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Transnational Quality Education for Organic Food Safety
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SAFE-ORGfood

Ready-to-implement manuals with practical solutions on food safety

HACCP Plan

for

pasteurized apple juice

(organic product)

Developed by SAFE-ORGfood Team

from

Estonian University of Life Sciences

Names of co-authors:

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Intellectual Output coordinating institution: Warsaw University of Life Sciences – WULS (Poland). All Partners contributed towards the development of this Intellectual Output of the project. Corresponding author Katrin Laikoja, e-mail katrin.laikoja@emu.ee

Content

1. Assemble HACCP team document

Name of organic plant 1st September 2021

§ 1

I am appointing a Team to implement the HACCP system (Hazard Analysis and Critical Control Point) composed of:

Katrin Laikoja-team leader

Mati Roasto- team member

Elen Peetsmann- team member

Anne Luik- team member

§ 2

The purpose of establishing the HACCP Team is to develop a HACCP system for the organic company producing Apple Juice (name of the product). The scope of HACCP Plan for the product is to ensure food safety and cover all production processes from accepting ingredients to distributing the final product.

§ 3

Members of the HACCP Team have the right to access all plant documents and to review the plant area and obtain all information necessary to develop the HACCP system.

§ 4

Plant employees are required to provide members of the HACCP team with all necessary information (oral and written) to develop the HACCP system.

§ 5

The HACCP team is obliged to develop HACCP Plan according to Regulation (EC) 852/2004 Regulation and *Codex Alimentarius*.

§ 7

The HACCP Team is appointed for the following period 1st Sep 2021 – 31st Jul 2022.

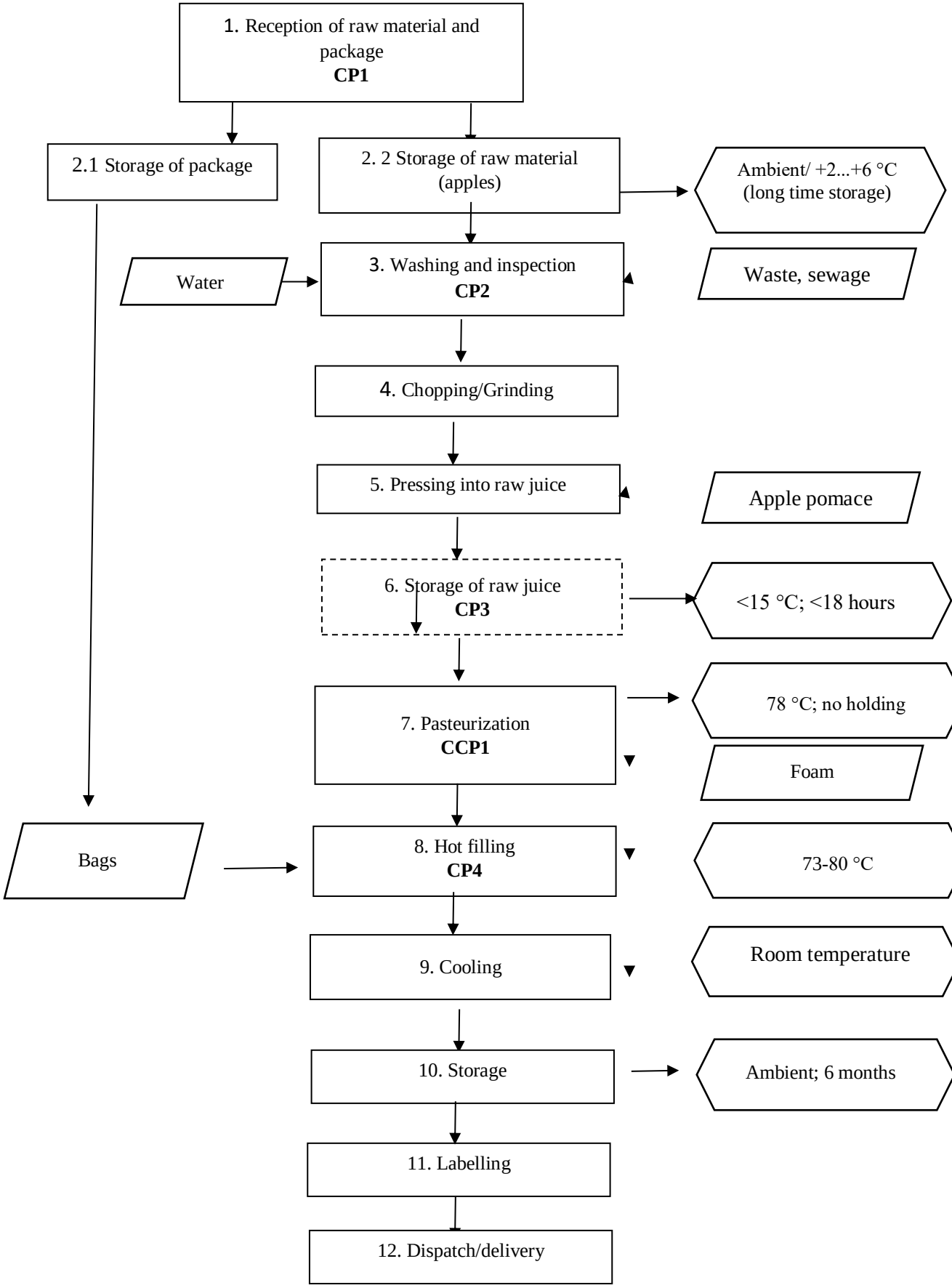
Director's/Owner's of the organic plant

Signature

2. Product description and identify intended use

Name of organic product	**Apple juice, organic, pasteurized, 3 liters bag**
Ingredients	**Organic ingredients:** apples
Production steps	**Production 12 steps:** Reception of raw material and package, Storage of raw material and package, Washing and inspection, Chopping/Grinding, Pressing, Storage of raw juice, Pasteurization (CCP), Hot Filling, Cooling, Storage, Labelling, Dispatching.
Physical/chemical characteristics	Characteristic of apple juice, without off-flavors and odors Color characteristic for the product – light brown Some sediment allowed pH 3.6-4.0 Processing methods/technologies: pasteurization
Microbiological/Chemical Criteria	Yeasts 1 x 10^2 Moulds 1 x 10^2 *Enterobacteriaceae* <1 x 10^1
Durability/shelf life	6 -12 months. After opening, keep in the refrigerator and consume within 2 weeks.
Storage conditions	Store in a dry, cool place. Protect against direct sunlight and frost.
Information on the label	The name of the food, the list of ingredients, net quantity of food, the date of minimum durability, conditions of use, the name of business and address, nutrition declaration Nutritional values per 100 ml: ● the energy value of 193 kJ/45 kcal, ● fat 0.1 g, of which saturated fatty acids 0.1 g, ● carbohydrates 11 g, of which sugars 9.7 g, ● protein 0.5 g, ● salt 0 g. EU organic product logo; Estonian eco-label EE-ÖKO-02 (code of Agriculture and Food Board); Estonian agriculture After opening, keep in the refrigerator and consume within 2 weeks.
Distribution methods	Transport in dry and cool conditions.
Packaging	Outer EVOH, inner PE, Closure VITOP STANDARD
Consumption conditions	RTE food, direct consumption
Identify intended use	Product for all consumer groups. Juice, juice for making drinks, desserts. Vegan

3. Construct process flow diagram



On-site verification of flow and schematic

On ……. 2022, the HACCP team verified the technological scheme of the organic product in the production conditions:

No discrepancies between the actual state were found and drawn diagrams.

Signatures of persons carrying out the verification of the technological scheme:

1…….

2…….

3…….

4…….

4. HACCP PRINCIPLE 1: Conduct a hazard analysis and identify control measures

PRINCIPLE 1									
1	2			3			4		5
			3A	3B	3C	3D	4A	4B	
Step (name or number)	Identify potential hazards introduced, controlled or enhanced at this step B = biological C = chemical P = physical		Source of hazards	The likelihood of occurrence of hazards (the frequency) Assess 1, 2,3, e.g. 1 - very rarely, 2 - average 3 - very often	The severity of adverse health effects associated with the hazards in the food in the absence of control Assess 1, 2,3, e.g. 1 - light, 2 - average 3 - very serious	Risk assessment Significant risk is in case of 6 and 9	Does this potential hazard need to be addressed in the HACCP plan?		What measure(s) can be applied to prevent or eliminate the hazard or reduce it to an acceptable level? List appropriate actions from the level of good hygiene and manufacturing practice
				O	S	R = O x S	YES	NO	
1. Reception of raw material and package	B	Soil pathogens (e.g *STEC*, *Salmonella* spp, *Listeria monocytogenes*), moulds, yeasts	Raw material	2	2	4	-	N	PRP: Raw materials (supplier selection, specifications)
		Flies, snails	Raw material	2	2	4	-	N	PRP: Working methodology PRP: Raw materials (supplier selection, specifications) PRP: Working methodology
	C	Pesticides in the raw material Mycotoxins (patulin) at concentrations above the maximum level in the raw material/ingredient	Raw material Raw material	1 1	2 2	2 2	- .	N N	PRP: Raw materials (supplier selection, specifications) PRP: Working methodology PRP: Raw materials (supplier selection, specifications)
		Chemicals released from food contact materials	Storage container	1	1	1	-	N	PRP: Working methodology PRP: Raw materials (supplier selection, specifications)
	P	Physical hazards in bulk raw materials (stones, leaves)	Raw material	2	1	2	-	N	PRP: Raw materials (supplier selection, specifications)
		Physical hazards	Vehicle	2	1	2	-	N	PRP: Working methodology

1	2		3				4		5
			3A	3B	3C	3D	4A	4B	
2. Storage of raw material (apples)	B	Pests contaminating the raw materials Microbial growth: insufficiently low temperature control will result in microbial growth	Storage room, containers Method	1 1	2 2	2 2	- -	N N	PRP: Pest control: focus on prevention PRP: Working methodology PRP: Technical maintenance and calibration PRP: Temperature control of storage environment
	C	Contamination from disinfectants Commingle with non-organic material	Storage room, containers Method	1 1	1 2	1 2	- -	N N	PRP: Physical and chemical contamination from production environment PRP: Cleaning and disinfection PRP: Working methodology
	P	Contamination from the storage area	Storage room, Containers	1	2	2	-	N	PRP: Infrastructure (building and equipment) PRP: Technical maintenance and calibration PRP: Working methodology
3. Washing and inspection	B	Contamination	Water Personnel Equipment	1 1 1	2 1 2	2 1 2	- - -	N N N	PRP: Working methodology PRP: Water and air control PRP: Personnel (training, hygiene, health status) PRP: Cleaning and disinfection
	C	Contamination	Water	1	2	2	-	N	PRP: Water and air control
	P	Contamination via manual handling and personnel intervention Contamination via washing equipment Remains of intrinsic physical hazards, eg seeds, leaves	Personnel Equipment Raw material	1 1 2	1 1 1	1 1 2	- - -	N N N	PRP: Personnel (training, hygiene, health status) PRP: Infrastructure (building and equipment) PRP: Technical maintenance and calibration PRP: Working methodology

1	2	3				4		5		
		3A	3B	3C	3D	4A	4B			
4. Chopping/grinding	B		Contamination due to a failure to clean and disinfect equipment properly, lack of personal hygiene, from the environment	Equipment Personnel Environ-ment	1 1 1	2 1 2	2 1 2	- - -	N N N	PRP: Infrastructure (building and equipment) PRP: Biological contamination from production environment PRP: Working methodology PRP: Cleaning and disinfection PRP: Technical maintenance and calibration PRP: Personnel (training, hygiene, health status)
	C		Contamination with chemical hazards from the equipment, personnel	Equipment Personnel	1 2	1 1	1 2	- -	N N	PRP: Cleaning and disinfection PRP: Personnel (training, hygiene, health status)
	P		Contamination with physical hazards from the environment	Environment	2	1	2	-	N	PRP: Working methodology PRP: Physical and chemical contamination from production environment
5. Pressing of raw juice	B		Contamination due to a failure to clean the equipment properly, lack of personal hygiene	Equipment Personnel	2 1	1 1	2 1	- -	N N	PRP: Cleaning and disinfection PRP: Personnel (training, hygiene, health status) PRP: Working methodology
	C		Contamination with chemical hazards from the equipment (material of textile, plastic), personnel	Equipment Personnel	1 2	1 1	1 2	- -	N N	PRP: Cleaning and disinfection PRP: Raw materials (supplier selection, specifications) PRP: Working methodology
	P		Pieces of chopped apples	Raw material	2	1	2	-	N	PRP: Working methodology
6. Storage of raw juice	B		Contamination due to a failure to clean and disinfect equipment properly	Equipment	2	1	2	-	N	PRP: Cleaning and disinfection
	C		Contamination with chemical hazards from the storage container (incorrect food contact material)	Equipment	1	3	3	-	N	PRP: Raw materials (supplier selection, specifications) PRP: Working methodology
	P		Contamination with physical hazards from the environment (if uncovered)	Method	2	1	2	-	N	PRP: Working methodology PRP: Personnel (hygiene, health status) PRP: Physical and chemical contamination from production environment

1	2		3				4		5
			3A	3B	3C	3D	4A	4B	
7. Pasteurization	B	Failure to achieve sufficiently high temperatures to ensure that microbial hazards are killed	Method	2	3	6	Y	-	PRP: Working methodology PRP: Technical maintenance and calibration
	C	Chemicals released from food contact materials, wrong choice of food contact materials (eg aluminium)	Equipment	1	3	3	-	N	PRP: Raw materials (supplier selection, specifications) PRP: Working methodology
	P	Contamination with physical hazards from the environment	Method	1	1	1	-	N	PRP: Working methodology
8 . Hot filling	B	Contamination due to a failure to clean and disinfect filling inventry properly	Equipment	1	3	3	-	N	PRP: Cleaning and disinfection PRP: Working methodology
	C	Chemicals released from food contact materials (eg inventry, package) due to too high temperature	Equipment Package	1 1	3 3	3 3	- -	N N	PRP: Raw materials (supplier selection, specifications) PRP: Technical maintenance and calibration PRP: Working methodology
	P	Not detected	-	-	-	-	-	-	
9. Cooling	B	Not detected	-	-	-	-	-	-	-
	C	Not detected	-	-	-	-	-	-	
	P	Not detected	-	-	-	-	-	-	
10. Storage	B	Microbial growth due to spores Lost traceability	Method Method	1 1	2 1	3 1	- -	N N	PRP: Temperature control of storage environment PRP: Working methodology
	C	Not detected	-	-	-	-	-	-	
	P	Damaged package (eg, because of rodents)	Environment	1	3	3	-	N	PRP: Pest control: focus on prevention PRP: Physical and chemical contamination from production environment

1	2		3				4		5
			3A	3B	3C	3D	4A	4B	
11. Labelling	B	Wrong label, wrong labelling information	Method	1	2	2	-	N	PRP: Product information and customer awareness PRP: Working methodology
	C	Not detected	-	-	-	-	-	-	
	P	Not detected	-	-	-	-	-	-	
12. Dispatching	B	Lost traceability	Method	1	1	1	-	N	PRP: Working methodology
	C	Not detected	-	-	-	-	-	-	
	P	Not detected	-	-	-	-	-	-	

5. HACCP PRINCIPLE 2: Determine Critical Control Points (CCPs), PRINCIPLE 3: Critical limits, PRINCIPLE 4: Monitoring, PRINCIPLE 5: Corrective actions

Critical Control points are to be determined **only** for hazards identified as significant as of the result of a hazard analysis.
CCPs are established at steps where control is essential and where a deviation could result in the production of a potentially unsafe food.

		PRINCIPLE 2							**PRINCIPLE 3**	**PRINCIPLE 4**				**PRINCIPLE 5**	
Name of the step of significant risk	Which kind of hazards should be control-led	Does this step need to be identified as CCP?		Justify your decision. What method did you choose to decide if a step is a CCP? You can use the decision tree or expert consultation	Decision tree (acc. *Codex Alimentarius*)				Critical limits	What	How	When (Frequency)	Who	Corrective action	Records for Principle 4 and 5
		Yes	No		Q 1	Q 2	Q 3	Q 4							
Pasteuri-zation CCP1	B	Y	-	Decision tree	Y	Y	-	-	Temp.: 78 °C/ without holding time	Tempe rature	Manually/Aut omatic temperature and time measurement by pasteurizer	Every batch	An employee performing the process	- Make adjustments to ensure the right pasteurization temperature, - Inform the manager of critical parameter values, - Repeat the process in right parameters. - Contact with the service provider of the device - Eliminate the cause of failure in cooperation with technical service	Form for recording of monitorin g and correctiv e actions in CCP1

6. Control Points

Control Points are to be determined for hazards identified as the result of a hazard analysis

Name of the step	Kind of hazard	Process parameters	Records
Reception of raw material and package CP1	Microbiological, chemical (mycotoxin patulin)	Visual inspection: no visually soiled apples, no rotten apples Up-to-date organic certificates and/or declaration of conformity Delivery document Visual check of vehicle	Organic certificates, declarations of conformity Monitoring sheets for raw material Monitoring sheets for vehicle Delivery certificates
Washing and inspection CP2	Damaged apples, rotten spots	Visual inspection: no visually soiled apples, no rotten apples	---
Storage of raw juice CP3	Microbial growth	<15 °C; <18 hours	Monitoring sheets for temperature and time control
Hot filling CP4	Chemical hazard from food contact materials	73-80 °C	Monitoring sheets for temperature and time control

7. Monitoring and corrective action procedure in CCP1 Pasteurization process

1. **PURPOSE:**
The purpose of the procedure is to determine the method of monitoring CCP2 Pasteurization process and to determine corrective actions in the event that the process parameters are out of control.

2. **SCOPE AND SUBJECT:**
Determination of critical values and critical limits of monitored process parameters, determinations of methods of their monitoring, determining of persons responsible for monitoring CCP1 and frequency of CCP1 monitoring, determination of corrective actions in case of failure to meet the established critical limits in CCP1, definition of record keeping.

3. **DEFINITIONS:**
CCP – Critical Control Point. A step at which a control measure or control measures, essential to control a significant hazard, is/are applied in a HACCP system.
Critical limit - A criterion, observable or measurable, relating to a control measure at a CCP which separates acceptability from unacceptability of the food.
Monitoring – The act of conducting a planned sequence of observations or measurements of control parameters to assess whether a control measure is under control. Monitoring in other words is checking the value of critical limits.
Corrective actions - Any action taken when a deviation occurs in order to re-establish control, segregate and determine the disposition of the affected product if any and prevent or minimize reoccurrence of the deviation.

4. **INTERESTED DEPARTMENTS:**
Production.

5. **RESPONSIBILITY AND AUTHORITY:**
The HACCP team develops the monitoring methods and develops type of corrective actions. The determined responsible person accepts the established monitoring system and corrective actions. Head of the production department / technologist / determined responsible person supervises the daily implementation of CCP monitoring and corrective actions. The pasteurizer operator is responsible for checking the critical limits und undertaken the corrective actions.

6. **PROCEDURE:**
6.1. The pasteurization process is carried out at the temperature of 78 °C, without holding time. The pasteurizer is operated in accordance with the device operating instructions. The pasteurizer is equipped with automatic temperature measurement - recording on a continuous register tape. In manual/batch pasteurization in a vat/tank, temperature is measured by thermometer.
6.2. The operator checks the pasteurization temperature of **every batch** before filling into the bags.
6.3. When critical values of the process parameters don't met the critical limits, the pasteurizer operator:

- makes adjustments to ensure the right pasteurization temperature,
- notifies the manager of critical parameter values,
- repeat the process in right parameters.
- contact with the service of the device
- eliminates the cause of failure in cooperation with technical services.

6.4. The results of monitoring, i.e. the value of each parameters should be recorded in the "Form of monitoring and corrective actions in CCP1".

6.5. Corrective actions are to be recorded in "Form for record of monitoring and corrective actions in CCP1" immediately after their execution.

6.6. Each columns in "Form for record of monitoring and corrective actions in CCP1" are to be filled/not left empty. If the corrective actions are not needed, a horizontal dash should be put in the "corrective actions" column.

6.7. Undertaken actions concerning monitoring and corrective actions are to be signed by responsible person.

7. RECORD:

Form for recording of monitoring and corrective actions in CCP1.

8. Record for monitoring and corrective actions of CCP1

Form for recording of monitoring and corrective actions in CCP1 Pasteurization of Apple Juice

Critical limits: temperature value not less than 78 °C

		PRINCIPLE 4	PRINCIPLE 5			
Date	**Time**	**Monitoring***	**Are corrective actions necessary**		**Corrective actions****	**Signature**
		Temp., °C	**No****	**Yes*****		
Example of the filling the document						
22.05	10:30	78,9	No	--		
22.05	12:45	80,2	No	--		
23.05	11:10	73,1	--	Yes	Additional heating until 78 °C	Signature

* enter values of critical limits, ** if no, please insert "No" *** if yes, please insert "Yes", **** enter the actions taken in accordance with the Monitoring and corrective action procedure in CCP1 Pasteurization

9. HACCP PRINCIPLE 6: HACCP internal audit procedure (for medium and large scale food business operators)

1. PURPOSE:

Establishing and standardizing the procedure for planning, conducting and documenting internal audits of HACCP system.

2. SCOPE AND SUBJECT: General principles of planning internal audits, conducting and documenting internal audits. The scope include audit schedule, conducting and documentation of audits.

3. DEFINITIONS:

Audit - systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled. In simple words, audit is process of checking whether approved performance is functioning in practice.

Auditor - an employee who has qualifications to perform food safety audit and is able to conduct the audit.

Observations – a statement of fact made during an audit and proves by objective evidence.

Objective evidence – records or statements of fact, which can be verified.

Non-conformity – the nonfulfillment of specified requirements.

4. INTERESTED DEPARTMENTS:

The whole company.

5. RESPONSIBILITY AND AUTHORITY:

The owner is responsible for establishing audit team, i.e. one or more auditors conducting an audit and for the audit schedule and determining the purpose and the scope for each audit. Auditors are responsible for the conducting the audit according audit scope based on the audit criteria.

6. PROCEDURE:

6.1. Auditor candidates must have knowledge about specifics of the company.

6.2. Auditor candidates must successfully complete an auditor training course or trained on site.

6.3. Evidence of auditor qualifications is maintained in employee training files.

6.4. Internal audits are carried out at least once per year.

6.5. The purpose, scope and auditor are determined for each audit. The responsible person for internal audits prepares the audit schedule in December for the next year. The purpose and the scope is determined for each audit. The auditors are to be chosen from staff members.

6.6. Management informs personnel in the involved departments about oncoming audit.

6.7. There are four phases of an audit: opening meeting, performing the audit, auditor's meeting, closing meeting. The diagram of the internal audit is presented in the next procedure.

6.8. The auditor should arrive to the audit always on time. During the opening meeting should the purpose of audit and scope of audit be confirmed by the auditor.

6.9. Performing the audit the auditor should carry out audit according to the plan, using the checklist, according to audit scope, observing operations at work, interviewing personnel.

6.10. The audit should be performed on the basis of the checklist. The example of the checklist is attached to the procedure. The auditor adjusts the checklist according to the purpose of the audit.

6.11. The auditor will collect evidence through interviews, examination of documents and quality / food safety records, and observation of activities and conditions in areas of concern.

6.12. All audit observations are documented, even if not originally covered in the checklist. Area management will be constantly informed of findings, there are to be no surprises at the closing meeting.

6.13. Necessary follow-up activities are determined by the auditor as corrective actions when nonconformities were found during the internal audit. The auditor will note required follow-up in the "Form of identified nonconformities and corrective actions" and determine an appropriate length of time needed to implement the corrective action and judge it's effectiveness.

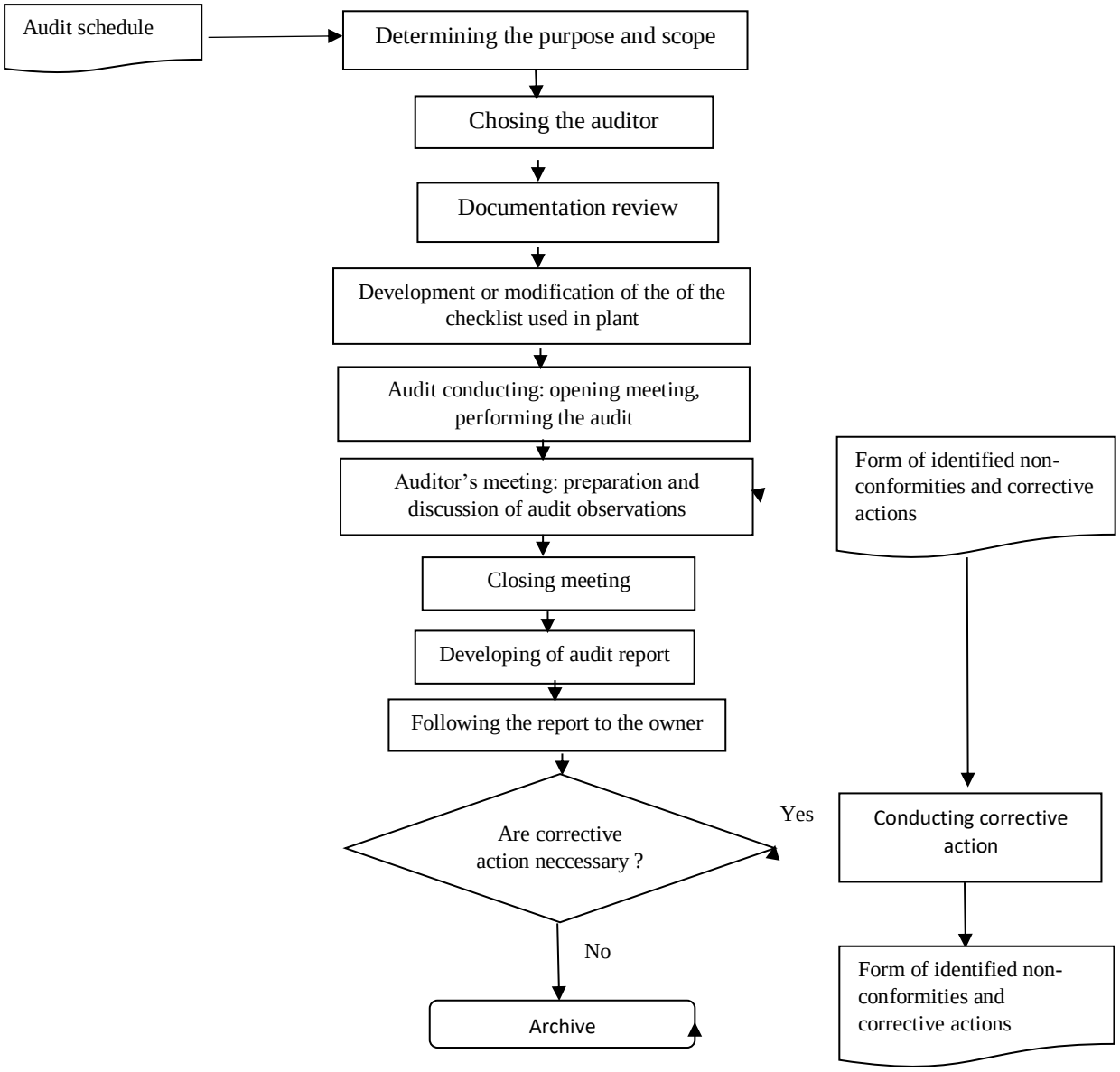
6.14. The auditor will present during the closing meeting audit observations, taking into account their perceived significance and conclusions regarding the effectiveness of the food safety system.

6.15. After the internal audit is completed, the audit team prepares an audit report, which is also overviewed by the owner.

7. RECORDS:

HACCP audit checklist
Form of identified non-conformities and corrective actions
Internal audit report form

Audit scheme



10. HACCP audit checklist*

Step	Audit questions	Conformity	Non-conformity	Audit evidence
1.	**HACCP team**			
1.1	Was HACCP team assembled in the enterprise?			
1.2	Was it a multidisciplinary team?			
1.3	Were all team members trained in HACCP?			
1.4	Was the HACCP plan developed?			
1.5	Was the team consisted of people with an understanding of particular biological, chemical and physical hazards and associated risks?			
1.6	Was the team consisted of people involved in production process?			
1.7	Was the team consisted of people with knowledge in microbiology, hygiene and food technology?			
2.	**Product description**			
2.1	Were products described?			
2.2	Where all range of products described?			
2.3	Was description of products made properly?			
2.4	Was the composition of products described including all raw materials, ingredients, additives?			
2.5	Was the composition of products complete?			
2.6	Was the type of the product processing specified?			
2.7	Was it specified how the product should be packaged?			
2.8	Was the microbiological parameters of the product specified?			
2.9	Was the chemical parameters of the product specified?			
2.10	Was the sensory parameters of the product specified?			
2.11	Was the physical parameters of the product specified?			
2.12	Was it specified how the product should be stored?			
2.13	Was it specified how the product should be transported and distributed?			
2.14	Was the durability term of the product specified?			
2.15	Where the labeling information appropriate?			
3.	**Identifying of intended use**			
3.1	Was intended use of all products specified?			
3.2	Was the nature of the target group for the product specified?			
3.3	Was the target group includes infants?			
3.4	Was the target group includes elderly people?			
3.5	Was the target group adults?			
3.6	Was the target group includes allergic or malnourished people?			
3.7	Was the intended use of products defined?			
4.	**Flow diagram**			
4.1	Were products detailed flow diagrams drawn up?			
4.2	Did flow diagrams included all raw materials, ingredients, additives?			
4.3	Did flow diagrams included packaging?			
4.4	Was the sequence of all production steps established?			
4.5	Did flow diagrams included technical parameters of raw materials?			
4.6	Did flow diagrams included technical parameters of byproducts?			
4.7	Did flow diagrams included technical parameters of final products?			
4.8	Did flow diagrams included breaks between production steps?			
4.9	Did flow diagrams excluded the risk of cross-contamination?			
4.10	Were procedures for cleaning and disinfection established?			
4.11	Was the hygienic environment of the production process provided?			
4.12	Did employees maintained hygiene during the production process?			
4.13	Were adequate conditions of storage and distribution of products ensured?			
5.	**On site confirmation of flow diagram**			
5.1	Was on site confirmation of flow diagram made?			
5.2	Was flow diagram confirmation made during production process?			
5.3	Was there evidence of performance the confirmation?			
5.4	Was the confirmation made by HACCP team?			
6.	**Principle 1**			

6.1	Was a list of possible hazards made?			
6.2	Was a list made for all steps in accordance with the developed product flow diagrams?			
6.3	Did a list included physical hazards?			
6.4	Did a list included chemical hazards?			
6.5	Did a list included microbiological hazards?			
6.6	Did a list included biological hazards?			
6.7	Did causes of possible hazards specified?			
6.8	Did preventive actions which eliminate or reduce hazards established?			
6.9	Did probability that hazards would occur specified?			
6.10	Did undesirable health influence of mentioned hazards specified?			
6.11	Did survival and multiplication of pathogenic microorganisms considered?			
6.12	Did formation of chemicals in products and production environment considered?			
6.13	Did allergens in products considered?			
6.14	Did the possibility of secondary pollution between raw materials, intermediate and finished products considered?			
6.15	Were control measures for specific hazards specified?			
6.16	Were all control measures assigned to existing procedures and specifications?			
7	**Principle 2**			
7.1	Were CCPs established?			
7.2	Were methods leading to determine CCPs specified?			
7.3	Was a decision tree used to determine CCPs?			
7.4	Was a decision tree used in accordance with flow diagrams at each production step			
7.5	Was a decision tree applied for each hazard at each production step?			
7.6	Did the HACCP team members received training from the use of decision tree and was it evidenced?			
7.7	Were CCPs identified properly?			
7.8	Whether any step, for which CCP should be determined, was omitted?			
7.9	Did employees working in the CCP are known that in this step CCP was established?			
7.10	Did employees working in the CCP area known what was CCP established for?			
7.11	Could supervisor of HACCP system listed all CCPs?			
8.	**Principle 3**			
8.1	Were parameters and critical limits established for each CCP?			
8.2	Were parameters and critical limits acknowledged in the documentation?			
8.3	Were critical limits correspond to the acceptable border values with regard to product safety?			
8.4	Whether critical limits were set for observable or measurable parameters which could show that CCP is under control?			
8.5	Were limits based on reasonable assumptions?			
8.6	Were critical limits properly chosen in each CCP?			
8.7	Did employees working in the CCP area known parameters of critical limits at this CCP?			
8.8	Did employees working in the CCP area known values of critical limits parameters at this CCP?			
8.9	Did employees responsible for monitoring of CCP known parameters and critical limits at CCP for which they were responsible?			
8.10	Did supervisor of HACCP system known parameters and critical limits for all established CCPs?			
9.	**Principle 4**			
9.1	Were monitoring system for all CCPs established?			
9.2	Were monitoring procedures for each CCP elaborated?			
9.3	Was the frequency of monitoring established?			
9.4	Was the frequency of monitoring established properly?			
9.5	Were monitoring methods established?			
9.6	Were monitoring methods adequate?			
9.7	Were employees responsible for CCPs monitoring designated?			
9.8	Were there CCPs monitoring devices?			
9.9	Were monitoring devices showed reliable measurements?			
9.10	Were there control cards to record the results of monitoring for each CCP?			
9.11	Did control cards allowed keeping of records of all monitored parameters in CCPs?			

9.12	Did the CCP monitoring procedures were available to employees responsible for each CCP?			
9.13	Did employees known the monitoring procedure at the CCP for which they are responsible?			
9.14	Whether employees responsible for monitoring at the CCP were aware of their responsibility for food safety?			
9.15	Were results of CCPs monitoring recorded regularly?			
9.16	Were entries in CCPs control cards completed?			
9.17	Were results of CCPs monitoring regularly evaluated by supervisor or competent person?			
9.18	Did control cards were located at easily accessible place and allowed records keeping?			
10.	**Principle 5**			
10.1	Were there corrective actions for each CCP, when monitoring results indicated a loss of control?			
10.2	Were corrective actions fully ensured a return to the assumed parameters?			
10.3	Were there corrective actions procedures for each CCP?			
10.4	Were there designated employees responsible for corrective actions for each CCP?			
10.5	Were there control cards to document the corrective action taken at all established CCP?			
10.6	Was there instruction of specified use of products obtained during period when CCP was out of control?			
10.7	Did employees working in the CCP area known procedures of corrective action at the CCP for which they are responsible?			
10.8	Could employees responsible for the CCP explain the way of action in case of exceeding the critical limit at the CCP?			
10.9	Whether employees responsible for corrective actions at the CCP for which they are responsible were aware of their responsibility for food safety?			
10.10	Were corrective actions always taken when control was lost in all the CCP?			
10.11	Did control cards were at easily accessible place and allowed records keeping?			
10.12	Were records of actions taken in line with the procedures of corrective actions?			
11.	**Principle 6**			
11.1	Were methods of HACCP verification established?			
11.2	Was the frequency of HACCP verification established?			
11.3	Were established verification methods appropriate?			
11.4	Was established frequency of HACCP verification adequate?			
11.5	Whether verification procedures were established to confirm that the HACCP system was effective and consistent with the plan?			
11.6	Was a employee responsible for analyze of verification results designated?			
11.7	Did verification included the accuracy of records?			
11.8	Did verification included also asking questions of employees, especially CCPs monitors?			
11.9	Did verification included observation of operations at CCPs?			
11.10	Did verification included calibration of monitoring devices?			
11.11	Were the verification of HACCP system made at established frequency?			
11.12	Were the verification of HACCP system made in accordance to established verification methods?			
11.13	Were the verification results analyzed by competent person?			
11.14	Did the verification results influenced the frequency of verifications?			
11.15	Did the verification results lead to improvement of HACCP system?			
11.16	Did persons designated to verification had the relevant authority e.g. auditor's training, proven expertise in HACCP system?			
11.17	Were preventive and corrective actions taken after verification of HACCP system?			
11.18	Were developed documentation of HACCP system verified periodically?			
12	**Principle 7**			
12.1	Was there a documentation of the HACCP system?			
12.2	Was there a documentation dealing implementation steps of the HACCP system?			
12.3	Was there established way of documentation supervising?			
12.4	Was the way of archiving system documentation established?			
12.5	Was a time archiving documents specified?			
12.6	Was a way to make amendments in the control cards specified if the employee made a mistake?			

12.7	Were all documents properly marked, and was it possible their unambiguous identification?			
12.8	Was there established method of exchanging outdated document to the current version?			
12.9	Was the system documentation available to relevant employees?			
12.10	Whether the operating documentation was completed by designated employees?			
12.11	Was the system documentation under appropriate supervision?			
12.12	Were all amendments in control cards authorized and signed by responsible employees?			
12.13	Was all system documentation up to date?			
12.14	Were outdated documents replaced to date in due course?			
12.15	Did operating records legible and clearly understood?			

*developed based on Trafialek and Kolanowski, 2014: Application of Failure Mode and Effect Analysis (FMEA) for audit of HACCP system, Food Control, 44, 35–44

11. Form of identified nonconformities and corrective actions

Nonconformities and corrective actions form	
Audit date:	**Place of the nonconformity:**
Describing the problem:	
Nonconformity:	
Cause of nonconformity:	
Corrective action to undertaken:	
Timeframe for corrective action:	**Person responsible for corrective actions:**
Signed (Auditor):	**Signed (auditee):**
Corrective actions acceptance:	
Signed (Auditor):	**Signed (auditee):**

12. Audit report

Internal audit report form	
Audited activity:	**Audit date:**
Audit criteria:	
Auditor(s):	
Audit purpose and scope:	
The description of the audit course:	
Records seen:	**Processes seen:**
Observations:	
Nonconformities (see attached Form of identified nonconformities and corrective actions as well)	
Timescales for corrective action:	
Signed (Auditor):	**Signed (auditee):**

13. HACCP PRINCIPLE 6: HACCP verification procedure using review of monitoring and corrective action records in CCPs

1. PURPOSE:
The purpose of the verification procedure is to demonstrate that the HACCP plan is being followed and controlling hazards on an ongoing basis by reviewing monitoring and corrective action records. The application of the procedure is to confirm that CCPs are kept under control in order to the ensuring the food safety of organic products, e.g. pasteurized apple juice.

2. SCOPE AND SUBJECT:
Determining the methods of the verification, its frequency, methods of documenting the review of HACCP monitoring and corrective action records and the persons responsible for carrying out the verification.

3. DEFINITIONS:
Verification - periodic activity to demonstrate that the desired outcome has indeed been reached.

4. INTRESTED DEPARTMENTS:
The whole company.

5. RESPONSIBILITY AND AUTHORITY:
HACCP team is responsible for the establishing the HACCP system verification. The determined responsible person (e.g. owner) is responsible for the approval of the developed method. The quality manager is responsible for review of monitoring and corrective action (the review can be carried out by external experts as well). The responsible employees are obliged to provide the documents for verification.

6. PROCEDURE:
6.1. After the HACCP system had been implemented, verification procedure was established to confirm that the HACCP system is working effectively. There were two verification procedures that HACCP team developed, i.e. review of records and/or internal audit.
6.2. Verification activities should be performed on an ongoing basis to ensure the HACCP system functions as intended and continues to operate effectively.
6.3. The review of monitoring and corrective action records are verified at least once in the month, i.e. till 5th the following month by quality manager or other determined person.
6.4. The review of records should be comprehensive and based on the analysis of the following aspects:

- systematic record keeping,
- keeping records in accordance with the agreed frequency,
- filling in each column of the forms, e.g. “Form for recording of monitoring and corrective actions in CCP1 Pasteurization of Apple Juice”,
- presence of the signature of the person who performed the measurement of monitoring parameters and took the corrective action, in case of deviations,
- the type of corrective actions taken and their effectiveness for the observed deviations.

6.5. The records review should confirm that the appropriate significant hazards have been identified, that control measures and critical limits are adequate to control the hazards, that

monitoring, that corrective actions are appropriate for deviations and verification activities occurring in accordance with this procedure and are capable of identifying deviations.
6.6. The verification activities must be documented in 'Form for review of monitoring and corrective action records".
6.7. After the review is completed, the record is also overviewed by the owner.

7. RECORDS:
Form for review of monitoring and corrective action records.

14. Form for review of monitoring and corrective action records

Form for review of monitoring and corrective action records

	PRINCIPLE 6	
Date	Records of monitoring and corrective actions in CCP1 Pasteurization of Apple Juice	Signature
Example of the filling the document		
01.11.2021	*The values of monitoring parameters were recorded to the established frequency. The corrective actions were undertaken et each case when deviations occurred. All signatures were present at the form. Corrective actions were in line with CCP 1 procedure, effective and proper.*	*ABC*
01.05.2022	*The values of monitoring parameters were recorded to the established frequency. The corrective actions were undertaken et each case when deviations occurred. On 20th Dec, the signature was missing. All employee responsible for CCP1 was trained again and the technical support of the device performed the additional service.*	*XYZ*

15. HACCP PRINCIPLE 7: HACCP documentation management procedure

1. PURPOSE:

The purpose of the procedure is to define and standardize the methods of organization, proper circulation, ensuring the validity of documents and guaranteeing their availability in the right places, as well as determining the persons responsible for the supervision of the documentation, records and reviews of this documentation.

2. SCOPE AND SUBJECT:

The procedure applies to all documents of the food safety management system consisting of the HACCP Plan and records. It defines the procedures for:

- approval of documentation,
- establishing rules for the distribution of documentation,
- updating selected procedures and instructions,
- circumstances justifying the introduction of changes,
- ensuring the availability of selected documents in all places where operations regulated by a supervised document are performed,
- removing obsolete documents.

3. DEFINITIONS:

Procedure - an agreed method of carrying out an activity or process.
Record – documented information, on paper or on an electronic medium, which is evidence of the performance of a given activity or procedure. Record is a completed form.

4. INTRESTED DEPARTMENTS:

All departments.

5. RESPONSIBILITY AND AUTHORITY:

HACCP team is responsible for the developing of HACCP Plan. The owner is responsible for the approval of the HACCP documentation.

6. PROCEDURE:

6.1. The HACCP Plan is the property of X Company, so it must not be made available to unauthorized persons.
6.2. It is not allowed to make copies of the HACCP Plan or make it available to third parties without owner's permission.
6.3. The HACCP Plan was issued in one copy, which is under the management of the plant owner. The assigned responsible person approves all the documentation.
6.4. The unauthorized changes are not allowed. Changes may only be made by a person authorized by the owner.
6.5. The HACCP Plan was prepared by the HACCP Team. The team develops the structure of all the documents and their content.

6.6. The HACCP Plan is updated when necessary, after the owner's instructions or as a result of internal audit.
6.7. The withdrawn originals of the HACCP system documentation and the fulfilled records are stored in the archive binder for at least 1 year. After this time, they can be destroyed.
6.8. Changes and updates to the documentation are recorded in the "HACCP documentation management form".
6.9. Employees are required to keep all necessary records and sign the forms after taking monitoring and corrective actions. The records are forwarded after the filling to the manager for checking and placing them in archive binder.
6.10. Places in the establishment where the Critical Control Points are identified and placed are marked with cards with the name of the CCP and its number.
6.11. All HACCP procedures along with the entry forms are easily accessible to employees. They are located at workplaces in the production area.
6.12. The employees are regularly trained on how to use and fulfill HACCP documentation.

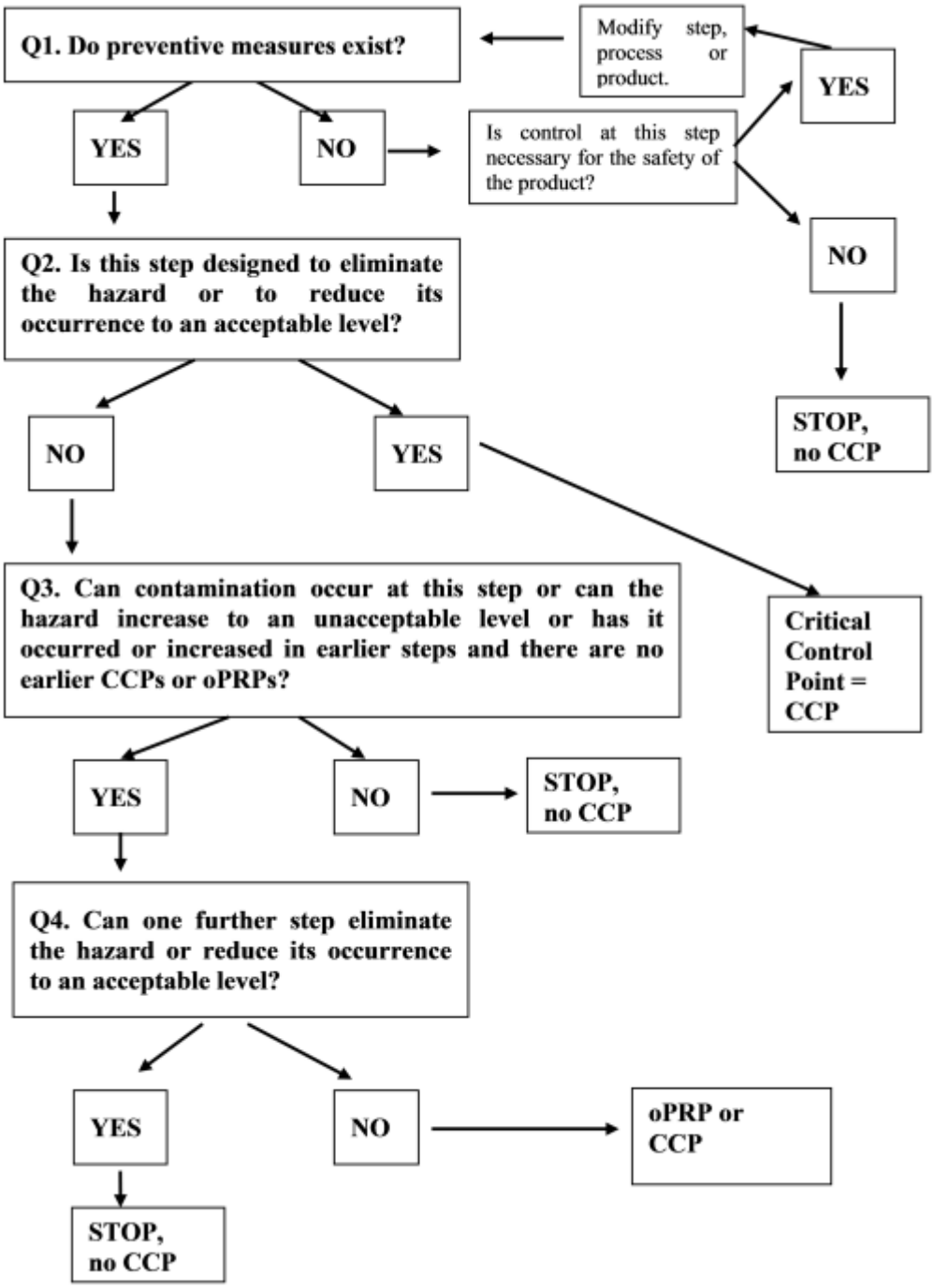
7. RECORD: " Form of updating of HACCP documentation".

16. HACCP documentation updating form

Form of updating of HACCP documentation

	HACCP principle 7		
Date	**Document**	**Updates / changes**	**Signature**

ANNEX 1. Decision tree



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