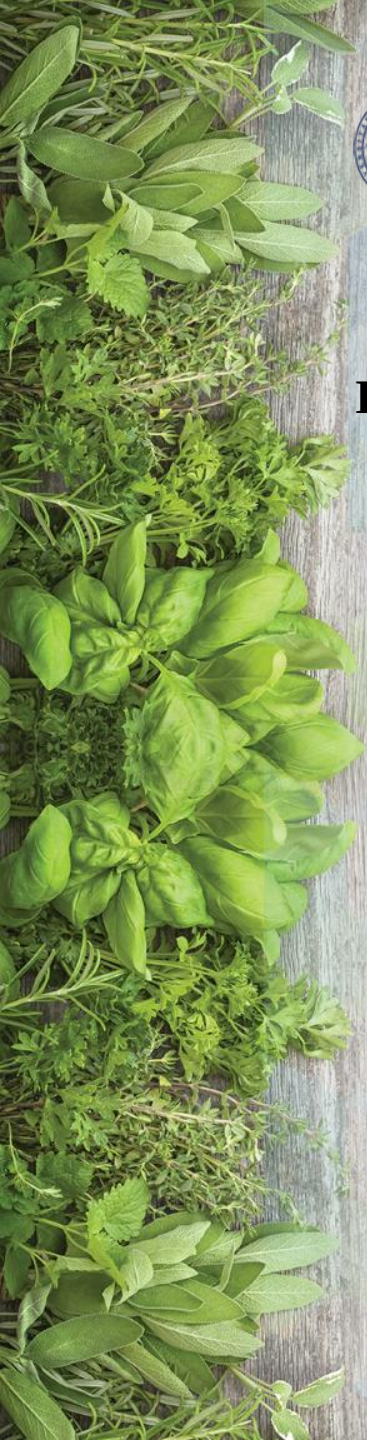

CATÓLICA
ESCOLA SUPERIOR DE BIOTECNOLOGIA
PORTO

Good Herbs

Erasmus+

Integration of good practices and new methods for professional training in the field of herbs processing for food and food supplements
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CHAPTER 4

FOOD SAFETY SINCE SPICES & CULINARY HERBS PRODUCTION UNTIL THEIR CONSUMPTION

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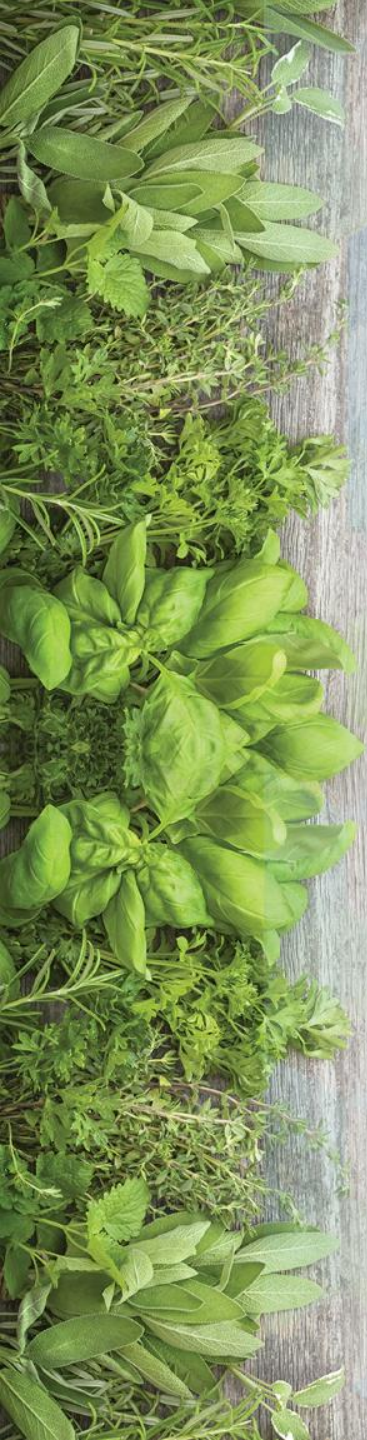

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4. Food safety since spices & culinary herbs production until their consumption

Production

Region
Soil conditions
Irrigation

Harvest

Season
Time
Maturity
Method

Processing

Drying method
Cutting
Milling
Packaging

Storage

Temperature
Humidity
Light
Hygiene

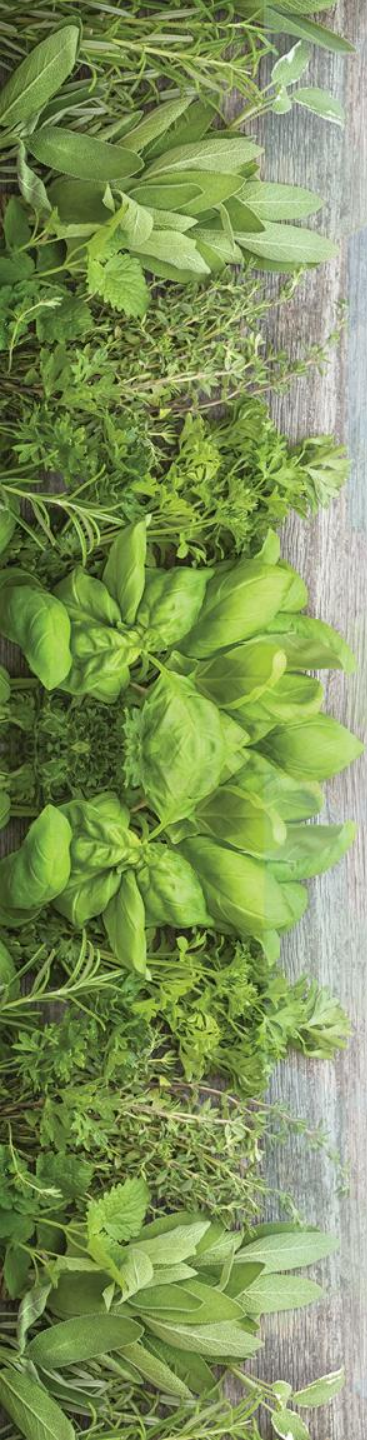
Quality and Safety of the final product

4.1. Biological contaminants

Several microorganisms detected in spices and herbs have the potential to cause human illness, including

- aflatoxin-producing fungi (ex. *Aspergillus* spp.),
- *Bacillus cereus*,
- *Clostridium perfringens*,
- *Escherichia coli*,
- *Salmonella* spp.,
- *Listeria monocytogenes*
- *Staphylococcus aureus*.

The possibility of pathogen growth is higher when spices are used in foods that have not been subjected to complete thermal treatment.



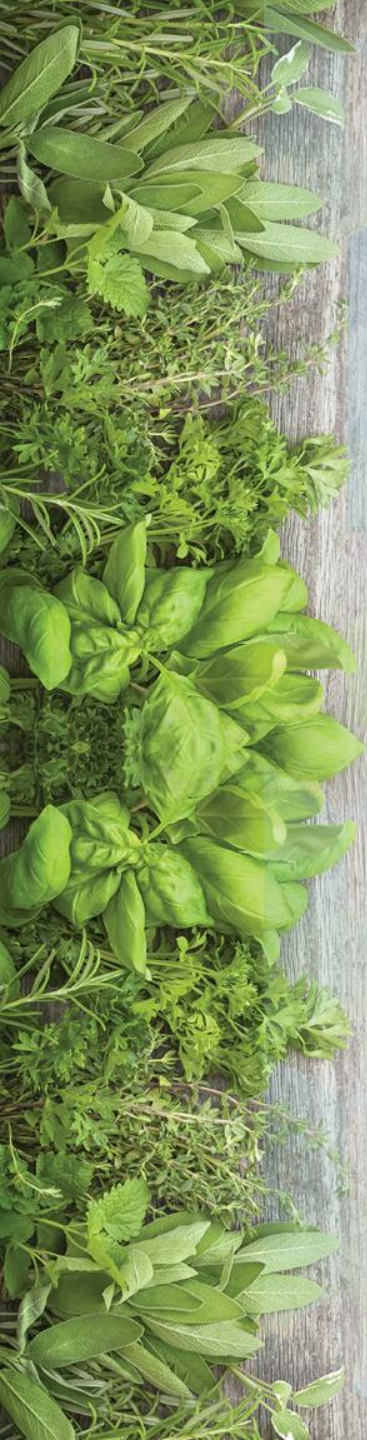
4.1. Biological contaminants

Legislation

There are not microbiological standards for dried spices and herbs in European Community legislation

Codex Code of Hygienic Practice specifies that dried spices and herbs should be free from pathogenic microorganisms at levels that may represent a hazard to health and further requires that Salmonella should be absent in treated ready-to-eat spices.

The European Spice Association (ESA) also specified that Salmonella should be absent in 25 g of spice, Escherichia coli to be present at less than 102 ucf/g, and other bacteria requirements to be agreed between buyer and seller.



4.1. Biological contaminants

Prevention!!!

Control processes based on steam or dry heat treatments to minimize the risk from pathogens must be applied by spice and herb suppliers.

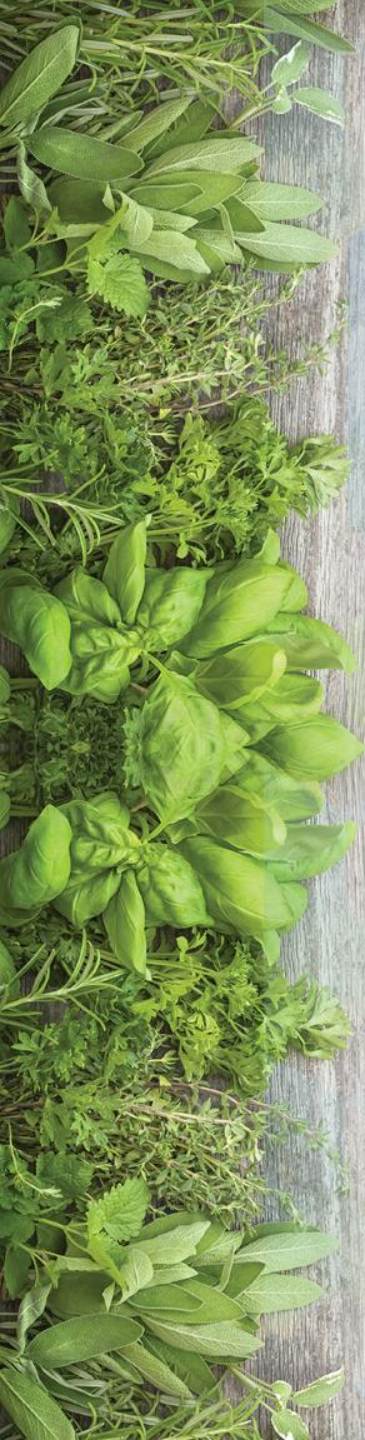
The control of microbial contamination in these products lies in the application of good hygiene practices in the production/harvesting area, processing and personnel.

4.2. Chemical contaminants

The presence of filth is attributed to unsanitary storage conditions and inadequate oversight of suppliers.

Signs of poor sanitation and health hazards include not only such items as stones, stems, and foreign seeds, but also insects, excreta, mold, bacteria, hair, and illegal chemicals.

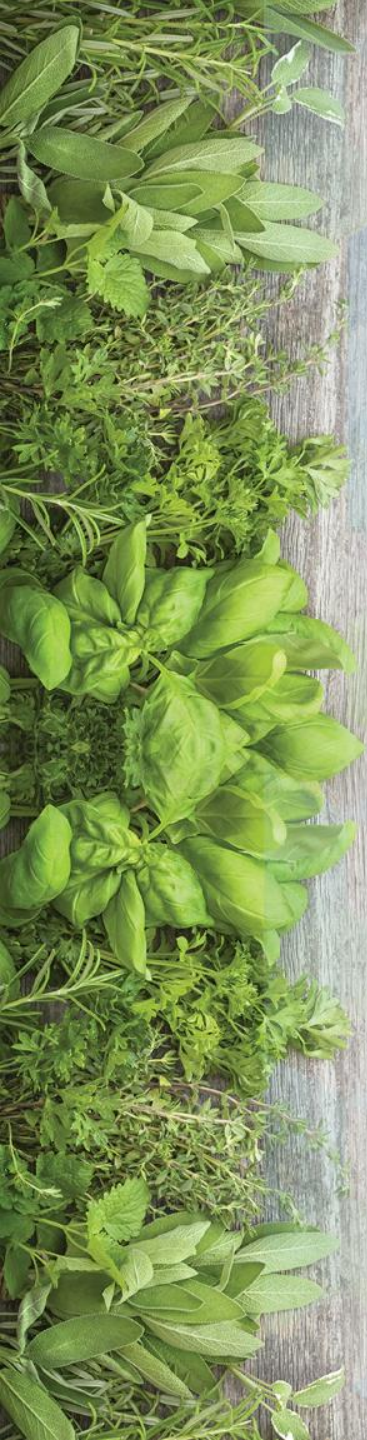
Moreover, chemical dyes are sometimes added to spices to intensify and maintain its colouring over time, although this kind of adulteration is not allowed and in some cases has also relevance for consumers' health



4.3. Food safety and quality management systems

Good Agricultural Practices and Guidelines for handling and storage of these products:

- Good manufacturing practices: processing of spices, facility construction and design, maintenance of the grounds, equipment design, pest control…). This guide focuses specifically on the spice manufacturing environment, and combines recommendations and best practices
- HACCP plan: a key analytical tool to allow the identification of physical, chemical and microbial risks to food safety and steps to prevent them
- Microbial reduction techniques: to assure spices and herbs are free from pathogens
- Supply chain management



4.3. Food safety and quality management systems

HACCP (Hazard Analysis Critical Control Points) is an analytical tool that enables management to introduce and maintain a cost-effective, ongoing food safety program.

The ASTA HACCP Guide to Spices and Seasonings has been updated and new tools have been added as companies begin to prepare for the implementation of the Food Safety Modernization Act (FSMA) and the expansion of HACCP to include preventive controls.

4.3. Food safety and quality management systems

American Spice Trade Association (ASTA) has developed guidance for the industry on pathogens in spice. The guidance includes five key recommendations:

- Minimize the risk for introduction of filth throughout the supply chain
- Prevent environmental contamination, cross-contamination, and post-processing contamination during processing and storage
- Use validated microbial reduction techniques
- Perform post-treatment testing to verify a safe product
- Test to verify a clean and wholesome manufacturing environment