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CODE OF HYGIENIC PRACTICE FOR MILK AND MILK PRODUCTS – 2

This bulletin includes technical information based on latest developments on products, systems, techniques etc. reported in journals, companies' leaflets and books and based on studies and experience. The technical information in different issues is on different areas of plant operation. It is hoped that the information contained herein will be useful to readers.

The theme of information in this issue is **Code of Hygienic Practice for Milk and Milk Products – 2.** It may be understood that the information given here is by no means complete.

In this issue:

1. INTRODUCTION

The last issue of the *Technews* presented the 'Overarching Principles', 'Relative Roles of Different Stakeholders' and guidelines on the application of hygienic measures related to the 'Primary Production' as detailed in the Codex 'Code of Hygienic Practice for Milk and Milk Products (RCP-57-2004) (Milk Hygiene Code)'.

This issue presents the remaining provisions of the Code. In presenting this code, necessary editing has been carried out, however, without altering the substance. The provisions relevant to milk used for raw milk products are not included here as such products are not made in our country.

2. ESTABLISHMENT: DESIGN AND FACILITIES

EQUIPMENT

- Equipment should be designed and installed such that as far as possible dead ends or dead spots in milk pipelines do not occur.
- Where dead ends or dead spots occur, special procedures should ensure that they are effectively cleaned or otherwise do not permit a safety hazard to occur.

3. CONTROL OF OPERATION

1. CONTROL OF FOOD HAZARDS

- It is important that control measures are applied during both primary production and processing to minimize or prevent the microbiological, chemical or physical contamination of milk.

- Preventive measures should be applied in primary production to reduce the initial load of pathogenic microorganisms as well as during processing to avoid contamination within the processing environment.
- Individual control measures should be selected and applied in such combination as to achieve a sufficient performance as to result in end products with acceptable levels of hazards.
- Acceptable levels of contaminants in the end product should be identified and be based upon:
  - → food safety objectives, end product criteria and similar regulatory requirements (*Technews* issue 58, September– October 2005), as applicable;
  - → acceptable levels derived from the purchaser constituting the subsequent link of the food chain; and/or
  - → the maximum levels found acceptable by the manufacturer, taking into account acceptable levels agreed with the customer and/or regulatory measures established by public health authorities.
- The guidance in the HACCP Annex to the '*Recommended International Code of Practice: General Principles of Food Hygiene (RCP-1-1969, Rev.4 2003, Amend. 2-2003)* (General Hygiene Code)' applies.

A. Hazard Identification and Evaluation

- All potential hazards should be identified. The following points are important in this respect:
  - → The identification should be based on the initial descriptions developed during preliminary steps and on experience, external information, as well as epidemiological and other historical data that have been associated with the type of food under consideration, the type of raw materials and ingredients used, and that may be introduced during processing and distribution.
  - → To insure a comprehensive approach, the various step(s) in the

manufacturing process, from material selection through processing and distribution, where a hazard may occur or be introduced should be identified.

→ When evaluating potential microbiological hazards, consideration should be given to which of the organisms are likely to be present in the milk. For instance:
  - microbiological hazards that are not relevant in the geographical area of concern (e.g. because the prevalence is insignificant or zero) can be ruled out at an early stage; and
  - where it can be verified that specific sanitary measures are successfully applied during primary production to prevent or significantly reduce introduction of a pathogen into the herd, including efficient eradication programmes, the pathogen in question may be ruled out. Records documenting the conditions that support such a determination should be maintained. This can be done by documenting the OIE status (e.g. disease-free area), the effectiveness of national programmes, the effectiveness of individual producer screening programmes, on the basis of documented historical evidence, and through the development of epidemiological evidence.

→ Regular analysis of the milk (including but not restricted to microbiological analyses) received at the manufacturing establishment producing milk products can be used to verify the implementation of control measures affecting the likelihood of occurrence of a hazard, depending upon the technology used and the kind of milk product being made.

→ Any additional hazards that can be introduced into the milk product during and after processing (e.g. environmental contamination, human contamination) should also be considered. During such considerations, the effectiveness of preventive measures taking place in the manufacturing environment (e.g., environmental and equipment sanitation programmes, employee practices, pest control programmes, etc.) should be evaluated to determine the likelihood of occurrence of potential hazards.

→ Hazard identification should take into consideration the allergenic nature of some foods. Milk products may contain ingredients such as nuts, eggs and cereal grains that are known to be allergens.

- Each potential hazard should be evaluated to determine the severity of its adverse health effects and reasonable likelihood of occurrence. Potential hazards that are determined to have severe adverse health effects and/or are reasonably likely to occur should be subject to control by the system of control measures.

B. Control Measure Selection

- Control measures and control measure combinations should be selected that will prevent, eliminate, or reduce, as appropriate, the hazards to acceptable levels.
- The control measures may be applied singly or in combination.
- Depending on the source and possible routes of contamination, the hazard(s) may be kept under control by preventive measures implemented at primary production level and/or in processing environments.
- When evaluating microbiological preventive measures, it is particularly important to know which of the hazards are affected by the preventive measure and to what extent the measure reduces the probability of the hazard contaminating the milk product during milking, processing and/or distribution.
- Those microbiological hazards that are not managed adequately by preventive and microbiostatic control measures need to be managed and controlled by adequate microbiocidal control measures with sufficient combined performance.
- Attention should be paid to the application of microbiocidal control measures with such performance that they effectively eliminate any risks associated with the transfer of additional zoonotic hazards to the

milk. Recommendations in the OIE International Terrestrial Animal Health Code apply.

C. Establishment of Process Criteria

- Process criteria should be established at such intensities that the control measures actually deliver the expected performance, taking into account normal process deviations.

- From the performance required, the corresponding process criterion or criteria (as appropriate to the nature of the microbiological control measure) should be established. They are intended for the appropriate implementation (set-up) of a processing step and for application in practical process control (e.g. filter size, pH, concentration of preservative, time/temperature combinations).

- The performance of individual control measures or control measure combinations against individual hazards in various media should be validated. The procedures outlined in the *Guidelines for the Validation of Food Hygiene Control Measures* (likely to be adopted by the CAC in its June-July session this year) should be utilized. In particular:
  - → the validation of control measures or control measure combinations is especially important when establishing the effectiveness of new or developing technologies; and
  - → validation may not be necessary in situations where well established control measures or technologies are considered to be acceptable.

- If the performance required cannot be achieved by the control measure(s) or if it is estimated and/or monitoring shows that the hazards are not under sufficient control by the selected combination of microbiological control measures, modification of the control system design is necessary, such as:
  - → increasing the intensities of the microbiological control measure(s) applied;

- → identification of additional microbiological control measure(s) that target the hazard of concern;
- → implementation of more stringent on-farm control measures;
- → introduction of specifically targeted measures at farm level that reduce the prevalence of the hazard of concern in the milk used; and
- → reduction of the intended shelf life and/or amendments of the intended storage conditions.

- In the context of HACCP, process criteria may or may not constitute critical limits.

2. KEY ASPECTS OF HYGIENE CONTROL SYSTEMS

A. Temperature and Time Controls

- Important guidance on management of products within the plant is provided below:
  - → In relation to the incoming milk, following care should be taken:
    - When arriving at the dairy plant, and provided that further processing does not allow otherwise, the milk should be cooled and maintained at such temperatures as necessary to minimize any increase of the microbial load of the milk.
    - The principle of "first arrived, first processed" should apply.
  - → In relation to the intermediate products, following care should be taken:
    - Those that are stored prior to further processing should, unless further processing does not allow it, be kept under such conditions of storage time and temperature that limit/prevent microbial growth or be further processed within a short time period.
    - There should be adequate stock rotation, based on the principle of “first in, first out”.

- The following points are important in relation to distribution of finished products:

- → The storage temperature should be sufficient to maintain the product's safety and suitability throughout the intended shelf life. It will vary depending upon whether the product is perishable or non-perishable.
- → For perishable products:
- → the distribution system should be designed to maintain adequate low-temperature storage to ensure both safety and suitability;
  - validation of the selected temperature should be carried out except in situations where well established storage temperatures are considered acceptable;
  - regular and effective monitoring of temperatures of storage areas, transport vehicles and store display cases should be carried out; and
  - particular attention should be paid throughout storage and distribution to the periods of defrosting of refrigeration units; temperature abuse; and overloading the cold storage facility.

- → For non-perishable products that can be stored at ambient temperatures, protection against external agents and contamination, e.g., direct sun radiation, excessive heating, moisture, external contaminants, etc. from rapid temperature changes is necessary.
- → Reasonably anticipated temperature abuse should be taken into account in designing the normal patterns of distribution and handling.

- It is the responsibility of the manufacturer to determine the shelf life of the product and the conditions for storage. The corresponding storage conditions are an integral aspect of product shelf life. In this regard, the following pints are important:
  - → It should be assured and, as necessary, demonstrated by the manufacturer, that the safety and suitability of the milk product can be retained throughout the maximum period specified, taking into consideration the potential for reasonably anticipated temperature abuse during manufacture, storage, distribution, sale and handling by the consumer;
  - → Reasonably anticipated temperature abuse takes into account the

normal period of transporting of purchased products to appropriate consumer storage facilities and normal patterns of handling during consumption, for instance, the number and length of periods in which the product is removed from the refrigerator and subjected to ambient temperatures until the whole package has been consumed; and

→ Possible reactivation of pathogens with time should also be taken into account when determining the shelf life.

- Shelf life determination can be carried out at the plant level by testing products subjected to the storage conditions specified or by predicting microbial growth in the product under the specified storage conditions. Reasonable anticipated temperature abuse can be integrated into the study or be taken into account by applying an appropriate safety factor (e.g., by shortening the maximum durability specified in the labelling or by requiring lower storage temperatures).

B. Microbiological and Other Specifications

- In relation to milk:
  - → incoming milk criteria should be established by the manufacturer that take into account the end use of the milk and the conditions under which the milk was produced;
  - → evaluation based on sampling of milk from individual farms or milk collection centres should be carried out when used for manufacture of products;
  - → olfactory and visual inspection should be carried out upon receiving. Other criteria (e.g., temperature, titratable acidity, microbiological and chemical criteria) should be used to detect unacceptable conditions; and
  - → any-non-compliance with the above mentioned criteria, and in particular with regards to pathogens, should result in immediate corrective actions at the farm level and in the manufacturing establishment and should be commensurate with the potential risks presented by the non-compliance.

- Microbiological criteria may be necessary to be established at different points in the process for carrying out the design of control measure combinations and for the verification that the control system has been implemented correctly.

C. Microbiological Cross Contamination

- The flow of the product and of the ingredients within equipment and through the processing facility should maintain a forward progression from raw material receipt to finished product packaging so as to avoid cross contamination.

- The flow of the water, air, effluents, and milk should be carefully evaluated to ensure that the potential for cross-contamination does not occur. Similarly, the flow of personnel should be evaluated to ensure that their actions couldn't contaminate milk.

- There should be adequate separation of areas with different levels of contamination risk. In particular:
  - → milk products that have been returned from other locations should be identified, segregated and stored in a clearly designated area; and
  - → where there is the potential for cross-contamination between end products and raw materials or intermediate products, and from contaminated areas such as construction and rebuilding areas, consideration should be given to a physical separation, such as by the application of barrier hygiene (the application of physical or mechanical barriers to prevent or minimize the transfer of contaminants or potential sources of contaminants) and wet/dry area segregation.

D. Physical and Chemical Contamination

- Preventive measures should be implemented to minimize risks of contaminating milk and milk products with physical and chemical hazards and foreign substances.

- Preventive measures should include measures that will minimize the potential for cross contamination of allergenic components and/or ingredients that may present in other products to a milk product in which these components and/or ingredients are not supposed to be present.
- Effective control of equipment maintenance, sanitation programmes, personnel, monitoring of ingredients and processing operations should be in place.

3. INCOMING MATERIAL (OTHER THAN MILK) REQUIREMENTS

- Ingredients used for the processing of milk products should be purchased according to specifications, and their compliance with these specifications should be verified.
- Specifications for raw materials should be established such that their use will result in a safe and suitable product.
- No raw material should be accepted if it is known to contain chemical, physical or microbiological contaminants that would not be reduced to an acceptable level by normal sorting and/or processing.
- Raw materials should, where appropriate, be inspected and sorted before processing.
- Any claims that raw materials meet safety and suitability specifications should be verified periodically.

4. WATER

- Dairy processing establishments should have potable water available, which prior to its first use, should meet the criteria specified by the competent authorities having jurisdiction and should be regularly monitored.
- Water conditioning systems should be properly managed to avoid the

systems becoming sources of contamination. For example, filter systems can become sources of bacteria and their metabolites if bacteria are allowed to grow on the organic materials that have accumulated on the filter.

- Appropriate safety and suitability criteria that meet the intended outcomes should be established for any water used in dairy processing. These criteria depend upon the origin and the intended use of the water. For example, reuse water intended for incorporation into a food product should at least meet the microbiological specifications for potable water.
- Water re-circulated for reuse should be treated and maintained in such a condition that no risk to the safety and suitability of food results from its use.
- Reconditioning of water for reuse and use of reclaimed, recirculated and recycled water should be managed in accordance with HACCP principles. Any reuse of water should be subject to a hazard analysis including assessment of whether it is appropriate for reconditioning. Critical control point(s) should be identified, as appropriate, and critical limit(s) established and monitored to verify compliance.

4. ESTABLISHMENT: MAINTENANCE AND SANITATION

1. MAINTENANCE AND CLEANING

- Processing areas should be kept as dry as possible.
- Use of dry cleaning methods, and limiting the use of water in processing areas, helps to avoid the spread of contamination by water. Wet cleaning (other than Cleaning-in-Place) has been known to lead to milk product contamination due to the production of aerosols.
- All food product contact surfaces in piping and equipment, including

areas that are difficult to clean such as by-pass valves, sampling valves, and overflow siphons in fillers should be adequately cleaned.

2. CLEANING PROGRAMMES

- A routine programme to verify the adequacy of cleaning should be in place.
- All equipment and utensils used in processing should, as necessary, be cleaned and disinfected, rinsed with water which is safe and suitable for its intended purpose (unless the manufacturer's instructions indicate rinsing is not necessary), then drained and air dried where appropriate.

5. ESTABLISHMENT: PERSONAL HYGIENE

The guidance provided in the General Hygiene Code is adequate.

6. TRANSPORTATION

The *Code of Hygienic Practice for the Transport of Foodstuffs in Bulk and Semi-Packed Foodstuffs* (CAC/RCP 47 – 2001) applies.

1. REQUIREMENTS

Products should be transported at time/temperature combinations that will not adversely affect the safety and suitability of the product.

2. USE AND MAINTENANCE

In the case of refrigerated products, the vehicle product compartment should be cooled prior to loading and the product compartment should be kept at an appropriate temperature at all times, including during unloading.

7. PRODUCT INFORMATION AND CONSUMER AWARENESS

LABELLING

Milk products should be properly labelled.

→ The Codex *General Standard for the Labelling of Prepackaged Foods* (CODEX STAN 1; 1985 (Rev. 1 – 1991)), the *Codex General Standard for the Use of Dairy Terms* (CODEX STAN 206; 1999) and the relevant labelling section of Codex commodity standards for individual milk products apply; and

→ Unless the product is shelf stable at ambient temperatures, a statement regarding the need for refrigeration or freezing should be included on the label of the product.

8. TRAINING

TRAINING PROGRAMMES

Milk producers and personnel involved in the collection and transport and retail of milk should be trained as necessary and have appropriate skills in the areas listed below:

→ Health of animals and use of veterinary drugs.
→ Manufacturing and use of feeds (more specifically fermented feeds).
→ Herd management.
→ Hygienic milking.
→ Storage, handling, collection and transport of milk (cleaning of storage tanks, temperature requirements, sampling procedures, etc.).
→ Microbiological, chemical and physical hazards and their control measures.

* * *

NEWS SECTION

Indian Food Laws

- **Notification GSR 206(E) of 25 March 2008 of the Ministry of Health and Family Welfare:** The Notification provides standard methods for analyses to judge compliance to PFA Rules. For this, it refers to the manuals of methods of analysis developed by the Ministry of Health and Family Welfare and also provides a list of standard books/manuals that may be referred for alternative methods of analysis. The manual of methods of analysis for milk and milk products is available free of cost in electronic form at the website: http://www.mohfw.nic.in/manmethod.htm).

- **Draft Notification GSR 208(E) of 25 March 2008 of the Ministry of Health and Family Welfare:** The Draft Notification proposes some amendments to the PFA Rules and invites comments from stakeholders by 24 May 2008. The amendments proposed are broadly indicated below:
  - → Proposal to allow use of sucralose in dried ice-cream mixes, milk / ice lollies and frozen desserts;
  - → New proposed definitions of ice-cream, *kulfi*, chocolate ice-cream or softy ice-cream; dried ice cream mix or dried frozen dessert or confection; frozen dessert or frozen confection; and milk ice or milk lolly;
  - → Proposal to allow some more additives in processed cheese; processed cheese spread; and cheese-sliced/cut/shredded.
  - → Revised microbiological standards for milk products.

Codex Alimentarius Commission (CAC)

The period June-July 2008 features the 31st Session of the Codex Alimentarius Commission during 30 June – 4 July 2008 in Geneva, Switzerland.

International Dairy Federation (IDF)

IDF has published the following Bulletin/Standard recently:

- IDF Bulletin No.427/2008: Towards A Reference System for Somatic Cell Counting in Milk
- IDF 025 – ISO 17837: Milk and milk products - Determination of nitrogen content and crude protein calculation - *Kjeldahl* method

For purchasing the IDF publications, the following may be contacted:

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