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QUALITY MANAGEMENT
GUIDE FOR THE TABLE OLIVE INDUSTRY

1. Scope

This guide is intended for table olive processing businesses, irrespective of their size or legal status. It provides pertinent advice on quality management from the time the olives are delivered until they are processed and packed for sale.

2. Purpose

This guide specifies the rules that have to be followed throughout table olive production as regards hygiene, hazard analysis, evaluation of critical control points and quality assurance aimed at overall quality in order to assure buyers and consumers of the wholesomeness (safety) of the table olives presented for consumption and to provide traceability and quality assurance.

3. Definitions

3.1. Terms relating to safety and suitability

Food hygiene – All the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.

Good hygiene practices – All the rules recommended to businesses concerning the conditions and measures necessary to ensure the safety and suitability of food at all stages of processing.

Good manufacturing practices – All the rules recommended to businesses concerning the measures necessary to ensure the safety and suitability of food at all stages of processing and all other measures relating to food suitability and quality.

Cleaning – The removal of soil, food residue, dirt, grease or other objectionable matter.

Contaminant – Any biological or chemical agent, foreign matter or other substances not intentionally added to food which may compromise food safety or suitability.

Contamination – The introduction or presence of a contaminant in a food or food environment.

Disinfection – The reduction, by means of chemical agents or physical methods, of the number of microorganisms in the environment to a level not likely to compromise food safety or suitability.

Hazard – A biological, biochemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.

Risk – Measure of the likelihood and consequences of the occurrence of an undesired event. The event concerned may be real or potential and may entail abnormal functioning at a stage of the production process or a defect in the product occurring as a result of such abnormal functioning.

HACCP – A system that identifies, evaluates and controls hazards which are significant for food safety.

Hazard analysis – The process of collecting and evaluating information on hazards and conditions leading to their presence to decide which are significant for food safety and therefore should be addressed in the HACCP plan.

HACCP plan – A document prepared in accordance with the principles of HACCP to ensure control of hazards which are significant for food safety in the segment of the food chain under consideration.

Critical control point (CCP) – A step at which control can be applied and is essential to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Critical limit – A criterion which separates acceptability from unacceptability.

Control (verb) – To take all necessary actions to ensure and maintain compliance with criteria identified in the HACCP plan.

Control (noun) – The state wherein correct procedures are being followed and criteria are being met.

Control measure – Any action or activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Corrective action – Any action to be taken when the results of monitoring at the CCP indicate a loss of control.

Food suitability – Assurance that food is acceptable for human consumption when eaten according to its intended use.

Food safety – Assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use.

Monitor – The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a CCP is under control.

Validation – Obtaining evidence that the elements of the HACCP plan are effective.

Verification – The application of methods, procedures, tests and other evaluations, in addition to monitoring, to determine compliance with the HACCP plan.

3.2. Terms relating to quality

Quality – The totality of characteristics of an entity (which can be individually described and considered – product, process, business) that bear on its ability to satisfy stated and implied needs.

Control point – The stage at which monitoring may be conducted and is essential to obtain and maintain a level of quality fulfilling a requirement by means of any preventative or corrective measure.

Requirement – Need or expectation that is stated, implied or obligatory.

Conformity – Fulfilment of a requirement.

Non-conformity – Non-fulfilment of a requirement.

Preventative measure (or action) – Measure (or action) aiming to eliminate the cause of potential non-conformity or another potentially undesirable situation.

Corrective measure (or action) – Measure (or action) aiming to eliminate the cause of non-conformity or any other undesirable situation detected.

Correction – Action aiming to eliminate any case of non-conformity detected; it may be conducted in conjunction with corrective action.

Quality system – The organisational structure, procedures, processes and resources needed to implement quality management.

Quality assurance – All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality.

Quality control – The operational techniques and activities that are used to fulfil requirements for quality.

Quality management – All the activities that determine the quality policy, objectives and responsibilities, and that implement them by every means to ensure quality planning, control, assurance and improvement within the quality system.

Quality plan – A document setting out the specific quality practices, resources and sequence of activities relevant to a particular product, project or contract.

Traceability – The ability to trace the history, application or location of an entity by means of recorded identifications.

Audit – A systematic and functionally independent examination to determine whether activities and related results comply with planned objectives.

Certification – The procedure whereby official certification bodies and officially recognised bodies provide written or equivalent assurance that foods or food control systems conform to requirements. Certification of food may be, as appropriate, based on a range of inspection activities, which may include continuous on-line inspection, auditing of quality assurance systems, and examination of finished products.

4. Definition of the products obtained by the table olive industry

The products obtained by the table olive industry are the fruits of the olive tree (*Olea europaea* L.) that have undergone the pertinent processes; preserved by natural fermentation or by heat treatment, with or without the addition of preservatives; packed with or without covering liquid; and offered for trade and for final consumption as table olives.

The fruits of the olive tree used in the table olive industry are from varieties chosen for their production of olives whose volume, shape, flesh-to-stone ratio, fine flesh, taste, firmness and ease of detachment from the stone make them particularly suitable for processing.

Table olives shall comply with the descriptions of the types of olives, trade preparations and styles and with the essential composition and quality criteria laid down in the *Trade standard applying to table olives* adopted by the International Olive Council and in the *Codex standard for table olives*. They shall also comply with the requirements of these standards in regard to additives, contaminants and hygiene and with the other requirements of the trade standard concerning containers, filling, labelling and methods of analysis and sampling.

5. Table olive processing

Delivery of the raw materials

5.1. Delivery of the olives

- In louvred crates or in bulk.

- Inspection of the conveyance used for transporting the olives to the plant: recording of the certificate or statement declaring the nature of the preceding load and the cleaning carried out in the case of bulk transportation or of transportation in containers likely to be used for other products.

- Recording: date of delivery, owner, weight, type of olives, variety, average degree of ripeness (particularly for green olives), average fruit size, proportion of fruit not suitable for processing, wet or dry olives, withered or swollen olives, fruit damage, presence of foreign matter, etc.

- Verification and recording of the date of harvest, of the certificate specifying the crop treatments applied by the olive grower and of the cropping system applied (non-irrigation or irrigation), specifying the system employed in the latter case.

5.2. Delivery of other raw materials

- Recording of the delivery of processing aids, additives and ingredients and verification of their conformity with specifications.

5.3. Delivery of cleaning products and lubricants

- Recording of the delivery of detergents and lubricants and verification of their conformity with specifications.

5.4. Delivery of packing material

- Recording of the delivery of packing containers and of the material for container sealing, marking and packaging for distribution.

5.5. Storage of fresh olives

- At ambient temperature, away from direct light; or

- In a controlled atmosphere or at a controlled temperature.

5.6. Size-grading and sorting of fresh olives

- Removal of over-small fruit, leaves and twigs and other extraneous matter.
- Separation by variety, colour and size.

5.7. Washing of fresh olives

- By immersion of the olives or by pressurised circulation of potable water.

5.8. Phases in the processing of treated olives

- Preparation of the alkaline solution for removing the bitterness of the olives (debittering).

- Removal of the bitterness of the olives by placing them in an alkaline solution at varying concentrations depending on the variety, degree of fruit ripeness and ambient temperature.

- Elimination of residual lye by successive washes, the number and duration of which vary according to the system used.

- Brine preparation.

- Brine placement and complete or partial fermentation.

- Brine preservation.

- Sorting to remove any defective fruit; size grading.

- Stoning, stuffing or preparation of other styles according to the trade preparation.

- Olive storage prior to packing.

- Packing.

- Treatment to ensure the keeping properties of the packed product.

- Storage of the packed product.

5.9. Phases in the processing of natural olives

- Fruit washing.

- Brine preparation.

- Brine placement and complete or partial fermentation.

- Brine preservation.

- Sorting and size grading.

- Stoning, stuffing or preparation of other styles according to the trade preparation.

- Packing.

- Treatment to ensure the keeping properties of the packed product.

- Storage of the packed product.

5.10. Phases in the processing of dehydrated and/or shrivelled olives

- Fruit washing.

- Blanching, or not, of the olives.

- Removal of the natural bitterness, or not, in a mild alkaline lye.

- Partial dehydration which, depending on the trade preparation, may be done by arranging the olives in alternate layers with dry salt in special crates or tanks and rotating the olives in crates, or by heating, or by both processes.

- Sorting and size grading.

- Complete dehydration.

- Packing.

- Storage of the packed product.

5.11. Phases in the processing of olives darkened by oxidation

- Fruit washing.

- Brine preparation.

- Brine placement and partial or no fermentation.

- Preservation in brine or any other solution.

- Sorting and size grading.

- Oxidation in an alkaline medium.

- Stoning, stuffing or preparation of other styles according to the trade preparation.

- Packing.

- Sterilisation.

- Storage of the packed product.

6. General principles of food hygiene: practical application and control

6.1. Plant location

- Plants should be located away from environmentally polluted areas and industrial activities that pose a serious threat of contaminating the olives.

- Plants should be located away from areas subject to flooding unless adequate safeguards are provided.

- Plants should be located away from areas prone to infestations of pests.

- Plants should be established in an area that is sufficiently large and suitably located to ensure proper waste treatment in order to avoid waste infiltration of the soil and waste discharge into water courses.

- Plant access roads should be consolidated, clean and properly drained.

6.2. Premises and facilities

The design of the premises should be such as to differentiate clearly between each work area, so preventing cross-contamination during the different operations:

- The materials employed should be suitable food-grade materials.

- The layout of the premises should comply with the principle of forward workflow.

- Area for delivery and pre-processing storage of olives, suitably equipped according to the storage methods used.

- Area for olive sorting, size grading and washing, connected by conveyor belts or some other suitable system to the debittering area.

- Area for the preparation of the original solutions: tanks made from suitable food-grade materials, fitted with homogenisers, pumps made from suitable food-grade materials and valves to facilitate filling and emptying.

- Area for alkaline treatment: tanks fitted with recycling pumps, grates for keeping the olives immersed in the solutions and valves to facilitate filling and emptying.

- Area for fermentation: aboveground or sunken tanks fitted with a cover, pumps, emptying valves and grates to keep the fruit immersed in the liquids.

- Area for sorting and size grading processed olives.

- Area for stoning and stuffing olives.

- Area for packing the olives for marketing.

- Area for pasteurisation and sterilisation.

- Area for storing and recycling brines and lyes.

- Area for recycling wash water or treating it for disposal.

At the discretion of the health authorities, these areas may be located in single, “suitably spacious” premises.

In addition, separate areas or premises should be provided for:

- Laboratory for physico-chemical and microbiological testing of brines and olives from processing to packing.

- Store for processing aids, additives and ingredients used during olive processing: the premises should be adapted to the nature of the product; they should be dry and equipped, where appropriate, with a cold store and freezer; and they should be easy to keep and to clean.

- Store for detergents, lubricants and disinfectants: the premises should be adapted to the nature of the product; they should be dry and kept properly closed, and they should be easy to keep and to clean.

- Store for keeping packing materials.

- Store for keeping packed product.

6.3. General requirements for premises

- Premises should be kept clean and should undergo regular maintenance; they should be large enough to handle maximum production volume and should be made of materials that do not cause environmental contamination and/or contamination of the olives during processing.

- Premises should be designed and built in such a way as to facilitate good hygiene practices by regulating process flows from the delivery of the olives to the obtention of the finished product.

- Floors, walls and ceilings should be made of materials that are heavy-duty, impervious, smooth, washable and adapted to the operating conditions in the area.

- Floors should be sufficiently inclined to permit drainage of liquids into discharge pipes; where necessary, joints between walls and floors should be sealed and corners should be rounded to facilitate cleaning.

- Doors should have smooth, non-absorbent surfaces, which are easy to clean and disinfect; where necessary, they should shut automatically. Entrance doors should open outwards and should be tight-fitting to prevent the entry of pests or other animals.

- Windows should be protected to prevent the entry of insects and pests, and they should be easy to clean. Where necessary, window glass should be replaced by alternative materials or properly protected to prevent contamination in the event of breakage.

- Floor openings for lines or pipes should be adequately protected to prevent any risk of contamination.

- Ceilings should be at least three metres high.

- Each worker should have a minimum space of two square metres.

- Lighting should comply with the requirements for ensuring correct production operations and inspection activities. Light bulbs and lighting installations should be protected to prevent contamination in the event of breakage.

- Ventilation should be such as to ensure adequate air renewal and to prevent the build-up of steam or condensation, the formation of mould or the spreading of particles. Where necessary, vents should be fitted with filters to prevent the entry of contaminated air.

- Drainage and waste disposal systems should be efficient and protected to prevent contamination, and they should not be connected to other waste disposal systems.

- Production areas should be provided with a suitable number of toilet facilities for staff, which should be suitably located and fitted with flushing mechanisms equipped with siphon pipes running into the drains. Washbasins should have a supply of hot and cold running water, and there should be soap dispensers, hygienic hand drying facilities and waste disposal bins.

- Toilet and washing facilities should not lead directly on to production areas and should have a good system of natural or mechanical ventilation.

- A notice to the effect that hands should be washed after using the toilet should be clearly visible in the toilet and washing facilities.

- Changing rooms should be equipped with twin-compartment lockers for keeping personal and work clothing.

- Water should comply with the legal provisions issued by the WHO for the quality of potable water. The flow, temperature and pressure of potable water should be adapted to production requirements.

- Non-potable water for industrial purposes (heat exchangers, fire hydrants, steam production, other non-food activities) should be carried in suitable piping separate from potable water piping.

- The business or State bodies should test the water periodically to check it is potable. Water not from the public supply system should be treated properly and tested to ensure it is potable. Chemicals used for water treatment should conform to the relevant legal provisions and chemical treatments should be monitored and checked to ensure the water is of the required quality.

- Water recirculated for reuse should be treated and maintained in such a condition that no risk to the safety and suitability of the food results from its use, in compliance with the general hygiene principles recommended by the Codex Alimentarius Commission. The treatment process should be effectively monitored. Recirculated water which has received no further treatment and water recovered from processing of food by evaporation or drying may be used, provided its use does not constitute a risk to the safety and suitability of the food.

- Water storage facilities should be designed, built and maintained in such conditions as to prevent contamination.

- The area for storing packed product should be sufficiently spacious to facilitate separation by production lots, and withdrawal and rotation according to production date. It should be kept in good hygiene conditions and at a cool temperature.

- The premises should be fitted with a fire system.

6.4. Staff hygiene

- Persons working in the plant should maintain a high standard of personal cleanliness and should avoid any behaviour that could result in contamination, such as smoking, spitting, chewing or eating, drinking, sneezing or coughing in the handling or production areas.

- Depending on the operations performed, staff should wear protective clothing, aprons, overalls, headgear, etc, which they should keep in good hygienic condition.

- Personal effects and clothing should be left in the changing rooms and should not represent a hazard.

- Access by persons and visitors should be controlled to prevent contamination.

- Any person known or suspected to be suffering from, or to be a carrier of, a disease likely to be transmitted through food may not be authorised to work in any production area if there is a possibility, direct or indirect, of product contamination.

- Suitable measures for ear protection should be taken in areas where there is a high level of noise.

6.5. Hygiene monitoring programme

- The business should draw up and implement a written cleaning and disinfection programme for all equipment *cleaned out of place (COP)* and *cleaned in place (CIP)*, comprising: the identity of the person in charge, frequency of operations, chemicals used, concentrations applied and cleaning, disinfection and rinsing procedures.

- Chemicals used for cleaning and disinfection should comply with the pertinent legal provisions and should be used according to the established procedures.

- Worktops (including equipment surfaces) should be kept in good condition and should be easy to clean and, if necessary, to disinfect.

- Cleaning and disinfection should not lead to contamination of the products and/or packing materials.

- Cleaning and disinfection programmes should be monitored for their effectiveness and checked through periodic plant inspections and/or microbiological tests.

- The business should draw up an effective pest control programme; the chemicals used should comply with the pertinent legislation and should be employed according to the instructions on the labels.

- The business should keep all the documents relating to cleaning, disinfection and disinfestation operations, specifying the date, personnel in charge, results, corrective action taken and the results of the microbiological tests.

6.6 Responsibilities – recording of inspections

The management of the business is responsible for implementing the hygiene rules and for monitoring their application.

7. Hazard identification, risk analysis, monitoring and control

7.1. Delivery of raw material:

7.1.1. Delivery of olives

Hazards:

- Physical: extraneous matter.

- Biological: presence of microorganisms or pests.

- Chemical: contaminants (traces of lubricants, engine oils, pesticide residues, etc.).

Preventative measures:

- Supplying olive growers with information.

- Issuing approval to olive suppliers.

- Requiring olive growers to submit a declaration specifying the treatments applied in their orchards and the timing of applications: crop chemicals, metabolism enhancers, defoliants, weed killers, fertilisers.

- Training staff for monitoring purposes.

Critical control points (CCP):

- Visual and analytical inspection for the presence of contaminants and checking that olive orchard crop treatment has been declared.

Critical limits:

- In accordance with the codes and rules and regulations of the countries of product destination, as well as with international standards: Codex Alimentarius standards and trade standard of the International Olive Council applying to table olives.

Monitoring system for each CCP:

- Programme for plant technicians in charge of taking delivery of olive lots to train them to accept or reject olive lots.

- Programme for plant technicians in charge of taking delivery of olive lots to train them to interpret correctly the treatment declarations presented by suppliers.

Corrective action:

- Non-acceptance of non-conforming lots of olives.

- Withdrawal of supplier approval.

7.1.2. Delivery of other raw material and of packing material

Preventative measures:

- Drawing up of specifications for food-grade raw material.

- Requirement for raw material, packing material and other materials to comply with the technical specifications.

- If technical specifications do not exist, requirement for suppliers to deliver a test certificate or food grade certificate (materials in contact with foodstuffs).

- Issue of approval to suppliers.

Corrective action:

- Non-acceptance or return of the raw material to the supplier.

7.2. Storage of fresh olives

No health hazards provided that hygiene rules and good processing practices are observed.

7.3. Sorting and size grading of fresh olives

No health hazards provided that hygiene rules and good processing practices are observed.

7.4. Alkaline treatment

No health hazards provided that hygiene rules and good processing practices are observed and that the alkaline materials used are checked to be of food-grade quality.

7.5. Rinsing

No health hazards provided that hygiene rules and good processing practices are observed and potable water is used.

7.6. Fermentation

No health hazards provided that hygiene rules and good processing practices are observed as regards pH level, sodium chloride concentration, fermentation, coverage of the olives in brine and keeping the fermentation tanks shut to prevent the formation of undesirable micro-flora on the surface.

7.7 Storage

Hazards:

- Biological: presence of undesirable pathogenic or non-pathogenic microorganisms and/ or toxins thereof.

- Physico-chemical: contamination caused by poor cleaning or fastening of storage tanks, or by any other cause.

Preventative measures:

- Drawing up of a programme for cleaning and disinfecting the fermentation-storage tanks.

- Drawing up of a programme for inspecting the tank fastening mechanism and for checking that the tanks shut tightly prior to use (programme of good handling practices).

- Compliance with the pH values, minimum acidity in terms of lactic acid (%) and sodium chloride concentrations set for the trade preparation concerned.

Critical control points (CCP):

- pH values.

- Determination of minimum acidity in terms of lactic acid (%).

- Sodium chloride concentration.

- Presence of pathogenic microorganisms or toxins thereof.

Critical limits:

- pH values and sodium chloride concentration in accordance with the limits established for the trade preparation concerned.

Monitoring system for each CCP:

- Control of the application of the programme for cleaning and disinfecting the fermentation–storage tanks.

- Control of tank fastening and tightness prior to use.

- Periodic analysis of the pH values, minimum acidity expressed as lactic acid (%) and sodium chloride concentration of the brine.

- Control to check for the absence of pathogenic germs or toxins thereof.

- Periodic inspection of the brine level in the tanks.

Corrective action:

- Restoral of the hygiene conditions of the fermentation–storage tanks by implementing a special cleaning and disinfection programme.

- Restoral of the conditions ensuring correct tank fastening and integrity by implementing a programme of good handling practices.

- Restoral of the pH values.

- Restoral of the minimum acidity values (lactic acid).

- Restoral of the sodium chloride concentration.

- If pathogenic germs are present, identification and isolation of the lot for subsequent destruction or for use for non-food purposes, or the application of adequate treatment (heat or otherwise) to ensure the suitability of the product.

7.8. Oxidation

No health hazards provided that hygiene rules and good processing practices are observed.

7.9. Sorting and size grading

No health hazards provided that hygiene rules and good processing practices are observed.

7.10. Stoning, stuffing and other styles of table olives

7.10.1. Critical point for splinters

Hazards: Possible health risk for consumers.

Preventative measure: Checking that the olive stoning machinery and densimeter are working properly.

Critical control point: Presence of an excessive percentage of splinters and/or stones in the stoned or stuffed product.

Critical limits: As laid down in the standards of the International Olive Council.

Monitoring system: Periodic checking of the percentages of splinters or stones in stoned or stuffed olives.

Corrective action:

- Adjustment of stoning machinery.

- Control of the concentration of the densimeter solutions.

- Ensuring olive sizes and varieties are suited to the kinds of machinery employed for stoning or stuffing.

7.11. Olive paste and preparation of olive paste and stuffing pastes

No health hazards provided that equipment hygiene rules are observed and that chilling and storage time are checked prior to using paste intended for stuffing or to packing olive pastes.

7.12. Packing

Hazards:

- Physical: broken glass when using glass jars.

- Chemical: in the case of non-compliance with hygiene rules or of the use of non-food grade materials.

- Microbiological: possibility of microbial contamination when containers are not tightly sealed or when the pH value, minimum acidity expressed as lactic acid or sodium chloride concentration is not correct.

Preventative measures:

- Programme of good handling practices.

- Programme of hygiene, cleaning and disinfection rules and precautions.

- Requirement for food grade certificates for containers.

- Maintenance of pH value, sodium chloride concentration and lactic acid, control that containers are tightly sealed and control of the efficiency of the vacuum systems, when used.

Critical control points (CCP):

- Presence of contaminants.

- pH values, minimum acidity expressed as lactic acid and sodium chloride concentration.

Critical limits:

- Set in the hygiene and handling programme drawn up according to the packing system employed.

- pH values, minimum acidity expressed as lactic acid and sodium chloride concentration in accordance with the limits laid down for the trade preparation concerned.

Monitoring system for each CCP:

- Verification that the procedure in the event of broken glass is properly implemented.

- Verification that the hygiene programmes are implemented for the equipment used.

- Verification that the containers are tightly shut.

- Verification that the containers comply with specifications.

- Control of the pH level and sodium chloride concentration.

Corrective action:

- Restoral of the pH value, minimum acidity expressed as lactic acid and sodium chloride concentration.

- Restoral of hygiene conditions.

- Restoral of good container sealing.

- Rejection of containers failing to comply with specifications and withdrawal of supplier approval.

- Restoral of good handling practices.

7.13. Preservation of the packed product

7.13.1. Sterilisation–Cooling

Hazards:

- Presence of undesirable microorganisms, pathogenic or not, and/or toxins thereof (because not completely destroyed).

- Possibility of microbial contamination of the product by cooling water.

Preventative measures:

- Drawing up of the sterilisation programme according to the type of product container.

- Periodic calibration of the sterilisation system (thermometer, manometer), solid or liquid sterilisation controls to facilitate lot traceability, keeping of sterilisation records up to the date of durability of the sterilised product.

- Evaluation of the presence of chlorine in the water at the end of the cooling process.

Critical control points (CCP):

- Cumulative sterility value expressed as exposure time at a reference temperature.

- Residual chlorine content of the cooling water.

Critical limits:

- The cumulative sterility value must be $\geq 15F_o$ when the reference temperature is fixed at 121 ^oC and the z curve of the thermal death time according to the temperature is 10 ^oC.

- Presence of free chlorine in cooling water.

Monitoring system for each CCP:

- Control of sterility values.

- Control of chlorine content of cooling water.

Corrective action:

- Restoral of sterility scales by controlling sterilisation temperature and time.

- Re-sterilisation.

- Chlorination of cooling water.

7.13.2. Pasteurisation–Cooling

Hazards:

- Presence of undesirable microorganisms, pathogenic or not, and/or toxins thereof (because not completely destroyed).

- Possibility of microbial contamination of the product by cooling water.

Preventative measures:

- Drawing up of the pasteurisation programme according to the type of product container.

- Periodic calibration of the pasteurisation system (thermometer, manometer).

- Evaluation of the presence of chlorine in the water at the end of the cooling process.

Critical control points (CCP):

- Pasteurisation unit defined as the cumulative lethal rate expressed as exposure time at a temperature of less than 100 ^{o}C.

- Residual chlorine content of the cooling water.

Critical limits:

- The minimum pasteurisation unit should be $\geq$ 15 PU when the reference temperature is fixed at 62.4 ^{o}C and the z curve of the thermal death time according to the temperature is 5.25 ^{o}C.

- Presence of free chlorine in the cooling water.

Monitoring system for each CCP:

- Control of pasteurisation values.

- Control of chlorine content of cooling water.

Corrective action:

- Restoral of the pasteurisation scales by controlling pasteurisation temperature and time.

- Re-pasteurisation.

- Chlorination of cooling water.

7.13.3. Other preservation methods

Table olives may be preserved by other methods in addition to pasteurisation and sterilisation. Such methods are:

- According to the specific chemical characteristics of the process (SCC).

- In a modified atmosphere: vacuum, addition of food-grade inert gas (MAT).

- Addition of authorised preservatives (PR).

- Keeping of the product at refrigerator temperature (R).

Preventative measures or corrective action in regard to health hazards (presence of undesirable microorganisms) should entail ensuring that the packing brine or juice complies with the following limits for sodium chloride concentration, pH and lactic acid values according to the trade preparation:

Preparation	Minimum sodium chloride content %			Maximum pH limit			Minimum lactic acidity % lactic acid		
	SCC, MAT	PR, R	P	SCC, MAT	PR, R	P	SCC, MAT	PR, R	P
Treated olives	5	4	GMP	4.0	4.0	4.3	0.5	0.4	GMP
Natural olives	6	6	GMP	4.3	4.3	4.3	0.3	0.3	GMP
Dehydrated and/or shrivelled olives	10	10	GMP	GMP	GMP	GMP	GMP	GMP	GMP
Olives darkened by oxidation	GMP	GMP	GMP	GMP	GMP	GMP	GMP	GMP	GMP

SCC: Specific chemical characteristics

MAT: Modified atmosphere

PR: Addition of preservatives

P: Pasteurisation

R: Refrigeration

GMP: Good manufacturing practice

7.14. Pack storage

No health hazards provided that hygiene and good handling practices are observed.

8. Management of quality control points, critical control points and control of records for the purpose of certification

All the details concerning the critical control points (CCP) are presented in section 7.

Stage	Control point	Preventative measures/ corrective action	Records	CCP (critical control point)
Delivery: - Olives	Presence of extraneous matter Integrity of olives	Acceptance/non-acceptance of the lot as per contract	Delivery certificate/ olive grower/lot (weight, variety, type, size, ...), proportion of damaged olives	Yes
- Additives, processing aids	Compliance with specifications	Return to supplier	Delivery notes	
- Ingredients	Compliance with purchase specifications	Return to supplier	Delivery notes	
- Other	Compliance with purchase specifications	Return to supplier	Delivery notes	
Storage of fresh olives	Clean premises Temperature Length of time	Compliance with hygiene rules Controlled temperature-atmosphere: max. 30 days Ambient temperature: max. 3 days	Inspection card	
Sorting and size grading of fresh olives	Clean belts	Compliance with hygiene rules		
Alkaline treatment	Sodium or potassium hydroxide concentration	Laboratory analysis	Concentration inspection card	

Stage	Control point	Preventative measures/ corrective action	Records	CCP (critical control points)
Rinsing	Potable water			
Fermentation	pH value, sodium chloride concentration, lactic acid content, texture and appearance of olives	Compliance with limits for trade preparations Maintenance of fermentation equipment Tightly sealed tanks	Fermentation inspection card	
Oxidation	Hygiene Washing of olives Oxidation time pH value, sodium chloride concentration	Compliance with tank cleaning programme Laboratory analysis	Oxidation inspection card	
Sorting and size grading	Clean belts	Compliance with cleaning programme and handling practices	Inspection card	
Stoning	Cleaning and disinfection of chain Calibration of chain Presence of stones or stone fragments Entry shaft of de-stoner	Compliance with cleaning programme and handling practices	Handling inspection card	Yes

Stage	Control point	Preventive measures/ corrective action	Records	CCP (critical control points)
Stuffing	Salt concentration of olives Presence of stone fragments Compliance of stuffing with specifications	Laboratory analyses Evaluation of number and size of stone fragments Good handling and stuffing practices Compliance with equipment cleanliness and disinfection rules	Inspection card for each parameter	
Packing	Pack and label compliance with specifications	Return to suppliers Compliance with programme of good handling practice	Inspection card for each parameter at each stage of packing	Yes
Storage	Cleanness Closing system Tightly sealed pH value, sodium chloride concentration Brine level	Compliance with cleaning and disinfection programme Compliance with pH and sodium chloride limits Tanks tightly shut	Storage inspection card	Yes
Sterilisation Pasteurisation Cooling Pack storage	Efficiency of equipment	Compliance with programme of good handling practice	Inspection card for temperature, time, residual chlorine	Yes

9. Traceability and recall programme

9.1. Traceability

- The packaging of the processed product should be marked with an indelible, legible code and a lot number should be printed on the packing material.

- The code identifies the establishment, and the day, month and year of production.

- The business should be able to demonstrate its ability to identify all its products by supplying accurate, real-time information. This may be done through documents relating to production, stocks, lot distribution, and the names, addresses and telephone numbers of customers receiving the lots under scrutiny. Such documentation should include sufficient information to ensure the traceability of any given product lot.

- Documentation should be kept for one year after the expiry date of the product stated on the label or, failing an expiry date, for five years from the date of manufacture or the date of delivery (shipment/reception).

9.2. Recall programme

- The business should draw up a recall programme for the withdrawal from the market of any lots displaying health or quality defects during distribution. This programme will be based on the information relating to the traceability of the lot.

- The business should keep and make available, upon request, any health or hygiene complaints concerning its products.

10. Training

For the effective implementation of the hygiene programmes and HACCP and quality assurance programmes specified in this guide it is essential to train business personnel in the principles and applications of such programmes and systems.

All personnel handling table olives should be aware of their role and responsibility in protecting product from contamination and deterioration. To this end, they must be aware of the potential hazards at all stages of table olive processing and of the way in which their action, positive or negative, can have a bearing on the quality and suitability of table olives. It is helpful to explain why an activity has to be performed in a certain manner (for instance, for reasons of food hygiene or safety) and the risks entailed in not doing so. Personnel need to have received suitable training in order for an HACCP plan to be implemented effectively.

10.1 Training programmes

Training programmes should be adapted to the needs of business personnel, who should be identified beforehand according to their level of knowledge and experience and specific responsibilities. Such programmes should comprise the following in particular:

- Training in hygiene rules as a solid foundation for ensuring the food safety of table olives and in their role as a prerequisite for developing the HACCP system. Trainees should grasp the importance of, and connection between, the business location, buildings, premises and facilities, personnel, food hygiene and hazard control.

- Familiarisation with the rationale of the HACCP system and with its importance as a systematic approach to food health safety.

- Training in describing the product, identifying its ingredients and other packing materials and in drawing up the manufacturing diagram.

- Acquisition of the knowledge and skills needed to:

* Identify all potential hazards (physical, chemical and microbiological) linked to table olive processing and to take into consideration appropriate measures for their control

* Determine the critical control points

* Establish the critical limits for each CCP

* Establish a monitoring system for each CCP

* Establish effective procedures for effective corrective action when there is a deviation from the critical limits for the CCP

* Establish procedures for verification of each CCP and of the HACCP plan

* Draw up the documentation of the HACCP plan and the records of the HACCP system

* Conduct internal audits to verify and improve the HACCP system

Additional training should be provided, where necessary, to update technical knowledge in the areas of table olive processing techniques and equipment.

10.2 Training management

Training needs should be identified regularly and any training deficiencies should be remedied. Periodic assessments of the effectiveness of training should be carried out in order to review and update it where necessary.

Routine supervision and verification systems should be put in place to ensure that handlers are kept informed of all the necessary procedures to maintain table olive safety and quality and that such procedures are implemented effectively and updated.

The business should keep appropriate records of the initial and vocational training of all its personnel, as well as of their expertise and experience.

11. References

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ISO 9001 – Quality systems – Model for quality assurance in design, development, production, installation and servicing.

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Norme française NEXP V01-002 (December 1998), Hygiène et sécurité des produits alimentaires – Glossaire hygiène des aliments.

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ANNEX

Specimen records