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Additional texts for the students specializing in hygiene

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Additional texts for the students specializing in hygiene розроблено для студентів магістрів спеціальності “Гігієна” як додаткове джерело лексичного збагачення та додаткової інформації до основного курсу.

Методичну рекомендацію розглянуто та затверджено на засіданні кафедри української та іноземних мов імені Якима Яреми № від _____2021 р.

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What is HACCP[1]

HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product. For successful implementation of a HACCP plan, management must be strongly committed to the HACCP concept. A firm commitment to HACCP by top management provides company employees with a sense of the importance of producing safe food.

HACCP is designed for use in all segments of the food industry from growing, harvesting, processing, manufacturing, distributing, and merchandising to preparing food for consumption. Food safety systems based on the HACCP principles have been successfully applied in food processing plants, retail food stores, and food service operations. The seven principles of HACCP have been universally accepted by government agencies, trade associations and the food industry around the world.

HACCP is a systematic approach to the identification, evaluation, and control of food safety hazards based on the following seven principles:

Principle 1: Conduct a hazard analysis.
Principle 2: Determine the critical control points (CCPs).
Principle 3: Establish critical limits.
Principle 4: Establish monitoring procedures.
Principle 5: Establish corrective actions.
Principle 6: Establish verification procedures.
Principle 7: Establish record-keeping and documentation procedures.

Questions for discussion:

1. What is HACCP?
2. What is prerequisite of a successful HACCP implementation?
3. What segments are included in HACCP
4. What are the main principles of HACCP?

Translate the words:

Перевірка, огляд, обмеження, оцінка, харчова промисловість, переробний завод, розповсюдження, керівник, застосування, небезпечна речовина, сировина, закупівля, поводження, безпека, контроль, збирання врожаю, проводити аналіз, встановлювати, облік, зобов'язатися, споживання

Important factors influencing HACCP

Education and Training

The success of a HACCP system depends on educating and training management and employees in the importance of their role in producing safe foods. This should also include information the control of foodborne hazards related to all stages of the food chain. It is important to recognize that employees must first understand what HACCP is and then learn the skills necessary to make it function properly. Specific training activities should include working instructions and procedures that outline the tasks of employees monitoring each CCP.

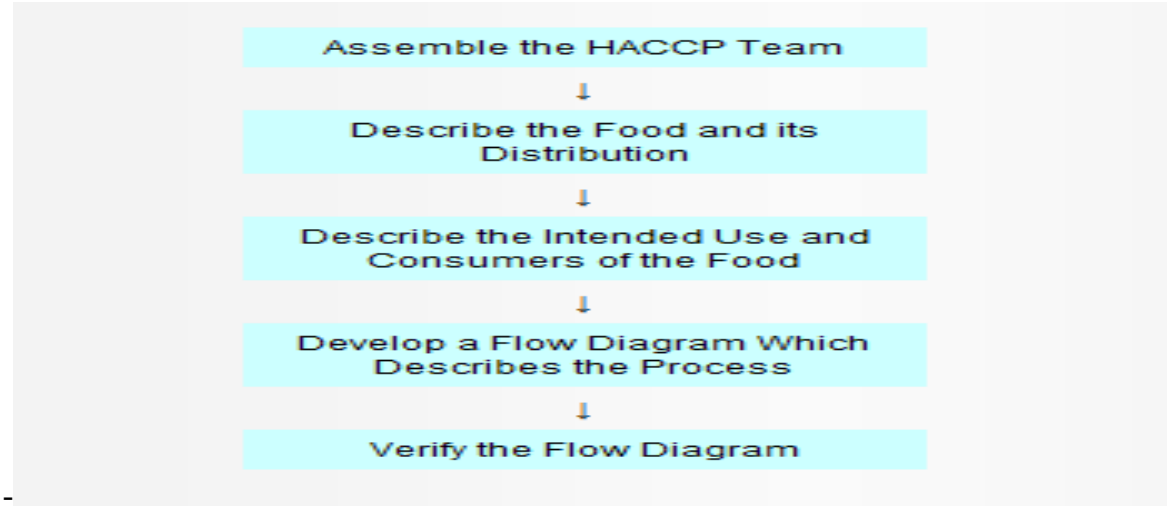
Management must provide adequate time for thorough education and training. Personnel must be given the materials and equipment necessary to perform these tasks. Effective training is an important prerequisite to successful implementation of a HACCP plan.

Developing a HACCP Plan

The format of HACCP plans will vary. In many cases the plans will be product and process specific. However, some plans may use a unit operations approach. Generic HACCP plans can serve as useful guides in the development of process and product HACCP plans; however, it is essential that the unique conditions within each facility be considered during the development of all components of the HACCP plan.

In the development of a HACCP plan, five preliminary tasks need to be accomplished before the application of the HACCP principles to a specific product and process. The five preliminary tasks are given in Figure 1.

Figure 1. Preliminary Tasks in the Development of the HACCP Plan



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Assemble the HACCP Team

The first task in developing a HACCP plan is to assemble a HACCP team consisting of individuals who have specific knowledge and expertise appropriate to the product and process. It is the team's responsibility to develop the HACCP plan. The team should be multi disciplinary and include individuals from areas such as engineering, production, sanitation, quality assurance, and food microbiology. The team should also include local personnel who are involved in the operation as they are more familiar with the variability and limitations of the operation. In addition, this fosters a sense of ownership among those who must implement the plan. The HACCP team may need assistance from outside experts who are knowledgeable in the potential biological, chemical and/or physical hazards associated with the product and the process. However, a plan which is developed totally by outside sources may be erroneous, incomplete, and lacking in support at the local level.

Describe the food and its distribution

The HACCP team first describes the food. This consists of a general description of the food, ingredients, and processing methods. The method of distribution should be described along with information on whether the food is to be distributed frozen, refrigerated, or at ambient temperature.

Describe the intended use and consumers of the food

Describe the normal expected use of the food. The intended consumers may be the general public or a particular segment of the population (e.g., infants, immunocompromised individuals, the elderly, etc.).

Develop a flow diagram which describes the process

The purpose of a flow diagram is to provide a clear, simple outline of the steps involved in the process. The scope of the flow diagram must cover all the steps in the process which are directly under the control of the establishment. In addition, the flow diagram can include steps in the food chain which are before and after the processing that occurs in the establishment. The flow diagram need not be as complex as engineering drawings. A block type flow diagram is sufficiently descriptive. Also, a simple schematic of the facility is often useful in understanding and evaluating product and process flow.

Verify the flow diagram

The HACCP team should perform an on-site review of the operation to verify the accuracy and completeness of the flow diagram. Modifications should be made to the flow diagram as necessary and documented.

After these five preliminary tasks have been completed, the seven principles of HACCP are applied.

Questions for the discussion:

1.Does a HACCP plan depends on the kind of product?
2. Is special training important for people working in s HACCP system?
3. What are the five preliminary tasks pf HACCP?
4. What members should a HACCP team include?
5. Should a team invite outside experts or only local ones?
6. What is meant by “ HACCP team describing a product”?
7. Give the examples of intended users/

8. Should a flow diagram be sufficiently descriptive or similar to complex engineering drawings?

Translate the words:

Вміння, завдання, забезпечувати, передумова, безпечна їжа, освіта та підготовка, небезпека спричинена харчами, специфічний, унікальний, умови, виправляти, санітарія, якість, складатися з, внутрішні експерти, зовнішні експерти, потенційна біологічна небезпека, заморожений, охолоджений, опис, споживач, громадськість, харчовий ланцюг, переробка, блок-схема, задокументований

Conduct a hazard analysis (Principle 1)

After addressing the preliminary tasks discussed above, the HACCP team conducts a hazard analysis and identifies appropriate control measures. The purpose of the hazard analysis is to develop a list of hazards which are of such significance that they are reasonably likely to cause injury or illness if not effectively controlled. It is important to consider in the hazard analysis the ingredients and raw materials, each step in the process, product storage and distribution, and final preparation and use by the consumer. When conducting a hazard analysis, safety concerns must be differentiated from quality concerns. A hazard is defined as a biological, chemical or physical agent that is reasonably likely to cause illness or injury in the absence of its control. Thus, the word hazard as used in this document is limited to safety.

A thorough hazard analysis is the key to preparing an effective HACCP plan. If the hazard analysis is not done correctly and the hazards warranting control within the HACCP system are not identified, the plan will not be effective regardless of how well it is followed.

The process of conducting a hazard analysis involves two stages. The first, hazard identification, can be regarded as a brain storming session. During this stage, the HACCP team reviews the ingredients used in the product, the activities conducted at each step in the process and the equipment used, the final product and its method of storage and distribution, and the intended use and consumers of the product. Based on this review, the team develops a list of potential biological, chemical or physical hazards which may be introduced. Hazard identification focuses on developing a list of potential hazards associated with each process step under direct control of the food operation. A knowledge of any adverse health-related events historically associated with the product will be of value in this exercise.

After the list of potential hazards is assembled, stage two, the hazard evaluation, is conducted. In stage two of the hazard analysis, the HACCP team decides which potential hazards must be addressed in the HACCP plan. During this stage, each potential hazard is evaluated based on the severity of the potential hazard and its likely occurrence. Severity is the seriousness of the consequences of exposure to the hazard. Considerations of severity (e.g., impact of sequelae, and magnitude and duration of illness or injury) can be helpful in understanding the public health impact of the hazard. Consideration of the likely occurrence is usually based upon a combination of experience, epidemiological data, and information in the technical literature. In addition, consideration should be given to the effects of short term as well as long term exposure to the potential hazard. During the evaluation of each potential hazard, the food, its method of preparation, transportation, storage and persons likely to consume the product should be considered to determine how each of these factors may influence the likely occurrence and severity of the hazard being controlled. However, there may be differences of opinion, even among experts, as to the likely occurrence and severity of a hazard. Hazards identified in one operation or facility may not be significant in another operation producing the same or a similar product. For example, due to differences in equipment and/or an effective maintenance program, the probability of metal contamination may be significant in one facility but not in another

Upon completion of the hazard analysis, the hazards associated with each step in the production of the food should be listed along with any measure(s) that are used to control the hazard(s). The term control measure is used because not all hazards can be prevented, but virtually all can be controlled. More than one control measure may be required for a specific hazard. On the other hand, more than one hazard may be addressed by a specific control measure (e.g. pasteurization of milk).

For example, if a HACCP team were to conduct a hazard analysis for the production of frozen cooked beef patties, enteric pathogens (e.g., *Salmonella* and verotoxin-producing *Escherichia coli*) in the raw meat would be identified as hazards. Cooking is a control measure which can be used to eliminate these hazards.

Step	Potential Hazard(s)	Justification	Hazard to be addressed in plan? Y/N	Control Measure(s)
Cooking	Enteric pathogens:	enteric pathogens have been associated with outbreaks of foodborne illness from undercooked ground beef	Yes	Cooking

Step	Potential Hazard(s)	Justification	Hazard to be addressed in plan? Y/N	Control Measure(s)
	e.g., *Salmonella*, verotoxigenic-*E. coli*			

Questions for the discussion:

1. What is the aim of hazard analysis?
2. Are safety concerns different from quality concerns.?
3. What aspects have to be taken into account while conducting a HACCP analysis?
4. What does word "hazard" mean?
5. How many stages does a hazard analysis involve? Talk about them/
6. Can experts' opinions differ sometimes?
7. What is " a severity of the potential hazard"?
8. What aspects are considered during evaluation stage?
9. Can more than one control measure be required for a specific hazard?

Translate the words:
Сирий, приймати міри, знищувати, запобігати, патогени, епідеміологічні дані, оцінювати, хвороба, потенційна небезпека, складність (серйозність), наслідки, довгостроковий, спалах хвороби, вплив, зберігання, транспортування, зараження, оцінка, список, зберігання, споживач, якість, поранення, гарантія, обладнання, розглядати

Determine critical control points (CCPs) (Principle 2)

A critical control point is defined as 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.

Complete and accurate identification of CCPs is fundamental to controlling food safety hazards. The information developed during the hazard analysis is essential for the HACCP team in identifying which steps in the process are CCPs. One strategy to facilitate the identification of each CCP is the use of a CCP decision tree .

Critical control points are located at any step where hazards can be either prevented, eliminated, or reduced to acceptable levels. Examples of CCPs may include: thermal processing, chilling, testing ingredients for chemical residues, product formulation control, and testing product for metal contaminants. CCPs must be carefully developed and documented. In addition, they must be used only for purposes of product safety. For example, a specified heat process, at a given time and temperature designed to destroy a specific microbiological pathogen, could be a CCP. Likewise, refrigeration of a precooked food to prevent hazardous microorganisms from multiplying, or the adjustment of a food to a pH necessary to prevent toxin formation could also be CCPs. Different facilities preparing similar food items can differ in the hazards identified and the steps which are CCPs.

Questions for the discussion:

1. What is important to identify during CCPs?
2. What is a decision tree?
3. At what step critical control points are located ?
4. Could there be several CCPs for a certain product?

Translate the words into Ukrainian:
acceptable level, thermal, to prevent, processing, to reduce, chilling, to eliminate, chemical residues, metal contaminants, product safety, to destroy, accurate identification, to destroy, hazard analysis, refrigeration, adjustment, a precooked food, to facilitate,

Establish critical limits (Principle 3)

A critical limit is a maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard. A critical limit is used to distinguish between safe and unsafe operating conditions at a CCP. Critical limits should not be confused with operational limits which are established for reasons other than food safety.

Each control measure has one or more associated critical limits. Critical limits may be based upon factors such as: temperature, time, physical dimensions, humidity, moisture level, water activity (a_w), pH, titratable acidity, salt concentration, available chlorine, viscosity, preservatives, or sensory information such as aroma and visual appearance. Critical limits must be scientifically based. For each CCP, there is at least one criterion for food safety that is to be met. An example of a criterion is a specific lethality of a cooking process such as a 5D reduction in *Salmonella*. The critical limits and criteria for food safety may be derived from sources such as regulatory standards and guidelines, literature surveys, experimental results, and experts.

An example is the cooking of beef patties In this example, the HACCP team concluded that a thermal process equivalent to 155° F for 16 seconds would be necessary to assure the safety of this product. To ensure that this time and temperature are attained, the HACCP team for one facility determined that it would be necessary to establish critical limits for the oven temperature and humidity, belt speed (time in oven), patty thickness and composition (e.g., all beef, beef and other ingredients).. The example given below applies to the first facility.

Questions for the discussion:

1. How do you understand a phrase “critical limit”?
2. What is the purpose of critical limits usage?
3. Could you name the factors upon which critical limits can be named?
4. Do critical limits have to be scientifically based?
5. Tell about an example of establishing CL for beef patties?

Translate the words:

Вологість, склад, цінність, консерванти, параметр, критерій, смертність, безпека, зниження, причина, обмеження, дослідження, стандарти, опитування, допустимий рівень, знищувати, густина, кислотність, візуальний вигляд, розрізняти, рівень

Establish monitoring procedures (Principle 4)

Monitoring is a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future use in verification. Monitoring serves three main purposes. First, monitoring is essential to food safety management in that it facilitates tracking of the operation. If monitoring indicates that there is a trend towards loss of control, then action can be taken to bring the process back into control before a deviation from a critical limit occurs. Second, monitoring is used to determine when there is loss of control and a deviation occurs at a CCP, i.e., exceeding or not meeting a critical limit. When a deviation occurs, an appropriate corrective action must be taken. Third, it provides written documentation for use in verification.

An unsafe food may result if a process is not properly controlled and a deviation occurs. Because of the potentially serious consequences of a critical limit deviation, monitoring procedures must be effective. Ideally, monitoring should be continuous, which is possible with many types of physical and chemical methods. For example, the temperature and time for the scheduled thermal process of low-acid canned foods is recorded continuously on temperature recording charts. If the temperature falls below the scheduled temperature or the time is insufficient, as recorded on the chart, the product from the retort is retained and the disposition determined .

Assignment of the responsibility for monitoring is an important consideration for each CCP. Personnel who monitor CCPs are often associated with production Those individuals must be trained in the monitoring technique for which they are responsible, fully understand the purpose and importance of monitoring, be unbiased in monitoring and reporting, and accurately report the results of monitoring. In addition, employees should be trained in procedures to follow when there is a trend towards loss of control so that adjustments can be made in a timely manner to assure that the process remains under control. The person responsible for monitoring must also immediately report a process or product that does not meet critical limits.

All records and documents associated with CCP monitoring should be dated and signed or initialed by the person doing the monitoring. Most monitoring procedures need to be rapid because they relate to on-line, "real-time" processes and there will not be time for lengthy analytical testing. Examples of monitoring activities include: visual observations and measurement of temperature, time, pH, and moisture level.

Microbiological tests are seldom effective for monitoring due to their time-consuming nature and problems with assuring detection of contaminants. Physical and chemical measurements are often preferred because they are rapid and usually more effective for assuring control of microbiological hazards. For example, the safety of pasteurized milk is based upon measurements of time and temperature of heating rather than testing the heated milk to assure the absence of surviving pathogens.

Questions for the discussion:

1.Whay is monitoring?
2. How many basic stages are there?
3. Is it better when monitoring is continuous or quick?
4. What functions does a person responsible for monitoring perform?
5. What do monitoring activities include?
6. What tests are preferred here and give the reasons why.

Translate the words:

Відхилення, порушення, графік, полегшувати, перевищувати, зберігатися, схильність, відслідковувати, ефективний, підписувати, записи, огляд, вимірювання, тестування, оцінювати, точний, часозатратний, виявлення, забезпечувати, неупереджений, втрата контролю.

Establish corrective actions (Principle 5)

The HACCP system for food safety management is designed to identify health hazards and to establish strategies to prevent, eliminate, or reduce their occurrence. However, ideal circumstances do not always prevail and deviations from established processes may occur. An important purpose of corrective actions is to prevent foods which may be hazardous from reaching consumers. Where there is a deviation from established critical limits, corrective actions are necessary. Therefore, corrective actions should include the following elements: (a) determine and correct the cause of non-compliance; (b) determine the disposition of non-compliant product and (c) record the corrective actions that have been taken. Specific corrective actions should be developed in advance for each CCP and included in the HACCP plan. As a minimum, the HACCP plan should specify what is done when a deviation occurs, who is responsible for implementing the corrective actions, and that a record will be developed and maintained of the actions taken..

Establish verification procedures (Principle 6)

Verification is defined as those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan.

One aspect of verification is evaluating whether the facility's HACCP system is functioning according to the HACCP plan. An effective HACCP system requires little end-product testing, since sufficient validated safeguards are built in early in the process. Therefore, rather than relying on end-product testing, firms should rely on frequent reviews of their HACCP plan, verification that the HACCP plan is being correctly followed, and review of CCP monitoring and corrective action records.

Another important aspect of verification is the initial validation of the HACCP plan to determine that the plan is scientifically and technically sound, that all hazards have been identified and that if the HACCP plan is properly implemented these hazards will be effectively controlled. Information needed to validate the HACCP plan often include (1) expert advice and scientific studies and (2) in-plant observations, measurements, and evaluations. For example, validation of the cooking process for beef patties should include the scientific justification of the heating times and temperatures needed to obtain an appropriate destruction of pathogenic microorganisms (i.e., enteric pathogens) and studies to confirm that the conditions of cooking will deliver the required time and temperature to each beef patty.

Subsequent validations are performed and documented by a HACCP team or an independent expert as needed. For example, validations are conducted when there is an unexplained system failure; a significant product, process or packaging change occurs; or new hazards are recognized.

Questions for the discussion:

1.Why is the HACCP system designed?

2. Can any deviations occur during production or any other procedure??
3. What steps are to be taken if deviation occur?
4. What elements should corrective actions include?
5. What is verification??
6. Is it better to rely on the end-product testing than on frequent reviews of their HACCP plan?
7. What information is needed to validate the HACCP plan?

Translate the words:.

Розвивати, корекційні дії, початкова перевірка, встановлені обмеження, підтримувати, відповідальний за, наукове обґрунтування, виправляти, відхилення, визначати, вживати заходів, огляд, працювати за планом, поломка системи, визначати, валідифікувати, кінцевий продукт, перевірений, технічно безпечний, знищення хвороботворних мікроорганізмів.

Establish record-keeping and documentation procedures (Principle 7)

Generally, the records maintained for the HACCP System should include the following:

A summary of the hazard analysis, including the rationale for determining hazards and control measures.

The HACCP Plan

Listing of the HACCP team and assigned responsibilities.

Description of the food, its distribution, intended use, and consumer.

Verified flow diagram.

HACCP Plan Summary Table that includes information for:

Steps in the process that are CCPs

The hazard(s) of concern.

Critical limits

Monitoring*

Corrective actions*

Verification procedures and schedule*

Record-keeping procedures*

Questions for the discussion:

1. Is record keeping important?
2. What documents are necessary at HACCP?
3. What information should a HACCP Plan Summary Table include?

Examples of Common Prerequisite Programs

The production of safe food products requires that the HACCP system be built upon a solid foundation of prerequisite programs. Each segment of the food industry must provide the conditions necessary to protect food while it is under their control. This has traditionally been accomplished through the application of cGMPs. These conditions and practices are now considered to be prerequisite to the development and implementation of effective HACCP plans. Prerequisite programs provide the basic environmental and operating conditions that are necessary for the production of safe, wholesome food. Common prerequisite programs may include, but are not limited to:

Facilities: The establishment should be located, constructed and maintained according to sanitary design principles. There should be linear product flow and traffic control to minimize cross-contamination from raw to cooked materials.

Supplier Control: Each facility should assure that its suppliers have in place effective GMP and food safety programs. These may be the subject of continuing supplier guarantee and supplier HACCP system verification.

Specifications: There should be written specifications for all ingredients, products, and packaging materials.

Production Equipment: All equipment should be constructed and installed according to sanitary design principles. Preventive maintenance and calibration schedules should be established and documented.

Cleaning and Sanitation: All procedures for cleaning and sanitation of the equipment and the facility should be written and followed. A master sanitation schedule should be in place.

Personal Hygiene: All employees and other persons who enter the manufacturing plant should follow the requirements for personal hygiene.

Training: All employees should receive documented training in personal hygiene, GMP, cleaning and sanitation procedures, personal safety, and their role in the HACCP program.

Chemical Control: Documented procedures must be in place to assure the segregation and proper use of non-food chemicals in the plant. These include cleaning chemicals, fumigants, and pesticides or baits used in or around the plant.

Receiving, Storage and Shipping: All raw materials and products should be stored under sanitary conditions and the proper environmental conditions such as temperature and humidity to assure their safety and wholesomeness

Traceability and Recall: All raw materials and products should be lot-coded and a recall system in place so that rapid and complete traces and recalls can be done when a product retrieval is necessary.

Pest Control: Effective pest control programs should be in place.

Other examples of prerequisite programs might include quality assurance procedures; standard operating procedures for sanitation, processes, product formulations and recipes; glass control; procedures for receiving, storage and shipping; labeling; and employee food and ingredient handling practices.

Questions for the discussion:

1. What is the purpose of Prerequisite Programs?
2. What kind of information do common prerequisite programs include?
3. How do linear product flow and traffic control facilitate the HACCP?
4. What kind of written specifications should there be?
5. How should equipment be maintained according to HACCP?
6. What requirements are put to the employees?
7. Are thete any requirements to the storage of raw materials?
8. Give other examples of prerequisite programs.

Translate the words:

Якість, цілісність, особиста гігієна, постачальник, зберігання, сировина, харчова промисловість, фумігант, санітарний контроль, міцний фундамент, калібрування, відслідковувати, транспортування, вилучення, маркування, застосування , відповідно до, встановлювати, корисна їжа, особиста безпека, контроль перевезення, волога, забезпечувати, пакувальні матеріали, шкідник, наживка.

Terms which are necessary to know

Control: (a) To manage the conditions of an operation to maintain compliance with established criteria. (b) The state where correct procedures are being followed and criteria are being met.

Control Measure: Any action or activity that can be used to prevent, eliminate or reduce a significant hazard.

Control Point: Any step at which biological, chemical, or physical factors can be controlled.

Corrective Action: Procedures followed when a deviation occurs.

Criterion: A requirement on which a judgement or decision can be based.

Critical Control Point: 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 maximum and/or minimum value to which a biological, chemical or physical parameter must be controlled at a CCP to prevent, eliminate or reduce to an acceptable level the occurrence of a food safety hazard.

Deviation: Failure to meet a critical limit.

HACCP: A systematic approach to the identification, evaluation, and control of food safety hazards.

HACCP Plan: The written document which is based upon the principles of HACCP and which delineates the procedures to be followed.

HACCP System: The result of the implementation of the HACCP Plan.

HACCP Team: The group of people who are responsible for developing, implementing and maintaining the HACCP system.

Hazard: A biological, chemical, or physical agent that is reasonably likely to cause illness or injury in the absence of its control.

Hazard Analysis: The process of collecting and evaluating information on hazards associated with the food under consideration to decide which are significant and must be addressed in the HACCP plan.
Monitor: To conduct a planned sequence of observations or measurements to assess whether a CCP is under control and to produce an accurate record for future use in verification.
Prerequisite Programs: Procedures, including Good Manufacturing Practices, that address operational conditions providing the foundation for the HACCP system.
Severity: The seriousness of the effect(s) of a hazard.
Step: A point, procedure, operation or stage in the food system from primary production to final consumption.
Validation: That element of verification focused on collecting and evaluating scientific and technical information to determine if the HACCP plan, when properly implemented, will effectively control the hazards.Verification: Those activities, other than monitoring, that determine the validity of the HACCP plan and that the system is operating according to the plan.

Examples of Questions to be Considered When Conducting a Hazard Analysis

The hazard analysis consists of asking a series of questions which are appropriate to the process under consideration. The purpose of the questions is to assist in identifying potential hazards.

A. Ingredients
    1. Does the food contain any sensitive ingredients that may present microbiological hazards (e.g., Salmonella, Staphylococcus aureus); chemical hazards (e.g., aflatoxin, antibiotic or pesticide residues); or physical hazards (stones, glass, metal)?
    2. Are potable water, ice and steam used in formulating or in handling the food?
    3. What are the sources (e.g., geographical region, specific supplier)
B. Intrinsic Factors - Physical characteristics and composition (e.g., pH, type of acidulants, fermentable carbohydrate, water activity, preservatives) of the food during and after processing.
    1. What hazards may result if the food composition is not controlled?
    2. Does the food permit survival or multiplication of pathogens and/or toxin formation in the food during processing?
    3. Will the food permit survival or multiplication of pathogens and/or toxin formation during subsequent steps in the food chain?
    4. Are there other similar products in the market place? What has been the safety record for these products? What hazards have been associated with the products?
C. Procedures used for processing
    1. Does the process include a controllable processing step that destroys pathogens? If so, which pathogens? Consider both vegetative cells and spores.
    2. If the product is subject to recontamination between processing (e.g., cooking, pasteurizing) and packaging which biological, chemical or physical hazards are likely to occur?
D. Microbial content of the food
    1. What is the normal microbial content of the food?
    2. Does the microbial population change during the normal time the food is stored prior to consumption?
    3. Does the subsequent change in microbial population alter the safety of the food?
    4. Do the answers to the above questions indicate a high likelihood of certain biological hazards?
E. Facility design
    1. Does the layout of the facility provide an adequate separation of raw materials from ready-to-eat (RTE) foods if this is important to food safety? If not, what hazards should be considered as possible contaminants of the RTE products?
    2. Is positive air pressure maintained in product packaging areas? Is this essential for product safety?
    3. Is the traffic pattern for people and moving equipment a significant source of contamination?
F. Equipment design and use
    1. Will the equipment provide the time-temperature control that is necessary for safe food?
    2. Is the equipment properly sized for the volume of food that will be processed?
    3. Can the equipment be sufficiently controlled so that the variation in performance will be within the tolerances required to produce a safe food?
    4. Is the equipment reliable or is it prone to frequent breakdowns?
    5. Is the equipment designed so that it can be easily cleaned and sanitized?
    6. Is there a chance for product contamination with hazardous substances; e.g., glass?

7. What product safety devices are used to enhance consumer safety?
    - metal detectors
    - magnets
    - sifters
    - filters
    - screens
    - thermometers
    - bone removal devices
    - dud detectors
8. To what degree will normal equipment wear affect the likely occurrence of a physical hazard (e.g., metal) in the product?
9. Are allergen protocols needed in using equipment for different products?

G. Packaging
1. Does the method of packaging affect the multiplication of microbial pathogens and/or the formation of toxins?
2. Is the package clearly labeled "Keep Refrigerated" if this is required for safety?
3. Does the package include instructions for the safe handling and preparation of the food by the end user?
4. Is the packaging material resistant to damage thereby preventing the entrance of microbial contamination?
5. Are tamper-evident packaging features used?
6. Is each package and case legibly and accurately coded?
7. Does each package contain the proper label?
8. Are potential allergens in the ingredients included in the list of ingredients on the label?

H. Sanitation
1. Can sanitation have an impact upon the safety of the food that is being processed?
2. Can the facility and equipment be easily cleaned and sanitized to permit the safe handling of food?
3. Is it possible to provide sanitary conditions consistently and adequately to assure safe foods?

I. Employee health, hygiene and education
1. Can employee health or personal hygiene practices impact upon the safety of the food being processed?
2. Do the employees understand the process and the factors they must control to assure the preparation of safe foods?
3. Will the employees inform management of a problem which could impact upon safety of food?

J. Conditions of storage between packaging and the end user
1. What is the likelihood that the food will be improperly stored at the wrong temperature?
2. Would an error in improper storage lead to a microbiologically unsafe food?

K. Intended use
1. Will the food be heated by the consumer?
2. Will there likely be leftovers?

L. Intended consumer
1. Is the food intended for the general public?
2. Is the food intended for consumption by a population with increased susceptibility to illness (e.g., infants, the aged, the infirmed, immunocompromised individuals)?
3. Is the food to be used for institutional feeding or the home?

HAZARD ANALYSIS CRITICAL CONTROL POINT (HACCP) CONCEPT IN MEAT INSPECTION

A specific HACCP concept tailored to each abattoir and the class of animal should be developed to ensure the most efficient and effective concept of sanitary control. The introduction of specific HACCP concept involves the following:

a. identifying hygienic hazards
b. ranking these hazards
c. defining the critical limit
d. identifying the critical control points
e. recommending necessary control
f. record keeping

g. verification procedures to ensure efficiency
h. tests to ensure that the concept is working

The Hazard Analysis Critical Control Point (HACCP) Concept was introduced in the food industry in 1971 to ensure that there would be effective control of the quality of processed foods. The World Health Organization (WHO) recommends that this concept also be applied to Meat Inspection and Meat Hygiene in particular to control salmonellosis. It can also be used to reduce bacterial contamination during slaughtering and dressing and to ensure quality control in Meat Inspection.

Meat Inspection and Meat Hygiene shall make sure that meat and meat products are safe and wholesome for human consumption. The practise of meat inspection has gradually changed over the last three decades. The classical antemortem and postmortem procedures were designed to detect disease in an animal before slaughter and the lesions produced by the disease after slaughter respectively. This was done by the use of senses (organoleptic tests) such as the use of touch (palpation), sight (inspection and observation), smell (gangrenous smell) and taste (only in cooked products). Zoonotic diseases, particularly tuberculosis received high priority. Laboratory tests were done to confirm the disease when necessary or as appropriate.

With the gradual reduction in the incidence of animal tuberculosis in many countries along with the development of intensive methods of animal husbandry and the widespread use of pesticides and veterinary drugs, new problems are emerging. These are associated with residues on one hand and increased human infections with zoonotic agents contaminating animal foods on the other. There appears to be a general trend worldwide, with a few exceptions where human Salmonella infections have nearly doubled during the last five year period and human Campylobacter infections have nearly tripled during the same period.

Other bacteria that are causing increasing concern as food contaminants are Yersinia spp. and Listeria spp. There is simultaneously a greater consumer expectation of a longer shelf life in the finished fresh meat product. All these factors suggest that in the practise of meat inspection, it would be advantageous to use the HACCP concept to identify the critical control points at which these bacterial groups and other spoilage organisms may contaminate the carcasses, so that appropriate action can be taken. During red meat production, major contamination occurs in the abattoir during skinning and evisceration, that some contamination could occur during transport, lairage and deboning and that the most effective control point is in the chiller. Therefore, it is absolutely essential for meat inspectors to ensure that skinning and evisceration are done properly. The critical control points during the slaughter of poultry are picking and evisceration. In developing countries where these tasks are not automated, it is necessary to ensure that proper hygienic precautions are taken during each of these operations. In automated plants, the machinery for picking and evisceration would need to be sanitised regularly, in particular when birds from different sources are slaughtered.

Questions for the discussion:

1. Is HACCP concept common to all types of food or tailored to each abattoir and the class of animal ?
2. When was a HACAP concept introduced in the food industry?
3.Can you name the reason for its usage?
4. What is the aim of antemortem and postmortem procedures?
5. What ways of detecting disease are there (after slaughter)?
6. What zoonotic diseases are widely spread?
7. When does major contamination occur in red meat production?
8. What are the critical control points during the slaughter of poultry?

Translate the words:

Ефективний, туша, дотик, нюх, кваліфікований, патрання, обвалювання, запобіжні заходи, забій, птиця, зняття шкіри, пальпація, ураження, хвороба, термін придатності, заражати, автоматизований, бойня, облік, забезпечувати контроль якості, огляд, посмертний, тваринництво, ліки, хвороби, ліки, хвороби спільні для людини і тварин, псування продукту, смак.

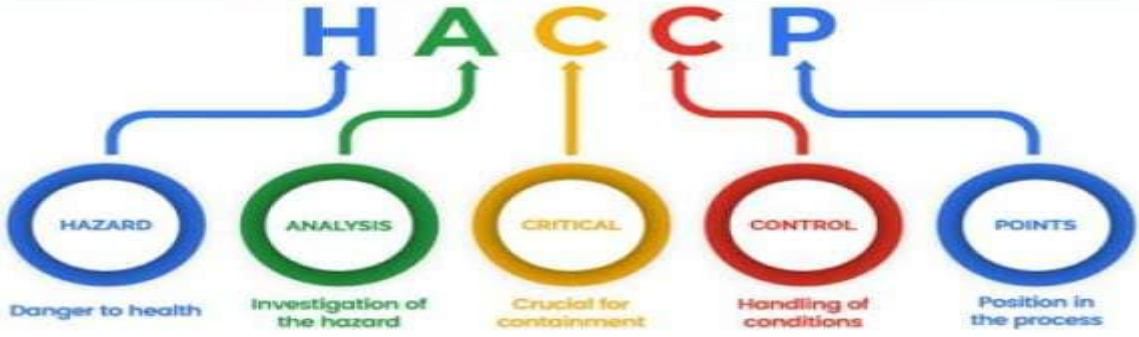
Meat Hygiene[2]

Meat Hygiene refers to a set of activities that require the implementation of specific standards, codes of practices and regulatory action by the competent authority to ensure safety and suitability of the meat the consumers eat. Hygiene requirements -are to be met at different stages of production, processing and transportation and must include hygiene of personnel, slaughter & meat processing equipments and environment.To ensure this, proper cleaning and sanitization practices are to be followed by plant personnel and should include disinfection of meat plant premises, equipments and storage area. Failure in maintaining meat hygiene may pose serious public health hazards and

therefore evaluation of meat for meat borne pathogens which can cause diseases of public health importance is very important. There are three principles of meat hygiene, which are crucial for meat processing operations.

- Prevention of microbial contamination during meat product manufacture by adopting proper cleaning and sanitation practices.
- Minimization of microbial growth in meat products by storing them at a low temperature.
- Reduction or elimination of the risk of microbial contamination by applying suitable heat treatment and packaging systems at the final processing stage.

Failures in maintaining slaughter hygiene, meat cutting and meat handling/transportation and in the hygiene of by-products and additives contribute to quality losses and deterioration of the final processed meat products. Two useful schemes are usually adapted at various levels of meat production as control measures, they are Good Hygienic Practices (GHP) and Hazard Analysis and Critical Control Point (HACCP) Scheme.



Questions for discussion:

1. What are the principles of meat hygiene?
2. At what stage Hygiene requirements must be met?
3. What things do Hygiene requirements refer to?
4. What can Failure in maintaining meat hygiene lead to?
5 Could you name three principles of meat hygiene?
6. What . schemes are adapted at different levels of meat production as control measures?
7. Explain what the combination of letters HACCP mean?

The key to success is:

Personnel hygiene

- Wear clean protective clothes
- Washing hands before starting work and repeatedly washing hands during work
- No finger rings, watches, bracelets
- Access to production areas with working clothes only
- Cleaning/disinfection of hands/tools/clothes if there was contact with highly contaminated subjects or abnormal animal parts likely to contain pathogens.
- Fresh wounds through knife cuts etc. must be covered by a watertight bandage. Workers with purulent wounds are not allowed to work with meat. (Risk of spread of Staph. aureus bacteria).
- Strict toilet hygiene must be observed (removal of apron, hand washing and hand disinfection). Toilets must be kept clean and must not have direct access to production areas. (Risk of spread of Salmonella).
- Periodic medical examinations of staff

Hygiene during meat processing

- Ideally meat cutting/deboning should be carried out in climatized rooms (approx. + 10°C) with low air humidity.
- If visual contamination of meat has occurred during manufacturing, do not try to wash it off but remove it with knives by cutting off superficial meat parts in the case of minor contamination. Discard the meat in case of heavy contamination.
- Do not hose down floor and wall areas or equipment next to meat processing operations or final products with a power hose. (Risk of contamination by aerosol/droplets).
- Never take meat pieces, which accidentally had contact with the floor or other contaminated surfaces, back onto working tables or into meat processing machines.
- Containers for meat, fat, or semi or fully processed meat products must not be placed directly on the floor but on hygienic stands, pallets etc.).

Hygiene of meat processing premises (design and construction). Meat processing facilities must meet the basic hygienic standards in order to ensure and maintain clean and hygienic working conditions:

- Provision of change room for duty staff.
- Wall windows must be positioned at least 2 m high over floor level in order to allow profound washing and disinfection of floors and walls. Window frames should be of non-corrosive material e.g. aluminium or similar materials and must not be painted.
- Walls in all rooms, where meat and by-products are handled, must have smooth and easily washable surfaces up to a minimum height of 2 m in processing plants. Walls should preferably be covered with wall tiles or at least with washable paint.
- Floors in the mentioned sections must be impermeable for water and reasonably smooth for good cleaning, but anti-slip for workers safety.
- In order to facilitate proper cleaning, the junction between floor and walls must be rounded (not rectangular)
- Rooms for meat processing should have sufficient ventilation. Air conditioning is only required in meat cutting/deboning rooms (10 - 12°C).
- Supply systems for electrical wiring and pipes for hot and cold water as well as for compressed air should not hamper cleaning operations and be out of reach of possible dirt contamination. Insulations for hot water pipes must have smooth surfaces and be washable.
- Openings for ventilation must be bird- and insect-proof.

Equipment hygiene

- Equipment should have proper sanitary design and construction. Designs must allow easy and profound cleaning and avoid any accumulation of difficult to remove organic matters. They should make use of food

grade construction material in designing food contact surfaces and equipments and should allow easy cleaning after processing operations.

- Stainless steel must be used for all food contact surfaces e.g. working tables, meat hooks (at least their parts contact in meat), blades of knives, saws, cleavers and axes etc.
- Food grade synthetic materials should be used for meat containers and other utensils

Translate the words:

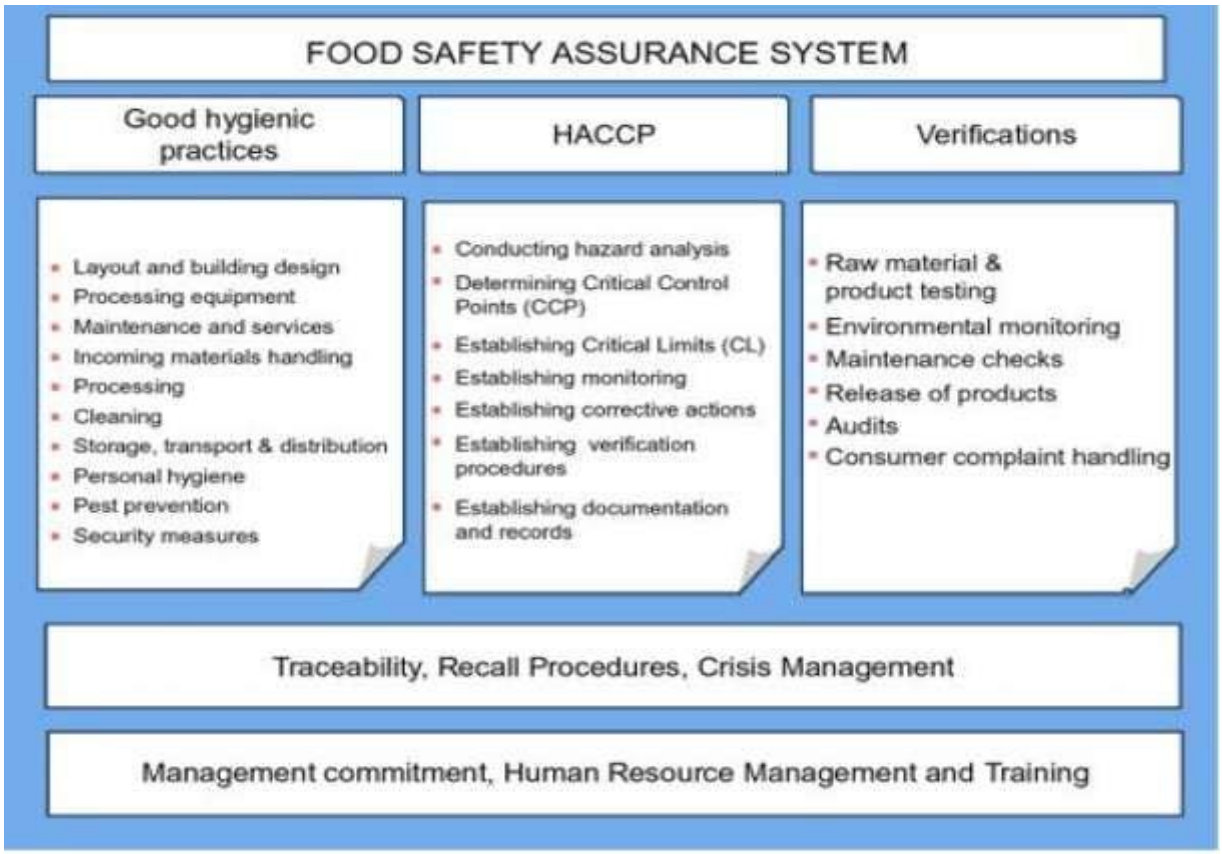
Водонепроникна пов'язка, медичний огляд, гладкі поверхні, ізоляція, персонал, виробництво, заражений, низька вологість повітря, сокира, дезінфекція, рана, змивати, захисне обладнання, зараження стафілококом, пилка, розробляти м'ясо, викидати, змивати шлангом, піддон, приміщення, рівень підлоги, настінна плитка, робоча поверхня, непроникний, достатня вентиляція, труби для гарячої води, перешкоджати, органічна матерія, нержавіюча сталь, лезо ножа, посуд.

Questions for discussion:

1. Name the principles of hygiene during meat processing.
2. Name the principles of personnel hygiene
3. Name the principles of equipment hygiene
4 Name the principles of hygiene of meat processing premises
5. Are accessories allowed according to principles of personnel hygiene?
6. What should be done if there are any wounds?
7. Can containers for meat, fat, or semi be placed on the floor?
8. What is the perfect temperature for dealing with meat?
9. What are the requirements for walls and floor?
10. What materials are suitable for equipment?

Hazard analysis and critical control point scheme (HACCP)

HACCP are factory and product specific strictly sanitary control schemes that shall prevent, detect, control and/or reduce to safe levels of accidentally occurring hazards to consumers health.. Specifically for meat processing plants, such hazards may be provoked by failures such as batches of incoming raw meat materials with abnormal tissues or heavy contamination, breakdowns in refrigeration, failure in cooking/sterilization operations, abnormal pH or in raw or finished products, errors in levels of application of curing salts and other additives, technical problems in sealing of vacuum packages or cans with the risk of recontamination.



Food poisoning through micro-organisms present in the meat

Food poisoning sets alarming situation for consumers. After consumption of meat contaminated with food poisoning bacteria, food poisoning results in severe illness with consumers needing intensive and costly medical treatments. Type of food poisoning observed due to bacteria are of two types, i.e.

- Food borne infection or
- Food borne intoxication

Bacteria that cause food borne infections, cause sickness through microbial metabolic substances i.e. toxic substances released by the living microorganisms inside the human digestive tract. The best-known examples of food borne infections are those caused by Salmonella bacteria and entero-pathogenic form, mostly type O157: H7 residing in faecal material, Listeria monocytogenes, Campylobacter jejuni and, Yersinia enterolytica. The Norovirus group can be responsible for food infections with similar, mainly gastro-intestinal symptoms, as bacterial food infection agents.

Microorganisms causing food borne intoxications produce and release the poison during their multiplication in the food. Upon ingestion by consumers of such food, which was heavily intoxicated outside the human body, severe gastro-intestinal food poisoning symptoms occur. Food borne intoxications are frequently caused by Staphylococcus aureus, and Cl. botulinum. Moulds are sometimes found on the surface of meat products after prolonged storage. Mold produce two types of toxins i.e. Aflatoxins (toxin of Aspergillus flavus) and Ochratoxin (toxin of Penicillium vividicatum).

Different symptoms of food poisoning

Cleaning and Sanitation

Generally cleaning refers to removal of visible, physical/chemical dirt and to some extent bacteria from the equipment surfaces, sometime from products itself and from the processing environment. On the contrary, sanitization term is used with disinfection of the product or product contact surfaces by all killing spoilage and pathogenic microorganisms in order to avoid all possible risks of microbial contamination. Inactivation of microorganisms requires antimicrobial treatments, carried out in food industries through hot water or steam or through the application of disinfectants or sanitizers.

Cleaning procedures

The first step in floor and equipment cleaning is to physically remove scrap, i.e. coarse solid particles, with a dry brush or broom and shovel. This is usually referred to as “dry cleaning”. “Wet cleaning” is followed after removal of physical scrap material. Wet cleaning could be done manually or by using high pressure nozzles. However, this would require water in sufficient quantities.

Cleaning with equipment producing a pressurized steam/water-mix is even more efficient as impact temperatures of approx. 100°C can be achieved. The disadvantage of this method is the intense fog and aerosol formation, which may not only cause unwanted microbial spreading by water droplets (aerosol) but also affect installations and equipment through high humidity and excessive condensation. For these reasons a steam/water-mix is not suitable for meat processing facilities and cold or hot pressurized water cleaning is preferred.

A relatively new cleaning method for the food industry, in particular the larger-scale plants, is foam cleaning. Water foam containing detergents and other cleaning agents is sprayed on wetted walls, floors and surfaces of equipment. The foam does not immediately run off but clings to the surfaces. This allows a longer term contact on the surfaces to be cleaned. After a sufficient impact period (min. 15 minutes) the foam is washed down with water (water hose or low-pressure water spray). As no high pressure water spraying is needed for washing off the foam, the spreading of water droplets (aerosol) in the room to be cleaned is minimized.

Cleaning agents

Traditional cleaning substances/detergents for manual use are alkalines, such as sodium carbonates (Na2CO3, washing soda). These substances are efficient in dissolving proteins and fats, but may cause corrosion in tools and equipment, if their pH is 11 and above.Ideal detergents should have the following desirable properties:

- Wetting and penetrating power-must wet, penetrate and dispose soil and remove it from walls of equipments.
- Emulsifying power
- Saponifying power
- Deflocculating power
- Sequestering and chelating power

- Quick and complete solubility
- Should be non-corrosive to metal surface
- Economical
- Stability during storage
- Should be mild on hands
- Should possess germicidal action

In Meat industry, various types of detergents and cleaners are used. Alkaline cleaning agents are generally suitable for removing organic dirt, protein residues and fat, while acid cleaning agents are used particularly for removal of encrusted residues of dirt or protein or of inorganic deposits (scaling) such as waterstone, milkstone, lime etc. On the other hand, Neutral cleaning agents have much less effect than alkaline or acid cleaning agents, but have mild impact on skin and materials and are useful for manual cleaning of smooth surfaces without encrusted dirt. In practice, alkaline and acid cleaning substances should be used alternatively.

Disinfection techniques

The elimination of microorganisms is achieved through disinfection, either by using

- hot water (or better steam) or
- chemical disinfectants

Chemical disinfectants are preferred for most applications in the meat industries as they are easy to use and do not involve the risk of accidents or other negative side effects such as damage to equipment by generating high humidity or water condensation, which may occur when using steam. Best results are achieved when chemical disinfection is preceded by intensive dry/wet cleaning.

Questions for discussion:

1. Which two types of food poisoning do you know?
2. What is the mechanism of action of food borne infections?
3. What is the mechanism of action of food borne intoxications?
4. What bacteria cause Food borne intoxications the most often?
5. What are the symptoms of food poisoning?
6. What is the difference between cleaning and disinfection?
7. What means are used while inactivation?
8. What is the sequence of dry and wet cleaning?
9. What is the disadvantage of cleaning with a pressurized steam/water-mix?
10. Could you describe foam cleaning?
11. Could you describe desirable properties of detergents?
12. Do alkaline and acid cleaning substances have similar or different qualities?
13What disinfection techniques do you know? Which is the best one?

Translate the words:

alkalines, washing soda, corrosion, detergents to dispose, to remove , mild, germicidal action, chemical disinfection, sanitization, steam, raw meat, abnormal tissues, organic dirt, protein residues, food borne infection, to release the poison, to be intoxicated, prolonged storage, food borne intoxication, heavy contamination, sealing, manual cleaning, encrusted dirt, vacuum packages, , digestive tract, gastro-intestinal symptoms, scrap, a dry brush, a broom, wet cleaning, waterstone, milkstone, lime, high pressure nozzles, efficient, intense fog, water droplets, equipment, humidity, hot pressurized water cleaning, a foam cleaning, detergents, to spray, to cling to the surface, water hose, water droplets, negative side effects

Disinfectants for the meat industry

Disinfectants should be effective and rapidly acting in killing microorganisms. In principle the following groups of substances are generally used as disinfectants:

1. Chlorine containing compounds e.g. Na/Ca hypochlorite or chlorine gas, has a corroding effect on equipment.
2.Aldehydes (used in animal production, e.g. Formaldedyde) Phenoles / Kresols (used in medicine, households Alcohols (used in medicine, e.g. skin) Alkalines (pH 10 or higher) (e.g. NaOH, used in animal production) Acids (some organic acids used in food industries). Quaternary ammonium compounds Amphotensids (used in food industries, as not corrosive) Low efficiency on spores. They have effect on cell walls, not corrosive, odourless, additional cleaning properties (surfactant)

3. Oxygen releasing compounds e.g. Peroxide compounds (H_2O_2) Per-acetic acid (use in food industries). Penetrate into cells, good effect on all microorganisms including on spores and virus, odourless, may be corrosive in concentrations >1%

An example of the optimal combination of disinfectant commercially used is

- Organic acids
- Surfactants (= surface active agents)
- Peroxide compounds

The organic acids, apart from their sanitizing effect, decrease the pH as some disinfectants are more efficient at lower pH. The surfactants assist in penetrating organic material. The peroxide compounds have the direct antimicrobial effect by coagulation and denaturation of proteins (virus) and penetration through cell walls causing cell destruction (bacteria).

Questions for discussion:

1. What groups of substances are used for disinfection?
2. What is the ideal combination of disinfectants?

Translate the words:

ПАР, дезінфікуючий засіб, речовина, складник, корозійний вплив, спори, без запаху, пероксидні сполуки, клітина, органічна кислота, знизити, коагуляція, проникати, антимікробний вплив, ефективний, лужний, хлор, обладнання,

Postmortem inspection[3]

Routine postmortem examination of a carcass should be carried out as soon as possible after the completion of dressing in order to detect any abnormalities so that products only conditionally fit for human consumption are not passed as food. All organs and carcass portions should be kept together and correlated for inspection before they are removed from the slaughter floor.

Postmortem inspection should provide necessary information for the scientific evaluation of pathological lesions pertinent to the wholesomeness of meat. Professional and technical knowledge must be fully utilized by:

1. *viewing, incision, palpation* and *olfaction techniques*.
2. *classifying the lesions* into one of two major categories - *acute or chronic*.
3. establishing whether the *condition is localized or generalized,* and the extent of systemic changes in other organs or tissues.
4. *determing the significance of primary and systemic pathological lesions* and their relevance to major organs and systems, particularly the liver, kidneys, heart, spleen and lymphatic system.
5. *coordinating all the components of antemortem and postmortem findings* to make a final diagnosis.
6. *submitting the samples to the laboratory for diagnostic support,* if abattoir has holding and refrigeration facilities for carcasses under detention.

Carcass judgement

Trimming or condemnation may involve:

1. Any portion of a carcass or a carcass that is *abnormal* or *diseased*.
2. Any portion of a carcass or a carcass affected with a condition that may present a *hazard to human health*.
3. Any portion of a carcass or a carcass that may be *repulsive to the consumer*.

Localized versus generalized conditions

It is important to differentiate between a localized or a generalized condition in the judgement of an animal carcass. In a *localized* condition, a lesion is restricted by the animal defense mechanisms to a certain area or organ. Systemic changes associated with a localized condition may also occur. Example: jaundice caused by liver infection or toxaemia following pyometra (abscess in the uterus).

In a *generalized* condition, the animal's defense mechanisms are unable to stop the spread of the disease process by way of the circulatory or lymphatic systems. The lymph nodes of the carcass should be examined if pathological lesions are generalized. Some of the signs of a generalized disease are:

1. Generalized inflammation of lymph nodes including the lymph nodes of the head, viscera and/or the lymph nodes of the carcass
2. Inflammation of joints
3. Lesions in different organs including liver, spleen kidneys and heart

4. The presence of multiple abscesses in different portions of the carcass including the spine of ruminants Generalized lesions usually require more severe judgement than localized lesions.

Acute versus chronic conditions

Acute conditions. An acute condition implies that a lesion has developed over a period of some days, whereas a chronic condition implies the development of lesions over a period of some weeks, months or years. A subacute condition refers to a time period between an acute and chronic condition.

The acute stage is manifested by inflammation of different organs or tissues, enlarged haemorrhagic lymph nodes and often by petechial haemorrhage of the mucosal and serous membranes and different organs such as heart, kidney and liver. An acute stage parallels with the generalized disease complex, when an acute infection tends to overcome the animal's immune system and becomes generalized.

Each case showing systemic lesions should be assessed individually taking into account the significance that these lesions have towards major organ systems, especially the liver, kidneys, heart, spleen and lymphatic system as well as the general condition of the carcass.

Chronic conditions. In a chronic condition, inflammation associated with congestion is replaced by adhesions, necrotic and fibrotic tissue or abscesses. The judgement in the chronic stage is less severe and frequently the removal of affected portions is required without the condemnation of the carcass. However, judgement on the animal or carcass judgement tends to be more complicated in subchronic and sometimes in peracute stages. If generalized necrotic tissue is associated with previous infection, carcass must be condemned.

Questions for discussion:

1. During what period should a postmortem inspection be carried out?
2.What is the aim of postmortem inspection?
3. What procedures does antemortem inspection consist of?
4. What should be done if a carcass that is abnormal or diseased.
5. What is a localized condition?
6. What is a generalized condition?
7. How does an acute lesion looks like?
8. How can you characterize chronic condition of a carcass?

Translate the words:

Хронічний, .бійня, жовтуха, гострий, туша, омертвілий, набряклий, ушкодження, селезінка, печінка, запалення, небезпека, тканина, серце, первинне ураження, селезінка, імунна система, абсцес, лімфатичний вузол, ускладнений, хребет, виявляти відхилення, огляд, місце забою, патологічні ураження, пальпація, зразок, лімфатичний вузол, зв'язка.

Significance of Hygiene in the Dairy Industry: Practicing the Basic Hygiene Standards [4]

As the food production chain becomes increasingly complex today, unhygienic work conditions and risks of contamination continue to plague the industry. Milk is one component that has a poor shelf life and is most susceptible to adulteration and growth of microbes if proper hygiene practices are not maintained. The dairy products intended for human consumption must be free from harmful pathogens such as Salmonella, Campylobacter, Listeria monocyogenes, Yersinia enterocolitica, etc. These microbes can cause serious ailments, particularly in elderly, pregnant women, children and individuals who are immuno-compromised.

The contamination of dairy products can occur via various sources such as unhygienic production & storage processes, handlers and equipment, environment, and packaging materials. To avert the risks associated with poor standards of food safety prevalent in the diary industry, it has become imperative for dairy farms and production units to stay compliant with GMP, GHP and HACCP guidelines.

Importance of Maintaining Good Hygiene in Dairy Plants

Milk is a perishable food product and easily falls prey to microbial contamination & increased pH levels. This causes dairy products to diminish in quality and taste if proper hygiene measures are not taken in manufacturing and storage conditions. Maintaining good hygiene is crucial for the dairy industry to:

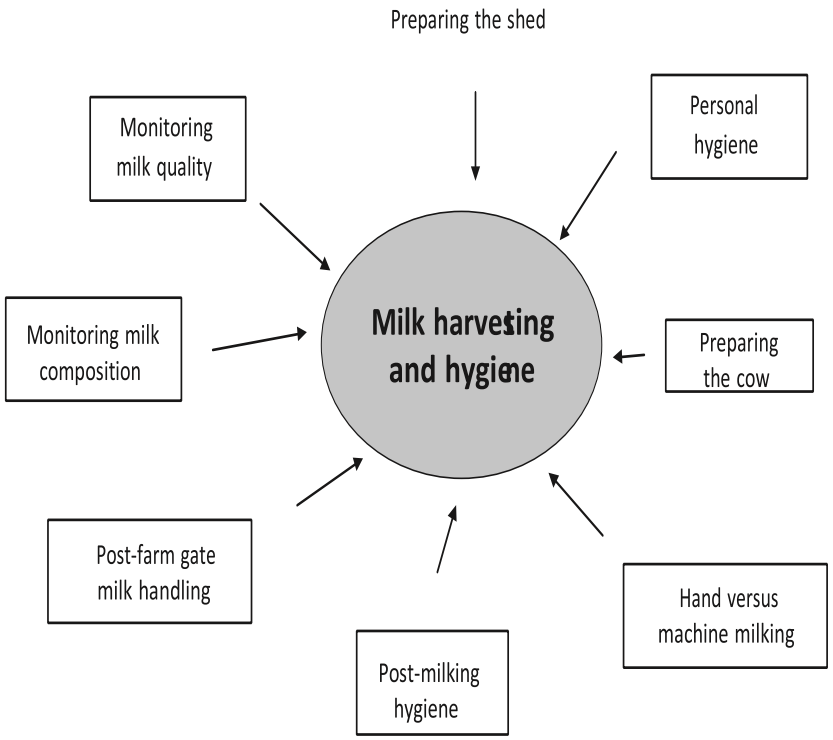
- Minimise or prevent contamination caused due to entry of pathogens and bacteria from unhygienic milking procedures, equipment, milk contact surfaces, handlers, storage or packaging conditions

- Ensure highest standards of food safety and improved compliance with regulatory practices defined for the dairy industry
- Provide only highest quality and safe dairy products for end consumers

Answer the questions:
1. Why is milk a perishable product?
2. What harmful pathogens can be present in milk?
3. What can these microbes cause?
4. What are the sources of milk contamination?
5. What guidelines are used to prevent milk contamination?
6, Why is it important to maintain good hygiene in milk?

Translate the words:
Продукт, який швидко псується, зараження, патогени, обладнання, фальсифікат, спричинити хворобу, недуга, імунодефіцитний, відвернути, дотримуватися вимог, обов'язковий, знизити якість, зменшити, виробництво, харчова безпека, кінцевий споживач, складний

Key elements in milk hygiene:



Milk Production Hygiene

Cutting-edge automated milk production techniques are fast replacing manual milking processes in top-notch dairy farms. However, proper hygiene training should be imparted to everyone involved in the milking process because the two primary contamination sources here are equipment used and handlers.

- Uphold superior hygiene standards in the milking process through the use of modern equipment and advanced milking monitoring measures
- Prevent contamination through mastitis by proper use of the milking machinery and avoiding overmilking
- In-depth training is important to help maintain highest levels of personnel hygiene

Dairy Plant Hygiene

Effective cleaning and sanitisation play an integral role in preserving mandatory hygiene measures in dairy processing plants. Plant hygiene typically comprises of three segments – Processing hygiene, Equipment hygiene and Personnel hygiene.

- Lack of knowledge pertaining to equipment handling or functioning of machineries is one of the key reasons causing bacterial contamination in milk and other dairy products. To prevent this, it is crucial to impart proper

training and ensure routine monitoring of the equipments' working performance. Lubricant contamination should also be prevented.

- Not adhering to equipment cleaning & sanitisation standards can also result into contamination through harmful substances such as milk residues, allergens, microorganisms or chemical residues. Therefore, comprehensive cleaning and sterilisation of equipment should be undertaken after milk processing
- Only non-corrosive, industry-approved detergents and disinfectants should be used
- Maintain optimal drainage system in the processing area and ensure abundant water supply for effective cleaning
- Using automatic can washer can help prevent milk surface contamination
- The plant floor should be built from Kota or Mandara tiles, while the dock should be covered with Iron Grid tiles. Ensure regular scrubbing and cleaning of the floor for optimum hygiene
- Maintaining good personal hygiene is also important to produce high-quality, contaminant-free dairy products. People working in the plant unit should enclose themselves in clean & sterilised workwear, including face masks, hair caps and gloves. Reinforced safety boots or shoes should also be used.
- Refrain wearing jewellery or cosmetics inside the production facility

Answer the questions:

1. What kinds of milking do you know?
2. What are the advantages of using milking machinery?
3. Why do handlers need in-depth training ?
4. What segments does plant hygiene comprise?
5. Why should comprehensive cleaning and sterilisation of equipment be undertaken?
6. What kind of detergents should be used?
7. Can jewelry be worn by handlers?
8. Are there any requirements to floors?

- **Translate the words:**
  Автоматизоване доїння, доїння вручну, на вищому рівні, сучасне обладнання, джерело, мастит, особиста гігієна, запобігати, обов'язковий, містити в собі, щоденний моніторинг, мастило, залишки молока, алергени, стерилізація, миючий засіб, шкідлива речовина, поверхня, плитка, надмірний, залізна сітка, очистка, робочий одяг,

Personnel Hygiene

Do you know that human beings are the biggest source of dirt, dust and contamination in a dairy plant, affecting quality & safety of the final product? Keeping this in mind, modern dairy farms and production plants should implement stringent personnel hygiene guidelines as mentioned herewith:

- Thoroughly wash hands using a high-quality disinfectant or hand-care product before and after leaving the milk processing or production unit. Every time the hands become soiled, they should be cleaned properly before getting back to the work area. Finger nails should be cut short and clean. Do not use performed hand soaps or lotions. Hands must be properly sanitised for critical production areas.
- Any cut or open sore must be reported to the medical centre and covered by a band-aid type coloured dressing
- Implement use of hygienic and sterilised clothing in dairy plant to prevent product contamination. The workwear should not be worn when away from the production facility or into the toilet, smoking room or canteen. Proper design of hygiene clothing is essential to prevent the skin from coming into contact with the products.
- Wearing hand gloves is mandatory when handling or packaging the dairy products. Feet should be properly covered with high-quality, disposable shoe caps.
- Dairy plants should also give utmost importance to effective workwear laundry. State-of-the-art laundry facility and compliance with highest standards of hygiene is vital for safe, sanitised and reusable clothing
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Dairy Waste Water Hygiene

Lack of proper measures to manage dairy waste water is a primary cause of unhygienic work conditions and spreading of contaminants through various sources. At the same time, most dairy farms and production plants do not have sufficient supply of clean & impurity-free water for rigorous cleaning and sanitisation purposes. To maintain proper hygiene and stay compliant to regulatory standards, it is important for dairy plants to implement effective measures for treating dairy waste water. Some of these methods are Aerobic Treatment, Biological Filtration and Activated Sludge.

Conclusion

Hygiene is one of the key parameters ensuring quality and credibility of any dairy farm or production facility. To comply with industry best practices and ensure highest levels of food safety to end consumers, it is imperative to maintain key hygiene standards and monitor performance.

Answer the questions:

1. Who is the biggest sourse of dirt on a diary plant?
2. Are there any special requirements to hands of a handler?
3. What kind of clothes should be worn?
4. Are shoe caps necessary on a milking plant?
5. Can waste water cause contamination?
6. What ways of water purification are mentioned?
7

- **Translate the words:**

Авторитет, дотримуватися стандартів, нестача, стічні води, вода без домішок, біологічна фільтрація, активний мул, рукавички, пральня, бахіли, їдальня, поріз, лейкопластир,

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