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Application of a system of quality control to improve the conservation of the artichoke in an industrial unit in Morocco

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ABSTRACT

Among the most important undertake a canner artichokes is to achieve consistent quality of the finished product. However, the presence of a consistently high rate differentials happens to 25%, the presence of pathogens, foreign bodies and traces of cleaning chemicals or pesticides are PROVEN failure crew rigorous. However, control measures which proceed in a truly preventive would need to be put in place to ensure the safety of artichokes and lead to better quality and continuously. Similarly that the regulatory requirements of the client, most solid product competitions, are in favor to improve and protect the brand image of the company, to choose the direction of preventive management for quality control. This activity shows a case adapted implementation of the system of risk analysis and study of Critical Control Point (HACCP) in a Moroccan company conservation artichoke. The outcomes torn completed at a reduced rate differences artichoke from 25% to 7%, a total disappearance of pathogens and increased customer satisfaction by about 20%.

KEYWORDS

Artichokes;
Pathogens;
HACCP;
Quality;
Business;
Clients.

INTRODUCTION

Food can be vectors or real culture media of microorganisms. Then they are potentially capable of causing various diseases among consumers whose severity depends primarily on the nature and number of microorganisms and / or toxicity of their excretory products.Among infectious diseases foodborne most frequently encountered resulting from the ingestion of microorganisms belonging to the genera Salmonella, Shigella, Listeria, Brucella, Mycobacterium, Escherichia, Campylobacter, Clostridium, Yersinia, Vibrio and ingestion of virus.These microorganisms behave vis-à-vis the body as parasites and multiply using components of the body as nutrients. They are invasive, often toxigenic and then cause damage to the digestive tract but also in other tissues (sepsis).

There are microorganisms that release their toxin in the host organism such as Clostridium perfringens toxins with A, B, C, D or E produced in Stage 3 of sporulation,

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Shigella, enterotoxigenic Escherichia coli with two types of toxins (heat stable and thermolabile), Vibrio parahaemolyticus, endotoxin Salmonella, Shigella, etc... These toxins are usually enteric tropism and are neurotoxic[1].

During the 80s, several health crises have appeared in medical fields (contaminated blood), food (BSE, dioxins...) food risk analysis[2].

Bovine Spongiform Encephalopathy (BSE) is causing a health crisis in the 1990s and early 2000s. It is due to the incorporation of animal meal in the diet of ruminants[3]. Accidental contamination of the food chain most severe ever known in Belgium in recent years der ¬ back to a period between 19 and 26 January 1999, it is the so-called "crisis dioxin. " The origin of this contamination, the introduction of a lot of fat recycling contaminated in the production chain of food for livestock[4].

Two other major accidents had also hit the headlines in the 1970s in Asia: the pre ¬ Mier in Japan in 1969 (Yusho), the second in Taiwan in 1979 (Yu-Cheng). In both cases, accidental contamination of rice oil by food-based fluids used PCBs as heat exchangers[4]. Campylobacter is the second leading cause of infections ori ¬ gin food in France and in most developed coun ¬ oped[5].

Strains of enterohaemorrhagic Escherichia coli emerged in 1982 with the serotype O157: H7. Commensal gut flora of cattle, these bacteria can contaminate foods of animal or vegetable origin. The TIAC often resulting from the consumption of hamburgers insuffi ¬ cient cooked chicken meat and products made from raw milk[5]. Infections with E. coli verotoxin (VTEC) are increasing in the Anglo-Saxon countries and Italy. These strains are responsible for a significant proportion ¬ formidable HUS occur in children less than five years[6].

Cyclospora cayetanensis is a protozoan sporulated parasite of the small intestine in humans without known animal reservoir and is responsible for large waterborne anemia (18). In 1996, he caused an epidemic released in North America, affecting nearly 1500 people and linked to the formation of con raspberries imported from Guatemala[7]. Trichinella spp (including T. spiralis) is a nematode that infects several species of mammals. Transmission occurs by ingestion of parasitized muscle tissue. The resurgence of human disease since 1975 in France and Western Europe is mainly due to the consumption of horse meat imported from North America, Mexico, and Central Europe. In 25 years, 7 outbreaks were reported in France and 6 in Italy, representing more than 2900 cases, each horse carcass was consumed raw or undercooked by several hundred people[8].

Noroviruses are responsible for the vast majority of non-bacterial gastroenteritis in developed countries. In Sweden, an outbreak linked to the consumption of imported raspberries has been described[9].

United States, several outbreaks of hepatitis A have had a great impact in their scope. That of 1997, affecting schools in five states, was due to the consumption of frozen strawberries imported from Mexico[10]. Prevention is based on respect for international regulations by the 149 member countries of the WTO and the fight against illegal imports, a systematic investigation of outbreaks of foodborne illness and the collective implementation of HACCP controls following[11].

It is successfully applied to the United States to control the quality and safety of low-acid canned foods, and has been adopted by many food companies in Europe and the United States. Agencies of regulation are more likely to recognize the usefulness of this tool and its principles have been incorporated into the legal obligations of both the EU (in the general rules of hygiene foodstuffs (93/43/EEC) and the Federal Ministry of Agriculture of the United States (CPR-123)[12,13].

The National Advisory Committee on Microbiological Criteria for Foodstuffs has issued guidelines for the application of HACCP plans including generic and decision trees in 1992 (Figure 1), and the Codex Alimentarius Commission adopted the system its twentieth session in 1993. HACCP systems can be integrated into other systems of quality assurance such as the ISO 9000 series.

HACCP has become synonymous with food safety. It is recognized around the world as a systematic and preventive control of biological, chemical and physical anticipation and prevention rather than inspection and tests on the finished product.Our job is to carry out an internal audit for a company of artichoke, which is to establish a diagnosis according to the requirements of

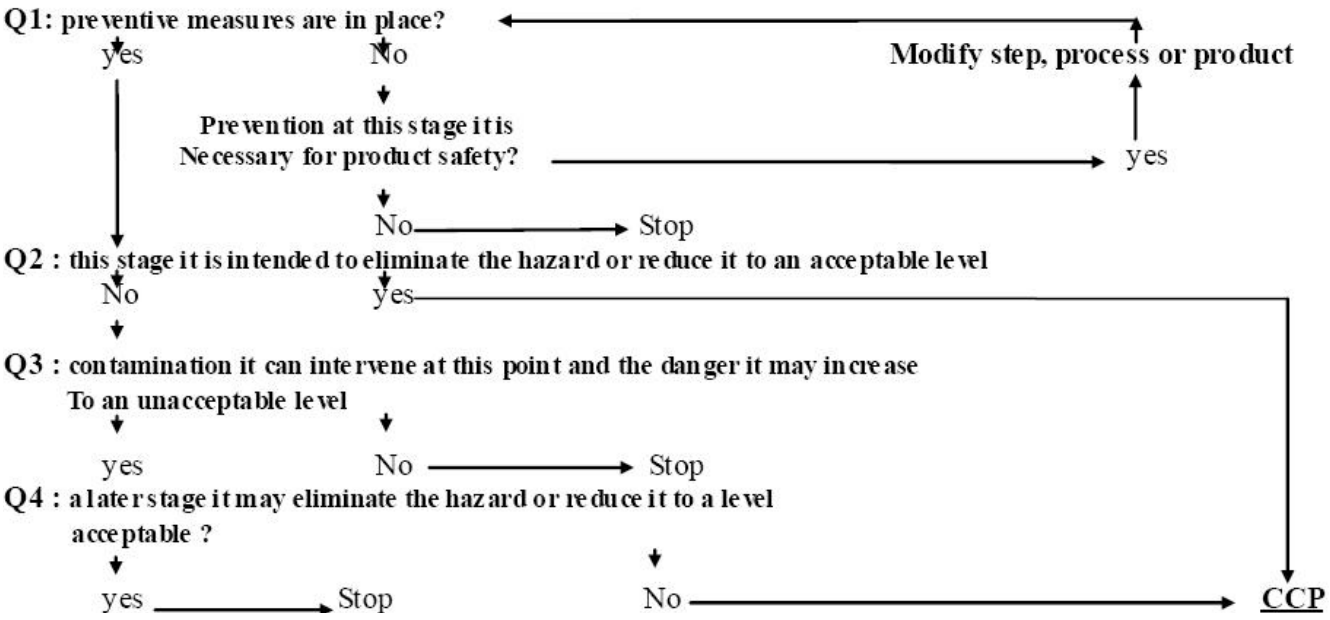

Figure 1 : The decision tree

HACCP and the implementation of an action plan to end all non conformities encountered

MATERIALS AND METHODS

The approach is to apply the HACCP requirements on the production line keeps bags 1 and 5 kilograms of artichokes in a business in the city of Kenitra. The HACCP, so that it is operating and cost, must be performed on a set of scientific principles accumulated below[11].

However, programs that promote safety and environmental operating conditions require processing checks so that the HACCP system is acting[14,15].

Prior programs

Was performed internal audits to assess the degree of HACCP requirements vis-à-vis the premises, facilities and equipment, utensils, personnel, transportation, fight against pests, withdrawal. To answer these questions, a checklist based on the prerequisite program requirements has been established. And is composed of 126 questions including 58 specific premises, 18 for transport and storage, 11 materials, 17 staff, 10 for sanitation and the fight against vermin and 8 withdrawals.

Premises for the packaging of the food product must be constructed in a manner to comply with the GMP is to say respecting the advance to avoid any kind of contamination, and to comply with BPH, a training plan, cleaning and disinfection procedures and training must established an efficient and proper manner.

Implementation of HACCP.

HACCP principles consists of 7 according to Directive Codex Alimentarius (1997), however, its implementation requires the correct application of 12 steps including seven principles[11].

which are

Step 1: Constitution of the HACCP team

This step requires:

- Management Commitment
- Appointment of a HACCP coordinator
- Establishment of a multidisciplinary team.

Step 2: Product Description

This phase requires:

- Description of materials used in the manufacture of the finished product: ingredients, raw materials, water, packaging,... specifications for products with specific requirements.- Descriptions of the finished product: product description with the expected characteristics of the finished product.

Step 3: Description of the intended use of the product

This task requires:

- Identification of the consumer and the population

at risk
- Use of the product by the consumer
- Duration of Use
- Storage Temperature
- Specific conditions of transport.

Step 4: Construct a diagram process flow diagram.

It summarizes the main steps of the manufacturing process (from receipt of raw materials to shipment of finished product) The diagram should be accompanied by a diagram illustrating the movement of materials, ingredients, packaging.... This diagram should help to identify all areas of potential cross-contamination in the facility (locker rooms, restrooms, cafeterias). (Figure 2)

Step 5: Checking / on-site confirmation of flow diagram.

Study HACCP This phase is based on the seven principles of HACCP. It determines the critical control points (CCPs)

Step 6: Listing of hazards (Principle 1)

The hazard analysis step is used to enumerate all the hazards that may reasonably be expected at each stage of the process flow diagram: reception, production, processing, storage, distribution and final consumption.

Once the hazard is identified, an analysis is performed to estimate the corresponding risk that expresses the health of man or animal. Only hazards with an intolerable risk to be present are subjected to step 7 (Principle 2)[16-18].

a/ list of potential hazards

This is the first time in a list all the dangers that can arise during the product life phases (see flow diagram)

Groups of hazards to consider are

Chemical chemicals are likely to come into contact with the product (cleaning residues, antibiotics, allergens, GMOs...)

Physical are all foreign bodies may contaminate the product (bone, metal, wood, cardboard, glass, plastic...)

Microbiological and biological one hand are the types of living beings can be the source of contamination and other micro-organisms and toxins that can contaminate and / or grow in the commodities and / or finished product (pathogens, indicator organisms hygiene, possibility of survival of toxins produced by microorganisms)For each hazard, we define an origin. Hazards can be classified according to five sources: personnel, equipment, environment, raw materials, process. To find this you can use the original method 5 M (Materials, Materials, Environment, Labour, Method)

b/ risk analysis

The risk is a function of the probability of an adverse effect on health and the severity of the effect resulting from one or more hazards in food. A qualitative assessment (therefore gravity) and possibly quantitative (probability of occurrence, frequency) of hazards shall be conducted to assess the degree of risk. From these data, prioritization of hazards can be achieved.

Control measures are actions, activities, materials or factors necessary to eliminate hazards or reduce their occurrence to an acceptable level.

The measures are defined from:

- The causes identified and their evaluation.
- Means and company resources (material, technical, human)

Control measures must be formalized in the form of procedures or instructions.

Step 7: Determination of CCP using the decision tree (Principle 2)

CCP or a critical point is a point, step or procedure, or the loss of control and creates an unacceptable risk that requires mastery points for the control to ensure the safety of the food[19,20]. We must remember that a CCP is a global operation that, in case of loss of control, no operation will compensate the deviation that occurred and resulting unacceptable risk.

The use of decision tree proposed by the Codex Alimentarius is a tool for the determination of PCB[20]. Among all the dangers listed in the previous step.

Step 8: Establish critical limits (Principle 3)

Critical limits set the boundaries of acceptability. They can be numerical values, sensory parameters or achievements. They are integrated into the procedure and work instructions HACCP plan[21].

Step 9: Establish monitoring procedures (Principle 4)

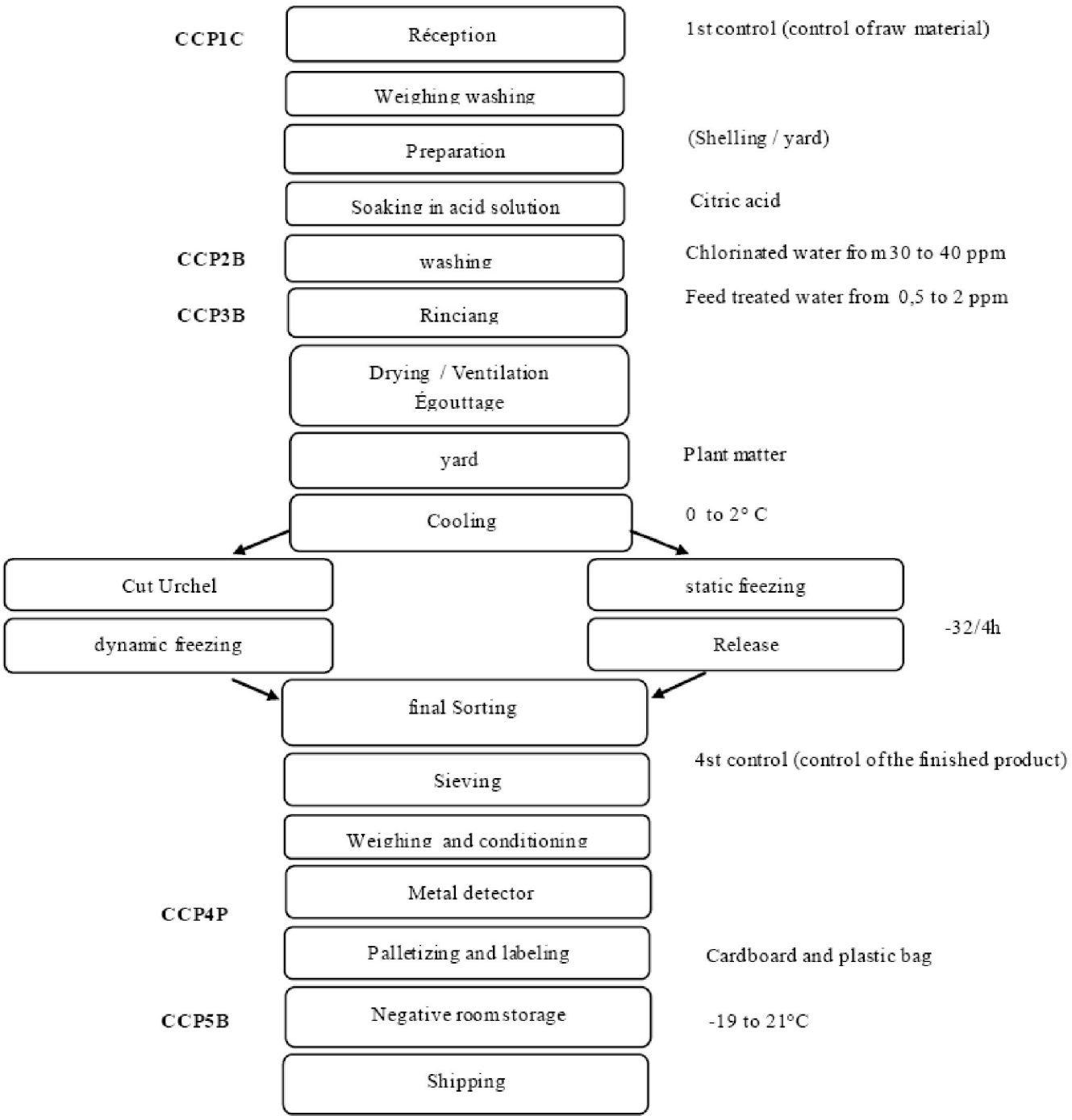

Figure 2 : Diagram canning artichokespacked in plastic bagc/ institution of control measures

This step is to measure or observe critical limits at a CCP. The measurements are recorded surveillance activities to demonstrate control of the CCP. The monitoring procedures must be able to detect loss of control.

For every action monitoring through a procedure must be specified if necessary:

- The method used for monitoring;
- The procedure;
- The responsibilities for implementation and interpretation of results;
- The frequency of observation;
- The sampling plan;
- The methods of recording the results.

There are two types of monitoring :

- Continuous monitoring which keeps record of the

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monitoring and act in real time,

- especially during initiation of corrective actions,
- Monitoring discontinuous demand answers quickly accessible yes or no (checklist) at a defined frequency,

Step 10: Establish corrective actions (principle 5)

Corrective actions must be developed for each CCP in order to make immediate correction when monitoring indicates a deviation from an established critical limit[22]. These measures should ensure that the CCP has been brought under control and predict what will happen to the product in question: the destruction, decommissioning, editing, identification and traceability. Corrective action must be accessible

Step 11: Establish verification procedures (Principle 6)

This step is to verify the effectiveness of the system but also its effective implementation. We may use the methods, procedures and tests, verification and audit, including sampling and analysis of random samples to determine if the system is working properly.

Step 12: Preparation of documentation system (Principle 7)

The documentation system should include two types of document:

- The HACCP manual which includes all documents defined in the enumeration of the different stages: process flow diagram, list of hazards, definition of responsibilities...
- Records.

RESULTS AND DISCUSSION

Our mission is to ensure the safety of artichokes preserved. Our diagnosis (TABLE 1) based on the requirements of the BRC v5, showing the findings and motivations of responsible, we helped raise different non-conformances at the company, and are related to the standard system for each phase of the handling and processing of the product.

TABLE 1 : diagnosis according to the requirements of the BRC v5 global standard Date: 22/02/2010

		Findings of the responsible	
BRC n°	**Requierent**	**Finding**	**Responsible Motivation**
2 PLAN FOR CONTROL OF FOOD SAFETY - HACCP			
2.0	The management plan for food safety should be based on a HACCP system must be systematic, complete, comprehensive, fully implemented and maintained. The Codex Alimentarius HACCP principles must be used and must be referred to the legislation, good practice guides or guidelines relevant.	Not Conform	The Company has not established a system based on HACCP principles 7 Codex Alimentarius HACCP.
2.1 The HACCP team - Codex Alimentarius Step 1			
2.1.1	The HACCP plan shall be developed and managed by a multidisciplinary team of food safety including quality managers / Maintenance, Production, Engineering and other relevant functions. The team members must have specific knowledge of HACCP and relevant knowledge of products, processes and hazards.	Not Conform	members of the team do not have specific knowledge of HACCP, products, processes and hazards.
2.1.2	The HACCP team must have a designated and qualified must demonstrate its competence and experience of HACCP.	Not Conform	HACCP team does not have a designated official and qualified must demonstrate its competence and experience of HACCP
2.1.3	Records shall be maintained to demonstrate that the HACCP team has the required knowledge and understanding of HACCP. In the event that the company does not have adequate internal expertise, external expertise may be sought, but the day-to-day system management of food safety must remain the responsibility of the company.	Not Conform	records are not kept

BRC n°	Requierent	Finding	Responsible Motivation
2.1.4	The management of the company must demonstrate its commitment and support to demonstrate the HACCP team.	Conform	HACCP team does not have the commitment of top management
2.2 Describe the product - Codex Alimentarius Step 2			
2.2.1	The HACCP team must define the products and / or processes included in the scope of the HACCP plan.	Not Conform	The frozen artichokes s description is not detailed
2.2.2	All relevant information necessary to conduct a hazard analysis must be collected, preserved, documented and updated. The company must ensure that the HACCP plan is based on comprehensive information sources, which are referenced and available on request, which may include the following (non-exhaustive list): -recent scientific literature,-known historical dangers associated with specific products -Good Practice Guides relevant; Guidelines recognized, - Regulating Health Products in recipient countries; - Customer Requirements.	Not Conform	sources bibliographqiues underlying risk analysis are not documented
2.2.3	A full description of the products must be made, including all relevant information concerning the safety of food. For indication, it may include the following (non-exhaustive list): _ composition (eg raw materials, ingredients, recipe) _ origin of ingredients _ physical and chemical characteristics have an impact on food safety (eg pH, aw) _ and treatment process (eg heat treatment, freezing, salting) _ method of packaging (eg modified atmosphere vacuum) _ conditions of storage and distribution (eg chilled, ambient temperature); _ life target under conditions of storage and use; _ instructions (eg storage, preparation) _ taking into account a possible misuse (eg storage, preparation).	Not Conform	description, product specification is not complete, and not available for all products
2.3 Identify Expected Use - Codex Alimentarius Step 3			
2.3.1	The intended use of the product by the customer must be described by defining the target consumer groups, including the suitability of the product for sensitive population groups (eg children, elderly, people with allergies).	Not Conform	The intended use of the product is not described
2.4 Build a Manufacturing Diagram - Codex Alimentarius Step 4			
2.4.1	A flow diagram should be made to cover each product, product category under HACCP, from the selection of raw materials, through processing, the following (non-exhaustive list): plan- premises and equipment layout, including raw materials, the introduction of fluids and other materials in contact (example;-sequence and interaction of all steps of the process;-outsourced processes and subcontracted activities;-process parameters; time potential expectations in the process;-reprocessing and recycling, separation of areas of low / high risk areas and clean / dirty-finished products, intermediate / semi-finished products, by-products and waste.	Not Conform	The flow diagram does not describe all the steps of the process and product groups. (a new step is added to the manufacturing process)
2.5 Verify Manufacturing Diagram - Codex Alimentarius Step 5			
2.5.1	The HACCP team must verify the accuracy of the charts by making on-site audit and testing in the most adverse conditions. The daily and seasonal variations must be taken into account and evaluated. Records charts making statements must be kept..	Not Conform	The diagram is not checked (new process step)

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BRC n°	Requierent	Finding	Responsible Motivation
1.6 List all Potential Hazards associated with each step of the process, Conduct and Analysis Define Control Measures Identified Hazards - Codex Alimentarius Step 6, Principle 1			
2.6.1	The HACCP team should confirm the scope of the HACCP plan to identify and register all potential hazards that may be reasonably expected at each stage in relation to the product, process and facilities, which can not be controlled by existing prerequisites. This will include hazards in raw materials, those introduced during the process or process steps survivors and risks allergens (see clause 5.2). The steps preceding and following the processing chain must also be taken into account.	Not Conform	The risk allergens has not been taken into account in the HACCP study
2.6.2	The HACCP team must conduct a hazard analysis to identify hazards that need to be prevented, eliminated or reduced to acceptable levels. Be taken into consideration at least the following: _ the likelihood of danger _ gravity effects on the health of the consumer; _ the vulnerability of those who are exposed _ the possibility of survival and multiplication of micro-organizations risk _ the presence or production of toxins, chemicals or foreign bodies _ the contamination of raw materials / intermediates / semi-finished products or finished products _ the possibility of fraud / intentional contamination.	Not Conform	HACCP study is not revised (new process step)
2.6.3	The HACCP team must take into account the control measures necessary to prevent, eliminate or reduce the risk to acceptable levels. We may consider the implementation of more than one control measure. Justification acceptable levels for finished products should be established and documented for each hazard.	Not Conform	justification acceptable levels for finished products is not established e no t documented for each hazard.
2.7 Determine the Critical Control Point (CCP) - Codex Alimentarius Step 7, Principle 2			
2.7.1	For each hazard that requires a control, the control points should be reviewed to identify those that are critical. This requires a logical approach and can be facilitated by the use of a decision tree. CCPs must be the control points that are required to prevent, eliminate or reduce to acceptable levels the danger related to food safety. If a hazard is identified at a step where control is necessary for safety but no control measure exists, the product or process should be modified at that step, or at an earlier stage or later, in order to provide a measure of control.	Not Conform	No revised for danges which requires a mastery
2.8 Establish limits for each CCP Reviews - Codex Alimentarius Step 8, Principle 3			
2.8.1	For each CCP, critical limits must be established appropriate to clearly identify if the process is in or out of control and the level of acceptable risk identified related to food security in the finished product may be exceeded. Critical limits shall be measurable whenever possible (eg time, temperature, pH) and the method for their preparation should be clearly documented. The HACCP team must take into account the regulations or best practice guides when establishing critical limits	Not Conform	Ctritques limits have not laid down for 5 CCP
2.8.2	All critical limits based on subjective data (such as visual inspection) will be supported by clear guidelines or examples.	Not Conform	HACCP study is not revuée (new process step) The limits set are not measurable .

BRC n°	Requierent	Finding	Responsible Motivation
2.8.3	The HACCP team must validate each CCP. Documented evidence must show that the control measures chosen are always able to control the hazard at the level indicated by the critical limit.	Not Conform	No HACCP team meetings
2.9 Establish a Monitoring System for each CCP - Codex Alimentarius Step 9, Principle 4			
2.9.1	The HACCP team must establish a monitoring system for each CCP to ensure that the critical limits are met.	Not Conform	HACCP study is not revuée (new process step)Adequate management measures are established for each CCP. But for the monitoring step storage room CCP5B negative: cold rooms are equipped with an alarm control T ° C, parcontre the objectives and importance alarm is not mentioned in the table the survillence and verification of CCP
2.9.2	Each CCP must be defined under control. The monitoring system must be able to detect loss of control of the CCP and, whenever possible, provide information in time for corrective actions are implemented. For information, you may consider the following (non-exhaustive list): _ line measurements, off-line measurements, _ continuous measurements (eg, temperature recorder) _ when discontinuous measurements are used, the system must ensure that samples are representative of the batch of products.	Not Conform	monitoring system is not able to detect loss of control of the CCP
2.9.3	The records related to monitoring CCPs must be signed by the person responsible for the supervision and verified, if necessary, by an authorized person. The records shall include the dates and results of the measurements.	Not Conform	records associated with monitoring CCPs are not signed by the person responsible for monitoring and SONR not verified by an authorized person.
10.2 Establish a Corrective Action Plan - Codex Alimentarius Step 10, Principle 5			
2.10.1	The HACCP team should specify and document corrective actions to be taken when monitoring results show that the critical limits are not met, or when monitoring results indicate a trend towards loss of control. This should include actions to be implemented by designated persons and apply to all products that have been manufactured during the period when the process was out of control.	Not Conform	No designations of persons affected by the measures to be implemented for non-compliance.
2.10.2	Documented procedures must be established and maintained for the appropriate treatment of potentially dangerous products to ensure that they will not be released until it has validated that they conform to a release.	Non Conform	absence of documented procedures for the proper handling of potentially hazardous
2.11 Establish Verification Procedures - Codex Alimentarius Step 11, Principle 6			
2.11.1	Verification procedures must be established to confirm that the HACCP system is working. Examples of verification activities: _ internal audits _ journal records when exceeded acceptable limits _ reviewing complaints from authorities and clients _ reviewing incidents withdrawals or product recalls.	Not Conform	Lack of internal audits
2.11.2	The results of inspections must be recorded and reported to the HACCP team.	Not Conform	Meetings between the HACCP team are not documented

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BRC n°	Requierent	Finding	Responsible Motivation
2.12 HACCP Documents and Records Retention - Codex Alimentarius Step 12, Principle 7			
2.12.1	Conservation of documentation and records must be adequate to allow the company to verify that the HACCP controls are in place and maintained.	Not Conform	conservation documentation and records is not appropriate.
2.13 Review of the HACCP Plan			
2.13.1	The HACCP team must ensure that procedures exist for reviewing the HACCP plan before any changes that may affect the safety of products. For information, this may include the following (non-exhaustive list): _ change a raw material or raw material supplier, change an ingredient _ / following a recipe _ conditions change or transformation equipment; _ changes in packaging, storage conditions or distribution _ change in personnel or changes in responsibilities _ use change by the client _ evolution of scientific information related to ingredients, the process or product. Changes that are required following the review should be included in the HACCP plan, fully documented and validated.	Not Conform	No intergration of the new process step in the HACCP plan
2.13.2	In the absence of any changes referred to above, the HACCP plan must be reviewed at least annually and records kept	Not Conform	The HACCP study is not revised (new process step)
4.9 Maintenance and Hygiene			
4.9	systems maintenance and cleaning must be in place to ensure that appropriate standards of hygiene are maintained at all times and that the risk of contamination is limited	Not Conform	Lack of control systems and validation of cleaning and maintenance
4.9.1	Cleaning procedures must be documented and kept in place for buildings, facilities, premises and all equipment. Cleaning procedures shall include at least the following information: _ responsible for cleaning, equipment _ / area to be cleaned, the cleaning frequency _, _ cleaning method, cleaning products used _, _ recording head cleaning and verification	Not Conform	The cleaning procedure is not available
4.9.2	Equipment cleaning in place (CIP) must be controlled to ensure that they function effectively. One must take into account the frequency, the duration of the cycle, the temperature, the concentration of the product and the location and coverage of the washing balls. The NEP must be sufficiently separate product lines active	Not Conform	facilities cleaning in place (CIP) are not controlled
4.9.3	Cleaning and maintenance must be performed by trained personnel in accordance with documented procedures and records should be kept	Not Conform	Lack of training for personnel responsible for cleaning and maintenance
4.9.4	Equipment and cleaning products must be: _ adapted for their use; _ correctly identified for the intended use, eg a color code or label _ stored in hygienic conditions to avoid contamination.	Not Conform	equipment and cleaning products are not properly identified
4.9.5	The effectiveness of the cleaning and disinfection should be checked and recorded. Corrective actions must be documented	Not Conform	The effectiveness of cleaning and disinfection is not achieved or internally or externally
4.9.6	The procedures for cleaning and disinfection must be revalidated after construction or maintenance, the introduction of a new product or change equipment.	Not Conform	cleaning procedures and disinfectants are not revalidated (new process step)

BRC n°	Requierent	Finding	Responsible Motivation
7 PERSONNEL			
7.1	The company shall ensure that the personnel performing work affecting safety, legality and quality of the product is clearly competent to provide this activity as a result of training, work experience or a qualification	Not Conform	Lack of process of staff training
7.1.1	All relevant staff, including temporary staff and sub-contractors must receive adequate training before they start work, and should be adequately supervised throughout the duration of the work.	Not Conform	training on good hygiene practices are not documented
7.1.2	Where staff are involved in activities related to Critical Points (CCP), adequate training and monitoring procedures must be documented in place.	Not Conform	copy of the HACCP plan is not available in the CCP leaders critical points
7.1.3	The company shall establish documented programs covering training needs of staff. These programs should at a minimum: _ identify the skills needed for specific functions _ provide training or take other actions to ensure that staff have the necessary skills _ examine and audit the implementation and effectiveness of training and competence of the trainer; _ consider the appropriate language for the trainees during the training.	Not Conform	Lack of training plan
7.1.4	A record of all training must be available. It shows a minimum: the name of the _ intern and confirmation of its participation; _ the date and duration of the training _ the title of the training, and if necessary its contents _ trainer.	Not Conform	The forms of training are not available
7.1.5	The company should periodically reassess the skills of staff and provide, where appropriate, relevant training. This can be in the form of a "booster shot" of coaching, mentoring, or experience "on the ground".	Not Conform	No evaluation of training

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The appearance of these nonconformities, forcing the company to make a corrective action plan distributed in three categories which are: HACCP, Hygiene and Training showing the descriptions of non-conformities, corrective actions proposed deadlines executions, evidence of efficiency and implementing the date closing the non-compliance.Based on this vision, we notice that there's a radical change in the HACCP hygiene and staff training that are visible and summarized in TABLE (2).

The application of HACCP system in the production line of canned artichoke expresses the execution of the 12 steps above in the materials and methods that generate the basic seven principles of the system, which are:

TABLE 2

logo	Proposed corrective Action Plan by the Establishment			Version; 01		Code: PAC
				Implementation 01/01/2010		Page 1/3
N°	**Item**	**Description of not conform**	**Action (s) Corrective (s) proposed (s)**	**Timeframe**	**Finding efficient execution**	**Date**
2	HACCP	Company has not established a system based on 7 HACCP principles of Codex Alimentarius HACCP	Implementation of HACCP based on the 7 principles of HACCP Codex Alimentarius	15days	Effective	08/03/2010

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N°	Item	Description of not conform	Action (s) Corrective (s) proposed (s)	Timeframe	Finding efficient execution	Date
2.1.1		The team members do not have specific knowledge of HACCP, products, processes and dangers associated.	Organization of training on HACCP, products, processes and dangers associated	15days	Effective	08/03/2010
2.1..2		The HACCP team are not a designated and qualified must demonstrate its competence and experience of the HACCP	Appointment of qualified manager to control the HACCP	15days	Effective	08/03/2010
2.1.3		Records are not kept	Developing traceability procedures	15days	Effective	08/03/2010
2.1.4		The HACCP team does not have the commitment of top management	Develop a management commitment	15days	Effective	08/03/2010
2.2.1		The frozen artichokes description is not detailed	Elaboration sheets showing the description artichokes	15days	Effective	08/03/2010
2.2.2		Sources bibliographqiues underlying risk analysis are not documented	Documentation bibliographic source	15days	Effective	08/03/2010
2.2.3		The description, product specification is not complete, and not available for all products	Developing a comprehensive description and specification for artichokes	15jours	Effective	08/03/2010
2.3.1		The intended use of the product is not described	Description of intended use of the product	15jours	Effective	08/03/2010
2.4.1		The flow diagram does not describe all the steps of the process and product groups. (A new step is added to the manufacturing process)	Added new step in the process flow diagram	15jours	Effective	08/03/2010
2.5.1		The diagram is not checked (new process step)	Verification and validation of process flow diagram by the HACCP team	15jours	Effective	08/03/2010
2.6.1		The risk allergens has not been taken into account when considering HACCP	risk allergens is considered in the HACCP study	15jours	Effective	08/03/2010

N°	Item	Description of not conform	Action (s) Corrective (s) proposed (s)	Timeframe	Finding efficient execution	Date
2.6.2		The HACCP study is not revised (new process step)	The HACCP study is reviewed	15 jours	Effective	08/03/2010
2.6.3		HACCP justification acceptable levels for finished products is not established and not documented for each hazard.	Development of procedures showing acceptable levels for each hazard	15 jours	Effective	08/03/2010
2.7.1		Not reviewed for danges which requires a mastery	Developing reviewed for hazards requires a mastery Effective	15 jours	Effective	08/03/2010
2.8.1		The limits ctritques not defined for 5 CCP	Set critical limits for 5 CCP	16 jours	Effective	09/03/2010
2.8.2		The HACCP study is not revised (new stage process)The limit values set are not measurable	The values of the limits established should be measurable	16 jours	Efficace	09/03/2010
2.8.3		Lack HACCP team meetings	Planifiers and document HACCP team Runions	16 jours	Efficace	09/03/2010
2.9.1	HACCP	The HACCP study is not revuée (new process step) adequate management measures are established for each CCP. But for the monitoring step storage room CCP5B negative: cold rooms are equipped with an alarm control T ° C, by against the objectives and importance alarm is not mentioned in the table the survillence and verification of CCP	mention the objectives and importance of the alarm in the table watched, nce and verification of CCP	16 jours	Effective	09/03/2010
2.9.2		The monitoring system is not able to detect loss of control of the CCP	Development of monitoring systems that are able to test the loss of control	16 jours	Effective	09/03/2010
2.9.3		The records related to monitoring CCPs are not signed by the person responsible for monitoring and not verified by an authorized person	records associated with monitoring CCPs must be signed by the person responsible for monitoring and are checked by an authorized person	16 jours	Effective	09/03/2010

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N°	Item	Description of not conform	Action (s) Corrective (s) proposed (s)	Timeframe	Finding efficient execution	Date
2.10.1		No designations of persons affected by the measures to be implemented for non-compliance	designations of persons affected by the measures to be implemented for 16 days nonconformities	16 jours	Effective	09/03/2010
2.10.2		absence of documented procedures for the proper handling of potentially hazardous	procedure documented for Development of appropriate treatment of potentially dangerous products	16 jours	Effective	09/03/2010
2.11.1		Lack of internal audits	Preparation and implementation of internal audit procedure	16 jours	Effective	09/03/2010
2.11.2		Meetings between HACCP HACCP team are not documented	Documentation of meetings between the HACCP team	16 jours	Effective	09/03/2010
2.12.1	HACCP	Conservation of documentation and records is not appropriate	Developing procedure of Preparation of documents and records maitise	16 jours	Effective	09/03/2010
2.13.1		No intergration of the new process step in the HACCP plan	integration of the new process step in the HACCP plan	16 jours	Effective	09/03/2010
4.9		Lack of control systems and validation of cleaning and maintenance	Setting up a system of control and validation maintenance and hygiene Effective	17 jours	Effective	10/03/2010
4.9.1		The cleaning procedure is not available	establish a cleaning procedure	17 jours	Effective	10/03/2010
4.9.2		Equipment cleaning in place (CIP) are not controlled	CIP must be sufficiently separate product lines in operation	17 jours	Effective	10/03/2010
4.9.3	HYGIENE	Lack of training for staff responsible for cleaning and maintenance	Organization of training for staff responsible for cleaning and maintenance	17 jours	Effective	10/03/2010
4.9.4		Equipment and cleaning products are not properly identified	Identification of equipment and cleaning products	17 jours	Effective	10/03/2010
4.9.5		The effectiveness of cleaning and disinfection is not achieved or internally or externally	Implementation of internal and external analyzes to validate the cleaning	17 jours	Effective	10/03/2010
4.9.6		The procedures for cleaning and disinfection are not revalidated (new process step)	revalidated the procedure for cleaning and disinfection after each modification process	17 jours	Effective	10/03/2010

N°	Item	Description of not conform	Action (s) Corrective (s) proposed (s)	Timeframe	Finding efficient execution	Date
7.1		TRAINING Lack of staff training procedure	Establish a procedure for staff training	18 jours	Effective	11/03/2010
7.1.1		training on good hygiene practices are not documented	Document training on good hygiene practices	18 jours	Effective	11/03/2010
7.1.2	FORMATION	Copy of the HACCP plan is not available in critical CCP responsible	Put at the disposal of CCP responsible copies of the HACCP plan	18 jours	Effective	11/03/2010
7.1.3		Lack of a training plan	Establish a training plan	18 jours	Effective	11/03/2010
7.1.4		The training records are not available	Availability of training records	18 jours	Effective	11/03/2010
7.1.5		No evaluation of training	Training Evaluation	18 jours	Effective	11/03/2010

- Principle 1: Hazard determinations.
- Principle 2: identification of critical points.
- Principle 3: adjustment of critical limits.
- Principle 4: Adjustment of a surveillance system.
- Principle 5: Determination of corrective actions
- Principle 6: Apply verification system.
- Principle 7: creation of a documentary.

Product Description

The bag should be canned artichoke duct sufficient information for staff involved in the next stage of the food chain of the product, stores and exposes the product for sale without risk. The product is described according to the Guide to Good Manufacturing Practice: artichoke heart pieces frozen, stored and distributed at temperatures <-18 ° C. The intended use: Ready to be consumed after thawing.

Different batches of food should be easily identifiable by lot number to find the history of the product in case of need. Other revelations are also marked on the packaging of plastic bag such as date of manufacture, date of end consumption and the chemical formulation of the product. These data are essential for the consumer to check the product before use and be careful in how to use the product.

Diagram manufacture

The process flow diagram is developed in collaboration with the production manager, the quality manager and completed in the field by the existence of qualified personnel (Figure 2).This flow diagram was developed by expressing the steps for adding each ingredient entering the product construction. All resulting layers are treated so ordered, upon receipt of the raw material, preparation, washing, freezing up the expedition, including all appropriate measures. Once the team validates properly diagram construction, it is unchangeable. If changes are made to the product formulation, preparation procedures or a manufacturing step, in this case must be evaluated a second time the HACCP plan based on these changes and create a new version.

The concrete investigation of potential dangers and recognized as risk analysis form the corresponding axes of the HACCP plan. Difficult dangers of the production line are of three types: chemical, biological and physical.

Chemical hazards are related to chemicals resulting environment during use pesticides that can not be managed by the company or for handling during the packaging process (oils and greases food machines revision, traces detergents...).

Other chemical hazards are likely abnormal heavy metals.

The control of these hazards can be done by chemical analyzes of water daily physicochemical and product.

Biological hazards are related to infections and development of bacteriatoxigenic which may be due to poor implementation of good hygiene practices and

manufacturing, as well as a bad sector organization artichokes departure.Physical hazards are foreign bodies can penetrate during one of the stages of the production chain and remaining in the finished product. Foreign bodies can be nails, jewelry, pieces of glass, pieces of plastic. Staff should incur liability by thinking all the operations which are connected with an application of good hygiene practices.

The different stages of the process flow diagram (Figure 2), we got to raise 60 hazards, biohazards forming 45% of all dangers. Chemical hazards profit from the second location with 30%, while 25% are physical hazards.

Determination of PAC

Honest determination of various CCP is based on a decision tree (Figure 1) in which the HACCP team asked questions and consistent characteristics to help raise the real CCP relative to a point that could be manipulated by the GMP or BPH.The CCPB type coincide biological development of pathogenic micro-organisms in the production intervals.

The PAAB physical types are those related to a passage of a foreign body (stone, metal, plastic, glass, paper...) at the sorting stage[23]. Once we identify the risks, appropriate measures should be considered, that is to say, it is necessary to implement an operation, training of staff in a given approach vis opinion GMP or GHP or activity to control the significant hazard for it to be removed, removed or reduced to an acceptable level.

In the case of storing the product in negative chamber and to avoid contamination of microorganisms, a temperature control must be conducted in a rigorous and continuous manner so that it remains lower than -18 ° C. For this alarm system is installed to warn any abnormal change in temperature and in the case of power failure a generator automatically starts to take reclure and is therefore preventive measures to ensure the safety of the finished product.The monitoring action runs or using a suitable apparatus: refractometer, pH meter, thermometer calibrated correctly or following a well-controlled operation: visual and manual control during triage, In general, the surveillance system is based on four radical questions: Who? What? When? How?

And to verify and validate our system it carries out internal audits, and microbiological and physicochemical analyzes.

A document must be recorded for each operation or activity which falls in the preparation and packaging of our product which shows evidence that the thresholds set are met, and it remains as proof whenever we seek the origin of a problem. It provided a product traceability and proof of product safety in cases of necessity and as a sign of the success of the HACCP planTo do this, we moved towards the preparation and implementation of a set of procedures for the activities of recall and traceability. And are recorded along another path that is electronic.

CONCLUSION

With the application of HACCP steps Deuze which includes seven principles helped us raised various dangers that lie long chain manufacturing artichokes, and using decision tree is arrived CCP has identified five that do are:

CCP chemical step of receiving is due to the existence of traces of pesticides in the product due to misapplications of chemicals in the field.

CCP biological washing phase which may be due to an overload of pathogenic microorganisms in the product after a washing ineffective

CCP biological rinsing step may be due to passage of microorganisms after a rinse ineffective.- CCP physical level metal detector that can be due to the transition metal objects result in malfunction of the unit.

CCP biological step of storing the finished product in the negative chamber which may be due to the following developments pathogenic microorganisms at temperatures ofFreezing or non-conforming to the disconnection of the power supply.For each CCP was established critical limits, established a system of monitoring, corrective actions for any deviations or lack of supervision, establish a system of checks to ensure compliance and evaluate our system and finally establish a retrieval system to trace the history of our product and in case of necessity.

And that's how the company stinks improve product quality, reduce disparities, gain satisfaction from these customers, gain other markets, and protect its brand image.

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