HACCP in Traditional Arabic Foods

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A number of traditional foods have been developed through the years in the Arab countries to accommodate with the needs and conditions prevailing in the region

- Traditional foods constitute a major part of everyday meals
- These foods are generally simple in preparation, and their ingredients are widely available

From a hygienic point of view, however, traditional foods are characterized by

- being intensively handled by workers,
- often prepared in premises that:
  - do not adhere to hygiene standards and
  - lack control measures that may help reduce and/or eliminate microbial hazards prior to consumption.

Traditional foods as microbial ecosystems

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Internal conditions that affect microbial activity:
pH, a_w, O/R potential and nutrient content
External conditions that affect microbial activity:
Storage conditions and technological properties

Traditional foods as microbial ecosystems

Microbial flora of each food and the content of indicator bacteria and pathogenic microorganisms

Examples to traditional Arabic foods

Hummus
Fuul (fava beans)
Falafel
Green salads
Shawerma
Meat pastries
Tahini
Halawa
Kunafa
Tamarind drink
Sous drink
Laban drink
Labaneh

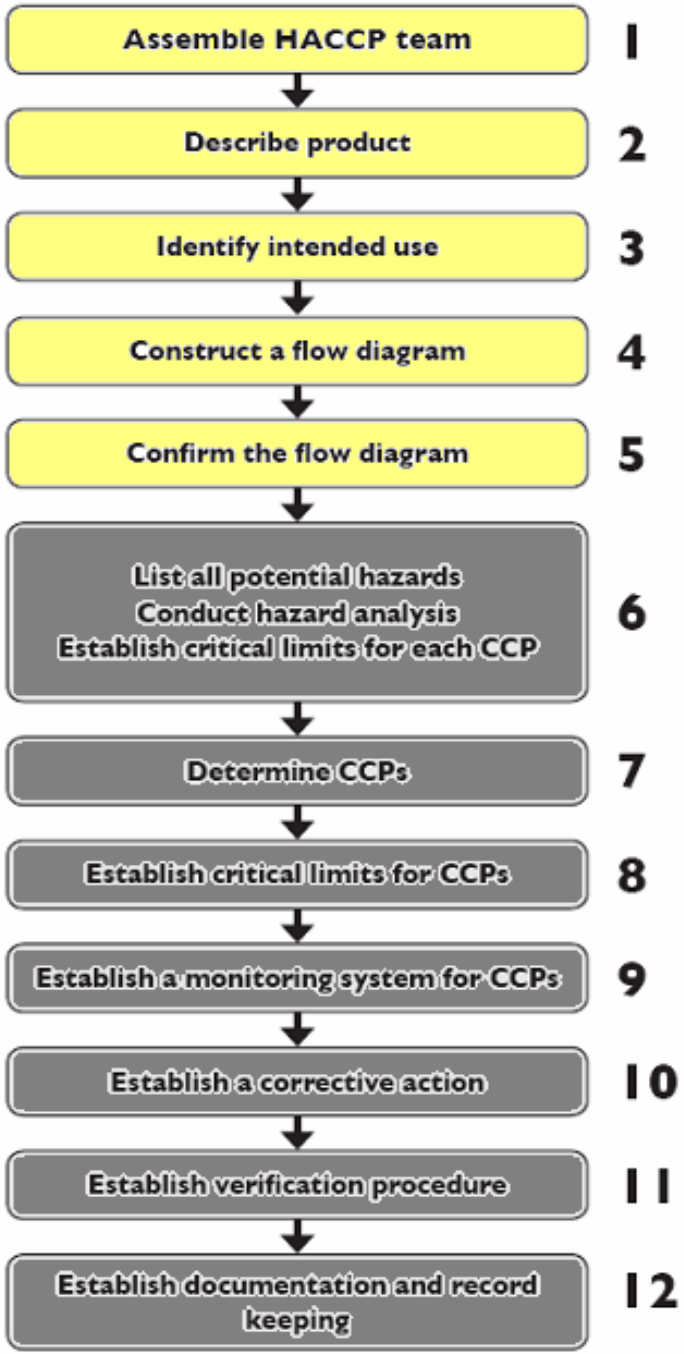
The HACCP system

It is the role of governments to uphold the safety and security of food.

It is the responsibility of producers to ensure the safety of their products.

So.

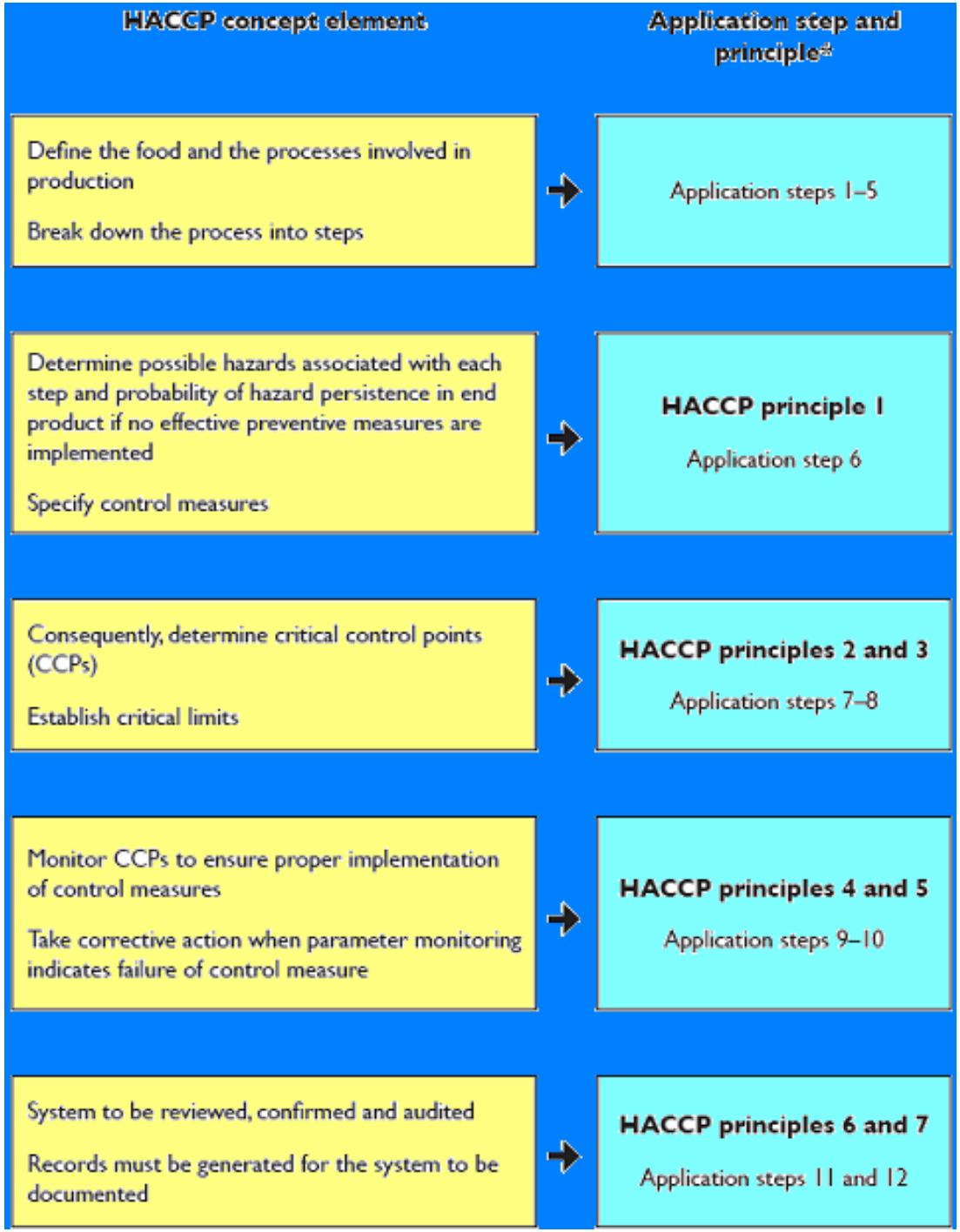
Producers are to adopt and apply the HACCP system to ensure food safety.



Logic sequence for application of HACCP

(Steps 6–12 are the application of the seven principles of the HACCP system)

Evolution of the concept of hazard analysis and the identification and monitoring of critical control points in a system to ensure food safety



Generic HACCP models

A principal characteristic of the HACCP system is that it is applied to each process of food production individually. This makes it possible to prepare generic HACCP models that can be applied to the production process of a particular food.

The idea of developing generic HACCP models is that these models, after being adopted by a regulatory or private agency engaged with food safety, can be used as templates for all relevant food sectors.

In this way establishments concerned with the implementation are spared the time, effort and cost of developing the system themselves.

Furthermore, implementing generic models has the advantage of creating a high level of uniformity among those who apply the system.

Generic models can be used as a part of the material for training in the HACCP system, and as a reference for inspection.
Experience gained in the first implementations of generic models, including avenues for improvement, can be incorporated into later applications of the model.

Generic models are to help producers, regulators, trainers and others concerned with the safety of traditional foods.

Form the basis for the development of food safety programs in these areas.

Development of generic HACCP models

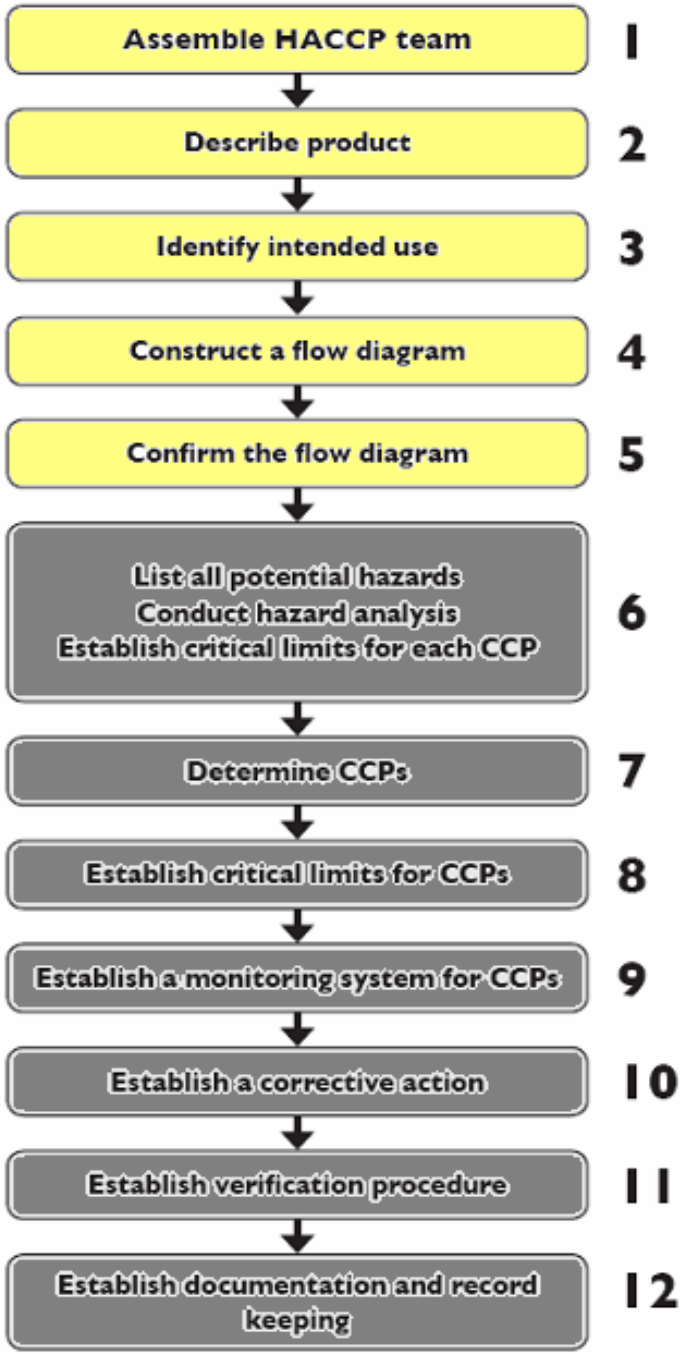
The concept of developing generic HACCP system models by governmental agencies responsible for control of food safety has been internationally acknowledged.
The USA, Canada, and New Zealand are among the countries in which generic HACCP models have been developed.

The first generic HACCP models to be developed were the American and the Canadian models for high risk foods (mostly of animal origin). These products are often for export, and are more frequently associated with foodborne illness outbreaks.

The application of HACCP system to the production of traditional Arabic foods in a generic form

Reference of HACCP system application

The Codex Alimentarius Commission Guidelines were followed in the application of HACCP System to the production of the traditional foods: "Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application. Annex to CAC \ RCP-1 (1969), Rev. 4 (2003), Joint FAO \ WHO Food Standards Programme."



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Prerequisites for the application of HACCP

Food hygiene requirements and measures

Conditions and measures of good manufacturing practice (GMP), which constitute a prerequisite for the HACCP system implementation have been taken in consideration

Hygiene and sanitation requirements outlined in the following references may be used in developing the prerequisite programs:

- **Codex Alimentarius Commission, *Recommended international code of practice – general principles of food hygiene* (CAC/RCP 1-1969, Rev. 4 (2003)) [1];**
- **United States Food and Drug Administration, *Current good manufacturing practice in manufacturing, packing, or holding human food,* 21 CFR Part 110 [4];**
- **National corresponding standards, especially those based on CAC/RCP 1-1969, Rev.4 (2003) [1], such as those developed in Jordan, Syria and member countries of the Gulf Cooperation Council.**

These include

- **Supplier control**
- **Production equipment and controls**
- **Maintenance, cleaning and sanitation**
- **Pest control**
- **Waste management**
- **Personal hygiene**
- **Health status**
- **Personal behaviour**
- **Visitors**
- **Receiving, storage and shipping**
- **Cross-contamination**
- **Packaging**
- **Training**

Generic HACCP models for some traditional Arabic foods


سلاطات
Generic HACCP model for
green salads


فول
Generic HACCP model for
fuul


حمص
Generic HACCP model for
hummus


حلاوة
Generic HACCP model for
halawa


طحينة
Generic HACCP model for
tahini


فلافل
Generic HACCP model for
falafel


بعجين
لحمة
Generic HACCP model for
meat pastries


شاورما
Generic HACCP model for
shawerma


سوس
Generic HACCP model for
sous
drink


لبنة
eneric HACCP model for
labaneh


تمرهندي
Generic HACCP model for
tamarind
drink


شراب اللبن
Generic HACCP model for
laban


كنافة
Generic HACCP model for
kunafa

In each HACCP plan (e.g., hummus)

1. Product description

Product name(s)	*Hummus (houmous, humous, humus)*
Important product characteristics	Average composition of *hummus* per 100 g of edible portion is 49.5 g water, 9.6 g protein and 19.7 g fat pH is 5.1 No preservatives are used
Intended use	*Hummus* is prepared for immediate consumption It is served as a snack or as a sandwich using Arabic bread Consumed by general public
Packaging	Served and dispensed on plates or bowls Sold as takeaway in plastic containers (100 g – 300 g)
Shelf life	24 h in the refrigerator (below 5°C*)
Prepared / sold in	Restaurants, hotels, homes
Labelling instructions	Keep refrigerated (below 5°C*)
Special distribution control	Transport, store, and display refrigerated (below 5°C) under hygienic conditions

2. Ingredients of *hummus*

Chickpeas	*Tahini*	Sodium bicarbonate
As per CODEX STAN 171-1989 [10]	*Packaged in plastic or metallic containers* No Codex standard available[a]	Powder No Codex standard available[b]
Salt	**Citric acid**	**Lemon juice**
As per CODEX STAN 150-1985 [10][c]	*Dried white* Food Chemicals Codex[d]	Fresh (sometimes used instead of citric acid) No Codex standard available[e]
	Water	
	As per WHO Guidelines for drinking-water quality [5]	

[a] Related national standard, e.g., Jordanian Institute for Standardization and Meteorology (JISM) 1124:2003 [11]

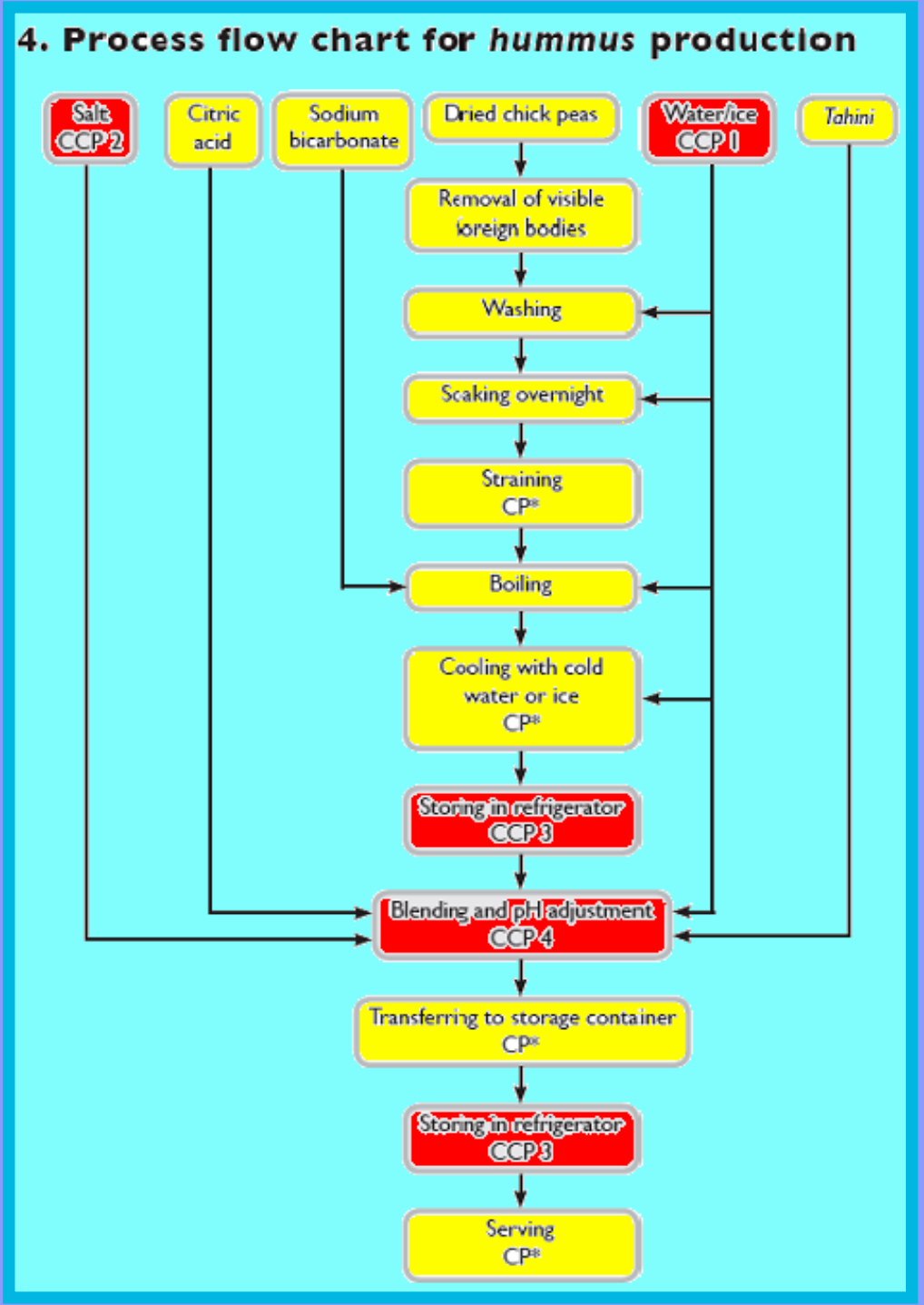
[b] Related national standard, e.g., JISM 987:1994 [11]

[c] Related national standard, e.g., JISM 32:1995 [11]

[d] Related national standard, e.g., JISM 649:2000 [11]

[e] Related national standard, e.g., JISM 627:2001 [11]

4. Process flow chart for *hummus* production



5. HACCP chart for *hummus* production

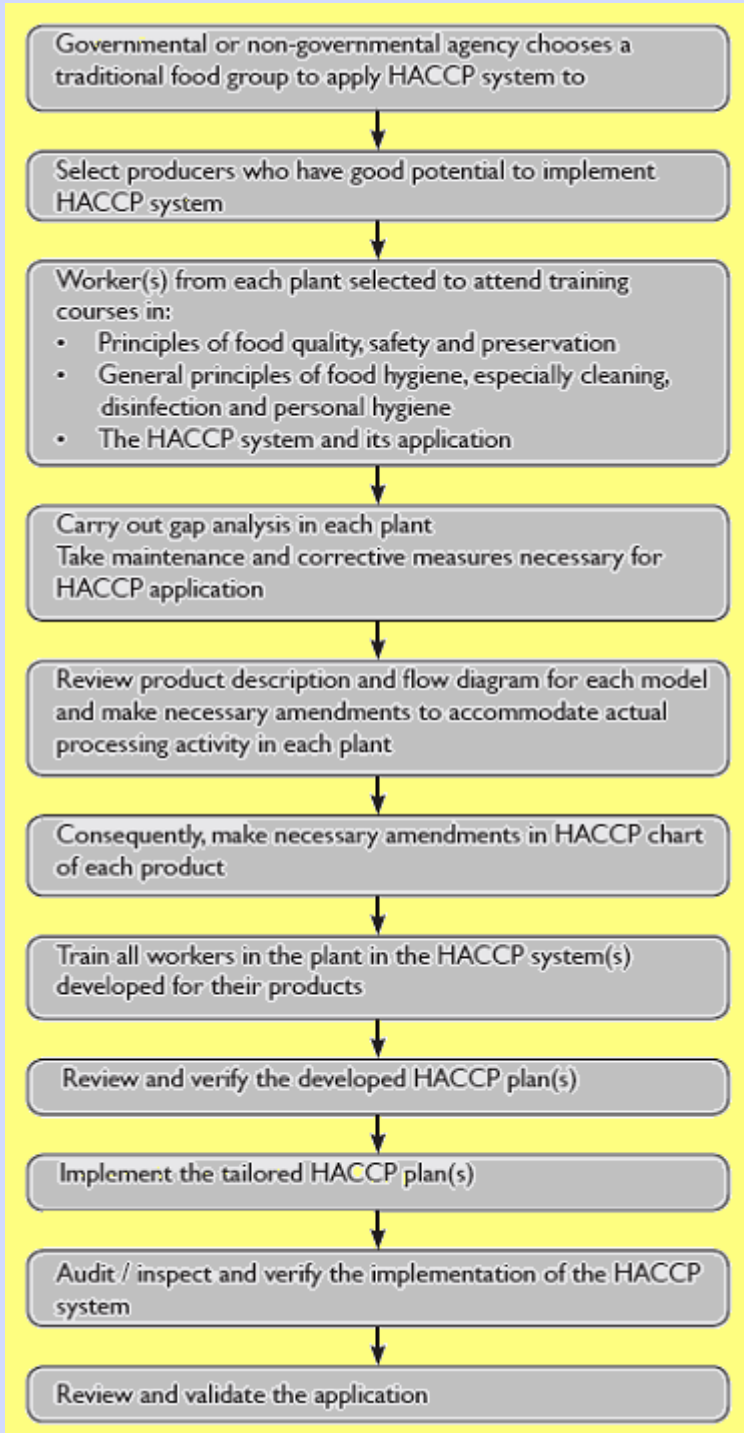
Step	Hazard	Control measure	CCP	Critical limit	Monitoring		Corrective action
					Test	Frequency	
Water	*Biological:* Disease-causing microorganisms	• Use a potable supply from the local authority • Ensure adequacy of filters, tanks and hydrants	1	Coliforms not detectable in 100-ml samples*	Estimation of coliforms count	Every month	• Discard contaminated water • Sanitize tanks and filters • Investigate root cause and eliminate
Salt	*Physical:* Foreign matter	Sieving	2	Mesh size of sieve	Visual examination	Each batch	Re-sieve salt
Storing in refrigerator	*Biological:* Growth of disease-causing microorganisms	• Control refrigeration (below 5°C for 24 h) • Date code of batches	3	• Temperature: < 5°C • Time: 24 h • Date code	• Temperature check on product • Date code	Continuous	• Discard non-conforming product • Investigate root cause, and eliminate
Blending and pH adjustment	*Biological:* Growth of disease-causing microorganisms	Adjust pH to below 5	4	pH < 5	Check pH using a calibrated pH meter	Each batch	• Readjust the pH • Investigate root cause, and eliminate

Application of the generic HACCP models

It is expected that most producers of the traditional foods will have little or no knowledge of the HACCP system, so to expect them to implement the relevant models alone would not be realistic.

Rather, governmental or non-governmental agencies engaged in health, food control, or safety of the environment will need to help groups of producers in implementing the models in their plants

Application steps for the generic HACCP models



Traditional food groups

Group Food

1 ***Hummus, fuul, falafel*** **and salads**

2 ***Shawarma*** **and salads**

3 **Meat pastries and salads**

4 ***Tahini*** **and *halawa***

5 ***Kunafa*** **(incl. Nabulsi)**

6 **Tamarind, *sous* and *laban* drink**

7 ***Labaneh***

Considerations to the Application of the generic HACCP models

The generic models are not intended for direct use in all plants, but should instead be adapted to reflect the conditions specific to each process and plant.
So the generic models should be reviewed and refined, and applied only after making adjustments to meet the needs and peculiarities of the establishment applying the system.

Differences in production steps, capabilities and resources between establishments will lead to differences in HACCP plans development and implementation for the same foods.

This is evident, for example, when dealing with raw materials.

Bigger establishments can specify their requirements for raw materials (for example sugar, flour, milk powder, cereals, etc.), which are usually reflected as critical limits. To ensure compliance, such plants usually require suppliers to provide them with certificates and test results, and carry out their own analyses and quality systems audits at the supplier’s premises.

However most traditional food producers are small producers and do not have such capabilities, so the procurement of raw materials is not assumed to be a CCP in the generic models, but merely a control point (CP).
For the small producer, awareness of hazards and critical limits, buying from reputable suppliers, visual inspection, and proper storage of raw materials are acceptable means of control at the procurement of raw materials CP.

Documentation (HACCP principle 7) is also a potential issue.
It is neither realistic nor practical to expect a high level of documentation in small restaurants and small plants.
Nevertheless it is imperative that all establishments, both large and small, have properly documented HACCP plans for their products, along with the necessary documentation to demonstrate proper implementation of the system.

Producers should be made aware that maintenance and continual improvement of the system are an integral part of its implementation.
A good way of verifying the proper implementation and maintenance of the system would be to review HACCP plans and perform internal and third party audits and inspections of the system, especially regarding monitoring of the CCPs and implementation of GMPs, at short and regular intervals.

The same applies to the prerequisite programs, especially:

- Personal hygiene (cleanliness, behavior, hand washing, etc .)
- Cleaning and disinfection of equipment and premises.
- Temperature control
- Control of cross contamination