



STUDY ON HYGIENE AND HYGIENE RULES IN BAKERY INDUSTRY

C. M. Canja¹, M. I. Lupu¹, D.W. Enache¹

¹ Transilvania University of Brasov, Brasov, ROMANIA, canja.c@unitbv.ro

Abstract: *The study presents the hygiene rules which have to be respect in the bread industry. There stand up the good manufacturing practice rules, the preliminary programs, the training programs and the personnel training. Also, are specified the hygiene rules typical to the means of transport, of deposits and of the sale space for bread and baking products.*

Keywords: *bread, hygiene, GMP, SSOP*

1. INTRODUCTION

Applying the rules of good hygiene practices in the production process helps to ensure that all raw materials which present contaminations outside of the acceptable limits will not be accepted, that the production respects the right hygiene and manufacturing conditions and the food is protected from the sources of contamination and potential hazards that would make them unproper for consumption.

The requirements of hygiene and food safety for the food and for the industry specific for bread and bakery specialties production are stipulated in numerous international, european and national acts, some of them with consultative character, others binding, but all with the purpose to substantiate the quality and food safety of these products and to support the producers to make a correct, efficient processing and with as little as possible negative impact on the consumer [3].

Food hygiene management requires proper maintenance and sanitation measures for both raw and auxiliary materials, and also for the construction and equipment to maintain them in good conditions for the proper conduct of operations, to prevent physical, chemical and biological food contamination.

The hygiene in food industry must:

- ensure the food security from microbiological point of view;
- improve sensory and nutritional properties of products;
- extend the timeshare for sale, the consumer timeshare and the optimal use duration.

In the case of food itself, the hygiene enforcement strategy involves:

- avoiding the external microorganisms that are harmful in raw materials;
- destroying the microorganisms in various ways, destruction that is more effective when the initial number of microorganisms is reduced;
- inhibiting the growth of microorganisms which could be damaged.

For the sanitation of the company in the food industry it is necessary to know:

- chemicals used and their properties;
- the way (nature) of dirt which has to be removed from a given area;
- the nature of dirt's substrate or the pack's material, the machinery, the equipment, the recipient and the area which will be cleaned and disinfected;
- the water used to prepare solutions for washing and rinsing;
- the adopted scrubbing: manual or automatic [2].

2. HYGIENE AND SANITATION IN BREAD INDUSTRY

The construction elements must be regularly cleaned and disinfected, where is necessary. In the areas where is a high risk of microbial and chemical contamination, the cleaning and disinfection operations must be done in special conditions.

The cleaning operations for the dirty places will be done by specialized staff. The frequency of cleaning operations depends on the contamination risk that every objective possesses and also depends on the cleaning method that is required and on the results obtained at the tests of sanitation efficiency.

The cleaning operations always start from the cleanest places to the dirtiest, from the ceiling to the floor, from working areas to sanitary annexes.

The recommended cleaning methods are: painting, vacuuming, sweeping wet and remove wet.

The washing substances that can be used for this field are: alkali (caustic soda, ash soda), acids, and surfactants. Disinfection can be done by physical or chemical methods. The chemicals used for cleaning and disinfection must be approved for food industry.

Following the recommendations of Codex Alimentarius, before applying HACCP in any sector of the food chain, it must operate in accordance with:

- General Principles of Food Hygiene Code (GHP);
- The Code of Good Manufacturing Practices (GMP);
- An appropriate legislation of food safety.

2.1. Maintenance and sanitation programs (PCS)

Every factory must prepare their maintenance and repair programs, cleaning, pest control, waste management that have to contain elements about: the place of action, the achievement data, the subject or field of action, the method and frequency of the achievement.

International regulations:

- CAC / RCP 1-1969. International Code of Practice – Codex Alimentarius. General Principles of Food Hygiene.

European Regulations:

- White Book for Food Safety, The European Commission, Brussels 12.01.2000;
- 852/29.04.2004 regulation on Food Hygiene;
- GD 942/2005 [MO 804/5.09.2005] General Regulations on Food Hygiene, which transpose The European Parliament and the Europe Council Regulation no.853/2004;
- WHO 975/10.12.1998 [MO 268/1999] on sanitary standards for food;
- Romanian standards:
 - SR 13462 -1/2001 Food Hygiene; General Principles;
 - SR 13462 -2/2002 Hygiene agro. The hazard analysis and critical control points (HACCP) guidelines and its implementation;
 - SR 13462 -/2002 Hygiene agro. Principles for the establishment of microbiological criteria for foods.

2.2. Good manufacturing practice [GMP]

GMP are activities which, although not found directly on the food production flow, they help to ensure its hygienic characteristics.

The premises and the environment

To avoid contamination, the location of bread production units must be at a sufficient distance from areas that may cause contamination (dumps, public toilets) and close to sources of drinking water.

The assurance and the proper maintenance of fences and enclosures of these units for the protection against the ingress of foreign animals and people in other areas out of the way, especially for the purpose.

Controlling the neighborhoods to identify any kind of pollution sources (smoke, dust, chemicals and radioactive, waste, household pests etc.) by regular checks and by actions which have to prevent the contamination.

Maintain in proper condition the roads and the areas used for internal traffic, roads that have to be asphalted, and provided with optimal drainage for rainwater and wastewater from leaning operation. These must be swept and cleaned whenever it is needed by washing with a hoe. A special attention will be given to the areas in the immediate vicinity of the processing space.

All access and circulation shall be clearly marked to identify and ensure the technological flow including on-site flows to avoid congestion and risk of accidents on the runways of the production unit.

The action of combating pests and of cleaning will be performed regularly and their efficiency will be controlled permanently [3].

Buildings and annexes

The location of the build by things should take into account the direction of prevailing winds so that no risk of cross contamination occurs, determinate by the airflow.

The buildings for the production deployment (development/employment) should have the walls, the pavements and the ceilings made of waterproof materials, non absorbent, non-toxic and easy to clean and disinfect. The way to realize the connections between them or between them and the windows; the doors must be made so they allow a good sealing and cleaning of all the surfaces.

In the production spaces, the packing and the storage must ensure a proper and effective ventilation to prevent the sweat and the mold. The measures taken at the ventilation must prevent the cross-contamination between the clean and dirty areas, through the air currents with directed movement. The inlets and the outlets air will be provided will small – meshed nets to prevent the pest entry.

The windows will be contracted in such a way as to ensure a good seal, not to favor the sweat production, to avoid the dust accumulation.. The windows which are near the work areas, near the raw materials or near the semi-finished materials, will be made of tempered glass, or they will have protection against the scattering shards and also against the pests' penetration.

The doors and the frames will be made of waterproof, non absorbent, non toxic, easily washable and they will ensure a tight seal, including the bottom.

The routes access in the production spaces will have systems for flushing and disinfection of the footwear [3].

The deposits for flour and other raw materials

The deposits are placed in the technological flow in order to ensure a functional relationship with the other working spaces. In these spaces it will be ensured properly conditions of temperature and relative humidity, cleaning and disinfecting and a good ventilation and lighting. It is recommended temperatures of 20°C maximum.

The storage of the bag with flour is made on wooden grills of 10 cm height approx., in stacks of 10 rows in the warmer seasons, with a load of less than 55% of the deposit. If the storage is longer than 30 days, the stacks must be checked regularly to avoid the self-heating, the hardening phenomenon, pest infestation or their attack.

The deposit of the other raw materials can be done in the same spaces with the flour, ensuring a separation from each type of raw materials through different stacks or separate shelves exposure.

It is recommended that raw materials which can borrow foreign odors to be stored in separate rooms or ensure their separation using a package with isolation possibility.

The deposits for bread and bakery specialties

The spaces for this purpose will be placed on the technological flow to ensure functional connections with the other spaces. The rooms will have an optimal height of 3...4 m, with resistant floors and the walls will be covered with tiles or washable and waterproof materials; the optimum temperature of 20°C in all seasons.

It will ensure an adequate ventilation of the space so as to prevent the condensation or the mold on the walls or ceiling.

The spaces must have hot and cold water supply, as well as floor drains to allow the cleaning and the proper disposal of the wastewater.

The storage of bread and bakery specialties is done on racks or in plastic packaging with special purpose, suitable for bread and bakery specialties, placed on platforms with a minimum height of 20 cm or trolleys, ensuring load deposits of 70...120 kg.

The cold stores and the freezers

The placing of cold rooms for storing yeast, eggs and vegetables fat is done on the flow, so as to ensure the functional links with the areas of production, taking into account the rule not to locate the refrigeration's in places with high air temperature or exposure the aggregates to the sub exposure. They must have a tracking system and a temperature control.

The product storage is made in compatibility with the material types, depending on the storage temperature for maintaining the quality and the security of food [3].

The production spaces

The production spaces will be arranged in an order that takes into account the technological flow and the control rules for cross-contamination. The spaces will have a minimum height of 3 m and they will have a surface of 12m³ for each person employed directly in the production process.

The production spaces will have sinks for hand washing.

The floor will be made of a material that is resistant at traffic, easy to clean, and the walls will be covered with washable and waterproof materials.

The laboratories

In the units that have laboratories, their work will be organized so as not to produce contaminations with the glass of laboratory equipment or with chemicals. The access will be allowed only to the trained personnel who works in the laboratory. The personnel employed in the laboratory will have access in the production areas respecting the personal routes and the other rules of behavior.

2.3. The Sanitary Standard Operational Procedures [SSOP]

Part of GMP the SSOPs are documents relating to the hygiene and sanitary conditions required to satisfy the regulatory requirements for food control. SSOP have to consider at least the following conditions and practices: the water and the ice safety, the conditions and the cleanliness of food contact surfaces, prevention of cross-contamination of food with unhygienic instruments, providing the facilities for personal hygiene, the food protection against alteration, the proper labeling, the storage and the use of the toxic compounds with caution, the health control of the employees and the pests elimination [5].

2.4. The personnel training programs

Annual it is necessary to prepare training programs to mention the time, the duration, the participants, the subjects, the lecturers, the evaluation conditions, the responsibilities and the venue.

The personnel training programs include training courses and information of the personnel, regular tests of skills and hygiene habits [4].

The personnel should receive explanations of the rules imposed to ensure food safety. General rules of hygiene will be provided by the entire personnel.

The employees should be encouraged through involvement in professional competitions and hygiene.

It is necessary to establish training programs to mention the time, the duration, the participants, the venue and the responsibilities.

The leaders and the supervisors of the production units must know the essential concepts and practical hygiene to appreciate the risks and take the necessary measures to remedy any deficiencies.

The training programs should be reviewed and updated regularly, so that the system can ensure the continual maintenance of food safety.

The personnel health

The working personnel in the manufacture of bread is committed only if the health is certificated by medical examination and laboratory tests. The personnel working in production with contact direct or indirect with raw materials must perform medical control.

The personnel will be trained and bound to notify the chief supervisor any digestive, skin, respiratory affections or otherwise that may contaminate the productions during the manufacture.

Any person who has a cut or a wound must stop working, isolate the wound with sterile dressing and then waterproof protection with a well secured and kept under observation.

The personnel behaviour

During the manufacturing processes the personnel who come into contact with the products will not wear jewelry, watches and hairpins. It is not allowed the access in the production units with personnel items.

All personnel involved in the production activities will wear full and clean protective equipment, including shoes and pieces for coverage of the hair, and for the areas with moisture they will need pieces made of waterproof material.

In the production spaces are prohibited: drinking, smoking, eating, or chewing gum. In production spaces there will not be used objects or glass utensils.

The protection equipment

Providing sanitary equipment by the employer must be in accordance with the specific requirements for each activity and in different colors, depending on the working area. Wearing protective equipment is obligatory throughout the conduct of business.

The equipment must always be full and clean. This should be checked at the beginning of each shift, by the heads of department or foremen.

The protective equipment which is not used is kept in special spaces, separated by the auxiliary materials, clean and protected from contamination.

The hygiene rules for the operational personnel:

- Keep the processing areas very clean;
- Do not let the product into contact with the floor, dirty clothes;
- Use only disposable cloths for wiping hands;
- To ensure cleanliness of the body and the clothing permanently;
- To wear clean hooded or beret on his head to avoid possible contamination due to hair loss on their surface;
- Before entering the toilet, they must take off the apron, the gown, the gloves or other clothing items that may come into contact with the products;
 - The personnel who works with raw materials should not have access to spaces where is handling the finished products to prevent the cross contamination;
 - Not to smoke in areas where the food is processed.

3. HYGIENE DURING THE TRANSPORT OF BREAD AND BAKERY

The internal and external transport of the flour, raw materials, auxiliary materials, bread and bakery specialties is performed by means of transport used only for this purpose, suitable and marked for food transport.

All the transportation means for raw materials, ingredients, packaging and finished products will be maintained so as to avoid any damage that can favor the contamination of the products. They must be cleaned and disinfected regularly.

Maintaining the transport hygiene is a specific procedure for each vehicle feature.

Inland of the flour can be done with elevators, screw conveyors or pneumatic transport. In this case it will ensure a proper functioning of the transport to prevent the possible physical or biological contamination.

To transport the bags of flour will be used approved transport machinery, maintained in a sanitary condition, fitted with wooden slats to stow bags and will ensure the product protection with undamaged coating system.

The refrigeration transport means must be cleaned, sanitized and will have the refrigeration units constantly running in order to ensure optimal transport temperature. They will be equipped with elements of monitoring the temperature and humidity.

The means of transport for bread and bakery specialties should have a special construction of the transport van. They should be properly maintained, cleaned and disinfected after each transmission, equipped with ventilation systems, protected with dust filters.

It will not be allowed the use of the vehicles space with broken bodywork, with fissures or cracks and defective doors.

The transport of the non-food products will not be done with the same machine that is carrying food.

The loading and the unloading of the bakery products will be made so that these products do not deteriorate.

The personnel who serve the food transport will wear protective equipment whenever he will come in contact with the food.

4. HYGIENE IN PACKING, STORAGE AND MARKETING SPACES OF BAKERY PRODUCTS

The packaging of bread should be hygienically, with packaging and packaging materials approved for food, with legal provisions of the GD 1197/2002 approving the Norms regarding materials and objects coming into contact with food, with subsequent amendments.

Individual wrapping is executed properly and hygienically, in separated spaces with a proper environment in terms of temperature, humidity and air quality, using appropriate equipment and accessories, easy to clean and disinfect [1].

The materials that packaging are made and are used in this area must meet levels of porosity and permeability to ensure a good storage of the products but also need a good ventilation to prevent condensation and mildew.

The transport packaging for bread and bakery specialties should be used only for this purpose with the identification mark.

The bread storage racks are made of non-corrosive materials, not to contaminate the product, easy to handle, with the top covered to prevent the contamination from the storage medium.

The retail units for bread and bakery specialties must ensure a storage of goods with notice of operation. The area for sale must have a minimum area of 10 m².

It is obligatory to connect the units to water and proper sewage system [1].

In the units where is selling food and other products, the district of bread will be places separately.

Shop fitting is made with the presentation of the products into the retail shelves and racks.

The lighting systems are installed in storage so as to provide a uniform and adequate lighting.

Health certificate is required to the personnel who sales bread.

The personnel that serve the customers have to wear full protective and clean equipment.

It is prohibited to store packages in the premises of the sale, in the circulation spaces or in the locker rooms.

The smoking is prohibited on the premises for sale and storage of bakery products.

5. CONCLUSION

- Applying the rules of good hygiene practices in the production process helps to ensure that all raw materials which present contaminations outside of the acceptable limits will not be accepted;
- Food hygiene management requires proper maintenance and sanitation measures for both raw and auxiliary materials, and also for the construction and equipment to maintain them in good conditions for the proper conduct of operations, to prevent physical, chemical and biological food contamination;

- Following the recommendations of Codex Alimentarius, before applying HACCP in any sector of the food chain, it must operate in accordance with: General Principles of Food Hygiene Code (GHP), the Code of Good Manufacturing Practices (GMP), an appropriate legislation of food safety;
- All the transportation means for raw materials, ingredients, packaging and finished products will be maintained so as to avoid any damage that can favor the contamination of the products. They must be cleaned and disinfected regularly.
- The personnel who serve the food transport will wear protective equipment whenever he will come in contact with the food.
- The packaging of bread should be hygienically, with packaging and packaging materials approved for food, with legal provisions of the GD 1197/2002 approving the Norms regarding materials and objects coming into contact with food, with subsequent amendments.

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