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Manipulation in Industrialized Meat Products

Neide Kazue Sakugawa Shinohara^{1*}, Klícia Santos Moura do Nascimento², Gerlane Souza de Lima³,
Maria do Rosário de Fátima Padilha⁴, Maria Luiza de Almeida⁵ and José Machado⁶

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ABSTRACT

Super and hypermarkets commercialize a wide variety of foods of animal origin and its derivatives, acquired by the population as an important source of proteins. The adoption of Good Manipulation Practices (GMP) in distribution networks and in commercialization represents an important tool to guarantee the quality of food, especially in the segment of processed meat products, due to its perishability. The objective of this study was to evaluate the application of good practices in the manipulation environment of animal products in supermarkets in the Metropolitan Region of Recife (RMR). The methodology used was the quantitative survey and action research during 30 days, with application of checklist regarding the handling and packaging of meat products with employees and managers of eight different companies of the retail network. The most frequently found nonconformities were deficiency in porting and the maintenance of the cold chain, visible microbial deterioration and packaging in unhealthy conditions, which may evolve into food-borne outbreaks.

Keywords: Meat, refrigeration, food preservation.

Manipulação em Produtos Cárneos Industrializados

RESUMO

Os Super e Hipermercados comercializam uma grande variedade de alimentos de origem animal e derivados, importantes fontes de proteínas para a população. A adoção das Boas Práticas de Manipulação (BPM) nas redes de distribuição e comercialização representa significativa uma importante ferramenta para a garantia da qualidade dos alimentos, em especial no segmento de produtos cárneos industrializados, devido à sua perecibilidade. O objetivo desse estudo foi avaliar a aplicação das boas práticas no ambiente de manipulação de produtos de origem animal em supermercados da Região Metropolitana do Recife (RMR). Foram realizados levantamento quantitativo e pesquisa-ação durante 30 dias, com aplicação de checklist quanto à manipulação e acondicionamento de produtos cárneos de oito empresas da rede varejista. As não conformidades mais encontradas foram deficiência no porcionamento e na manutenção da cadeia de frio; deterioração microbiana visível e acondicionamento em condições insalubres, que podem evoluir para surtos de origem alimentar.

Palavras-chave: Carnes, refrigeração, conservação de alimentos.

¹ Professora do Departamento de Tecnologia Rural da Universidade Federal Rural de Pernambuco – Recife, Pernambuco, Brasil.
*neideshinohara@gmail.com

² Professor do Centro Universitário Guararapes – Recife, Pernambuco, Brasil.

³ Bacharel em Gastronomia pela Universidade Federal Rural de Pernambuco – Recife, Pernambuco, Brasil.

⁴ Professora do Departamento de Tecnologia Rural da Universidade Federal Rural de Pernambuco – Recife, Pernambuco, Brasil.

⁵ Tecnólogo em Alimentos – Recife, Pernambuco, Brasil.

⁶ Professor do Departamento de Tecnologia Rural da Universidade Federal Rural de Pernambuco – Recife, Pernambuco, Brasil

Introduction

Regular supermarkets are medium-sized establishments, known for being a place of food trade. With areas between 800 and 2,500 m², they commercialize an average of 10,000 items, divided into sections: groceries, meat, poultry, cold cuts, dairy products, fish, bakery, bazaars, textiles, electro electronics. Hypermarkets are large stores with areas between 5,000 and 14,000 m², where products are sold in the same segments as the previous group, but with greater variety, around 60,000 items (RESENDE; PACHECO, 2010).

Cold cuts sections of super and hypermarkets are very busy on daily schedules, which is reflected on large quantities of meat products and derivatives portioning, subjecting them to risks of cross-contamination during handling (GOTTARDI, 2006). Knowledge about hygiene and adoption of good practices of large-scale manipulation is essential in this scenario, in order to create a safe and contamination-free environment in every production area, directly assisting in the guarantee of the quality of the final product offered to consumers, and its excellence.

Technical procedures correctly applied in the process of cleaning and sanitizing in foodstuff units aims to eliminate or reduce to secure levels, from the public health point of view, the undesirable microbial load of food, as well as to completely exclude contamination by dirtiness, therefore, providing a product of better nutritional, sensorial and hygienic-sanitary quality (GERMANO, GERMANO, 2015).

Diverse risk factors, such as cross contamination, lack of hygiene in food preparation, inadequate processing and storage, may allow microorganisms to multiply, possibly reaching infective concentrations. These risks must always be taken into account by the trade segments that serve a large number of people, since food without adequate handling procedures may function as carriers of pathogenic microorganisms. Therefore, these companies must follow norms and laws of sanitary regulation, to guarantee a safe food supply (GOTTARDI, 2006; SOUZA; MEDEIROS; SACCOL, 2013).

Meat is an excellent source of protein, which ensures the necessary intake to human diet. However, meat and its derivatives constitute an excellent medium for pathogenic microorganisms growth, due to pH close to neutrality, high water activity and many nitrogenous compounds such as amino acids, peptides, as well as simple carbohydrates, all substrates that favor the development of pathogenic and/or deteriorating agents (AZEREDO, 2012; DAMODARAN; PARKIN; FENNEMA, 2009).

The objective of this work was to evaluate the Good Manipulation Practices of industrialized animal origin products from large retail chains of the Metropolitan Region of Recife (RMR).

Material and Methods

This is an explanatory research, with quantitative survey and research-action design (GIL, 2008). For a 30-day period, inspections were performed in partnership with an official sanitary inspection body, to verify the conservation of the cold chain in these establishments, considering the items described in a checklist, adapted to the reality presented by manipulators and managers. Then, the checklist was applied to the employees who directly handled and portioned animal origin foods (sausages, cheeses, hams, bacon and calabresa).

In the checklist, based on RDC N° 275 (BRAZIL, 2002) and RDC N° 216 (BRAZIL, 2004), the following questions were addressed: daily sales volume; portioning and packaging; conditioning and marketing temperature control; standard operating procedures for sanitation of the sliced food handling area and slicing procedures; prevention of losses in processed meat products.

Results and Discussion

From all eight establishments visited, stores considered as conventional hypermarket or supermarket, the management and the interviewees allowed the checklist to be answered by the employees directly involved in the food handling and portioning. In these establishments, were also considered the items that involved the interviewer observation. The application of the questionnaire also aimed to obtain information about the cleaning and hygiene practices of the sliced food handling area and slicing procedures.

In two (2/8) of the visited establishments, there were boxes of mortadella disposed on the floor of the cold rooms, as shown in Figure 1. According to the current legislation (BRAZIL, 2004), all food must be stored on pallets, to avoid direct contact with the floor, minimizing the risks of cross contamination.

In Figure 2, mortadella slicing is performed at room temperature, which goes against the current legislation (BRASIL, 2004). Another nonconformity registered was the non-adoption of the manufacturer's recommendations, which orient the commercialization in temperature up to + 25 ° C. At the time of the evaluation, the room temperature reached + 28 ° C, allowing the multiplication of different groups of microorganisms, thus compromising the product shelf life.

Figure 1 - Inappropriate storage of meat products in the cold room.



Source: Authors, 2016.

Figure 2 - Industrialized meat products portioning at room temperature.



Source: Authors, 2016.

It was also observed non-conformity regarding the portioning, being executed under inadequate conditions of the location and sanitary conditions in which the meat products were found. There were visible dirtiness in the environment, utensils with food residues and equipment in deterioration state, with points of rust.

During the inspections, 30 kg of chicken sausages were collected (Figure 3), presenting inadequate conditions for consumption, due to being expired. In Figure 4, although being commercialized under refrigeration, the same adulteration of the shelf life was verified in other establishment. At both stores, the actions were an agreement between the local management and fraudulent suppliers, aiming to deceive the

consumers. The Consumer Defense Code (BRASIL, 1990) states that the sale of products with critical or expired dates entails their apprehension and the civil liability of those involved.

Figure 3- Expired chicken sausage commercialization at room temperature.



Source: Authors, 2016.

Figure 4 - Expired chicken sausage commercialization under refrigeration.



Source: Authors, 2016.

According to the checklist applied, in all the establishments of the research, cheeses were sliced or portioned excessively, due to demand informed by manipulators and managers. This kind of behavior increases the risk of microbiological contamination, compromises the sensorial and organoleptic characteristics of those portioned cheeses and generates waste and losses. It is known that improper hygiene conditions of the equipment used in the slicing process can cause cross-contamination especially in cheese, mainly from fungal contamination (SILVA JUNIOR, 2005). Cheeses without health protection not just enable the occurrence of contamination by toxigenic molds, but also allow the contamination by pests, such as flies, that

deposit their eggs, and rats, responsible for the transmission of leptospirosis (RIEDEL, 2005).

Relating to the hams, it was observed that the incorrect portioning prevision caused large quantities of portioned product, leading to exudation, due to the pressure exerted of the slices. The exudate favors the growth of microorganisms, especially pathogenic or deteriorating bacteria. Its growth speed is superior to other microorganisms, causing its predominance among other biological agents (FRANCO, LANDGRAF, 2003; FORSYTHE, 2013).

Bacon and other smoked products are defined as foods with low water activity, salted and smoked, presenting a shelf life of 30 days, when closed. After portioning, must be consumed according to manufacturer's instructions. Five samples from three sites (3/8) showed presence of larvae and fungal growth, as observed in Figure 5. The reported situation probably occurred due to inadequate storage, allowing the contact of the food with vectors, or even a previous contamination in the raw material, specially when the employees forget that the pests can cause cross contamination in different meat foods.

Figure 5 - Fungal growth in smoked bacon.



Source: Authors, 2016.

In calabresa, a very popular smoked meat product, nonconformities were not found, since they are stored at room temperature for 15 days, according to the manufacturer. During the study period, the product sales were very intense. Hence, there were no occurrences that could compromise the quality of the product, even when the ambient temperature was higher (+ 28 ° C) than recommended for the correct commercialization.

In a study on carne-de-sol commercialized in "Casa do Norte" at Diadema/SP, Mennuci et al. (2010) found 13.6% of carne-de-sol samples contaminated with filamentous fungi. According

to these authors, fungi can cause severe food deterioration, causing chemical degradation and alteration of its components, as well as producing toxic metabolites, interfering in the nutritional value and sensorial characteristics of the products, thus raising the risk of their consumption.

During the study period, the employees were trained, with orientation on the application of the Good Manufacturing Practices Manual (MBPF) by their technical responsible, emphasizing its importance, since the population is potentially exposed to a possible cause of DTA, transmitted by manipulated or incorrectly prepared products, when difficult sanitization equipments used are not correctly cleaned (BRASIL, 2004). The insufficient sanitization of these equipments allows the adherence of pathogenic bacteria to surfaces, where they multiply and form biofilms (ANDRADE; MACÊDO, 1996; KANEKO et al., 1999).

Employees training is extremely important, since they are the main responsible for the adequacy of each parameter required by the legislation (SOUZA; MEDEIROS; SACCOL, 2013). So, the manipulators' training must cover all the steps and processes, to guarantee and offer safe food.

Therefore, some measures were applied and reiterated to the employees during the training, such as: hygiene and organization of the cold display counter; organization of cold rooms; sanitation of the cutting machine, wall, counter, floor and trashcans in the cold sector; collection of cardboard boxes in the sector; provision of dispensers; intensification of the traceability of sausages in general; monitoring and daily temperature control of equipment and products. Four (4/8) of the studied establishments showed that the evaluated parameters were in adequate conditions, within the established conformities by the competent organs. These stores were exempted from the action proposed by the research, only needing to follow up corrective actions and appropriate measures applications, when necessary.

The existence of a technical responsible and the application of the Manual of Good Manufacturing Practices was also questioned, as well as the state of conservation of the equipments; existence of sanitizing solution and paper towels in the handling area; structural evaluation regarding hygiene and maintenance (BRASIL, 2004). After applying the checklist, the units that presented nonconformities (4/8) were selected and was promoted training with the staff directly connected to manipulation of sliced foods.

Good Hygiene and Manipulation Practices (BRASIL, 2002) and the continuing education of food handlers contribute to reducing the incidence

of food poisoning and toxoinfections. Strategies to reduce the occurrence of DTA involve the implementation of educational programs for consumers and manipulators, training them to recognize food contamination causes, prevention and contamination risk reducing methods. Health education should aim to develop individuals' autonomy, allowing the development of personal skills, stimulating dialogue, providing elements for critical analysis, and recognizing determinants of health status, as well as the ability to decide on the appropriate actions to promote their own health and of their community (GERMANO, GERMANO, 2015). However, published data on microbial contagions found in food-handling environments are still few, due to the high laboratorial costs to measure the biological risk of different groups of meat foods (RIBEIRO; CARVALHO; PILON, 2000).

No matter which, any foreign substances found in industrialized foodstuffs should be considered as harmful to consumers' health, which can be associated with gastroenteric disorders, allergic reactions and oropharynx obstruction, when accidentally ingested by young children. The presence of foreign matter in food represents a lesion to goods protected by the rules of consumer law, civil law and criminal law, which may lead to legal proceedings (GERMANO, BOANOVA; GERMANO, 2009).

The hygienic conditions of the work environment and the fulfillment of official and legal requirements are important factors in the production and commercialization of safe food and its quality. Meat and its derivatives, for their perishability and potential food risk, require the use of efficient and effective conservation methods, especially after the animal is slaughtered and when the cold cycle is interrupted (LUNDGREN, 2009).

Conclusions

The hygienic-sanitary conditions of animal origin products manipulation area of four (4/8) evaluated supermarkets from the Metropolitan Region of Recife presented nonconformities of portioning, storage (cold chain), packaging, hygiene and manipulation.

As a measure to solve the cross contamination problem, it is necessary to apply the GMP, regular manipulators trainings, as well as constant verification of the correct execution of their activities.

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