MICROORGANISMS, QUALITATIVE INDICATORS FOR MEAT PRODUCTS

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Annotation: Due to the fact that, for a few years now, our focus is more and more concentrated on safety and security of meat and vegetable products, this study's aim is to evaluate the quality of certain well - known meat products (sausages, dry salami, and half-dried salami), purchased in a supermarket, from Timisoara. Microbiological tests were made especially on sanitary microbiological indicators (Escherichia, Enterobacter, Klebsiella). These tests emphasize hygiene in processing ang handling of products. In some cases, it higtlights how various heat treatments (pasteurization type) apply to food products. It also establishes the microbial load on the microscopic field and the colony forming units, by a culture method in plates, at 37º C for 48 hours. Based on the obtained results, it has been established that, concerning the microbial load and the presence or absence of coliform bacteria, studied products fall into the quality permitted by applicable law.

Keywords: meat products, sanitary microbiological indicator.

Introduction

Food infection is one of the most significant concerns for public health. The quality of meat products intended for human consumption is imposed by law. These are the targets that define the product's quality: sensorial quality, sanitation, tropic and biological value. Microbial innocuity involves the absence or presence of twin pathogens, or their toxins, in a limited number. Sometimes, raw or industrially prepared meat products are a favorable environment for developing microorganisms. Hygiene and sanitary microbiological indicators are established by state standards. According to the bacteriological test of meat products, we have the following hygiene and sanitary indicators: TNG (total number of mesophyll aerobic germs), anaerobe twins, coliform, enterococcus, staphylococcus bacteria, which positively coagulate, Salmonella, Bacillus aureus, Clostridium perfringens [1]. Coliform bacteria (Escherichia, Enterobacter, Klebsiella) are of a great importance to food microbiology. Coliform bacteria are important microbiological sanitary indicators, which emphasizes hygiene in processing and handling of products. In some cases, it highlights various heat treatments (pasteurization type) applied to meat products [2].

The huge outbreak of food poisoning established important studies that settled the main products responsible for poisoning, and these are: meat, meat products, fish, eggs and milk products. Food poisoning manifests itself differently, depending on the biological features of the individual, but also depending on the particular food product that contain germs or toxic substances [3]. Testing the effect of antibiotics on E. coli from conventional and organic samples of pork, a significantly lower development of antimicrobial resistance has been established. It also helps to reduce development and to spread the antimicrobial resistance among these bacterial food poisoning [4]. One of the most studied and established bacterial species as concerning pork and chicken is Salmonella enterica. Salmonella enterica is responsible for half of the infection outbreaks notified in the European Union [5]. Transmission of this species is

primarily related to raw materials or insufficient pasteurization of pork or poultry products [6]. According to their opinion, there is not only a quality risk of products, but also a quantitative one.

2. Materials and methods

Six different kinds of meat products had been subjected to bacteriological analysis: sausages made of chicken breast, sausages prepared of chicken, half dried salami, delicious sausages, ham salami and cabanos sausages. The products had been purchased from a hypermarket in Timişoara. Bacteriological analyses were to determine the total number of aerobic and mesophyll germs and the total number of coliforms. Mesophilic bacteria have been highlighted by the inoculum's diffusion method [7, 8]. Three suspension-dilutions have been performed (10-1 – 10-3). The final dilution has been made on a usual environment of nutrition gelosis. Petri plates with seeds had been incubated in the thermostat for 48 hours at 37° C. The total number of germs has been established (expressed in UFC), at 1 g per studied product, based on the formula:

UFC / ml = Σ (n x d) / N x V, where: - n - number of colonies developed in a Petri box; - d - inverse dilution of the samples; - N - number of Petri boxes; - V - sample volume, in ml and compared to maximum value allowed by legislation in force Coliform bacteria were emphasized by Kessler environment culture, after incubation at 37° C for 24 hours. Each product is aseptically weighed in 10 g and homogenized with 90 ml distilled water.Obtained suspension has been distributed on the culture environment. Total number of coliforms has been based on the same formula as in calculating the total number of germs [7,]. Obtained values are also compared with legislation in force.

3. Results and discussion

After 48 and 24 hours, the obtained results had been plotted and reported to the existing laws [8]. Thus, in the case of total number of twins, the allowed maximum value per 1 gram from a product is 30 UFC. In the case of our products, recorded values did not exceed this value. The total number of coliform bacteria from our products registers values between 0.40 and 1.20 UFC per gram. The allowed maximum value hasn't been exceeded by 3 UFC per gram of a product (Figure 1.). Distribution on axes of a multitude of points corresponding to the UFC value, established that the sample of cabanos sausages is closest to the allowed maximum limit and represents a high risk for the consumer's well - being. The other samples subjected to analysis, like the 2 bacteriological indicators, shows that there are no risks. After the statistical processing and study of the obtained results for the 2 bacteriological parameters (Figure 2.), we established the following:

- product - sausage made of ham is located in the first quadrant. It is characterized by a high number of coliform bacteria, but a relatively small number of germs. It shows the signs of rotting, considering that coliform bacteria are the first group of bacteria to allow a food quality assessment; - product - delicious sausage is distributed to quadrant IV, is characterized by a small number of coliform bacteria, but it has a large total number of germs. This reveals the existence of a large number of other types of bacteria, other than coliform bacteria. These bacteria species have a growing risk to rot the product. We, therefore established that the 2 studied products (delicious sausage and sausage made of ham) have an increased risk to ruin the products and that may jeopardize the consumer's health.

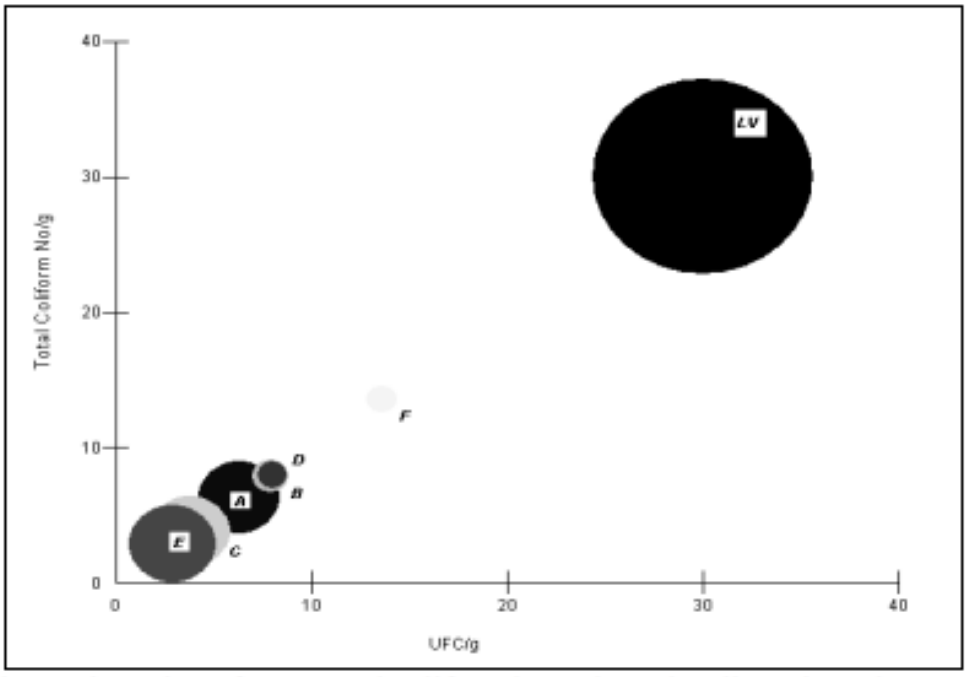

Figure 1. Reporting the total number of germs and coliform bacteria to the allowed maximum value according to the law (A. sausages made of chicken, B. chicken sausages, C. half dried salami, D. delicious sausages, E. salami made of ham, F. cabanos sausage, LV - limited value).

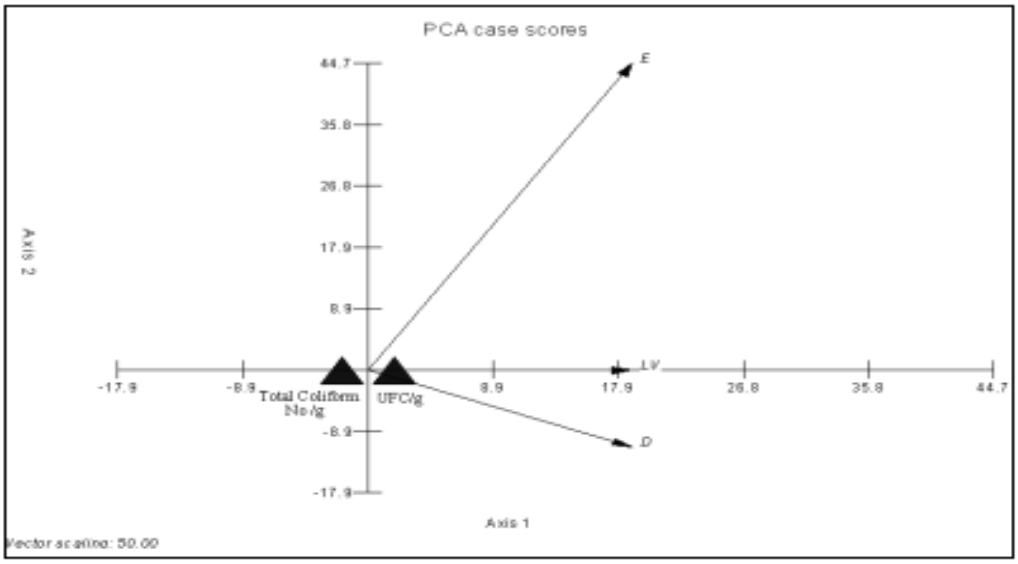

Figure 2. To establish meat products with an increased risk (A. sausages made of chicken breast, B. chicken sausages, C. half dried salami, D. delicious sausage , E. salami made of ham, F. cabanos sausage).

Cluster statistical analysis uses appropriate mathematical square root values, in order to highlight the behavior similarity between sausages made of chicken breast and chicken sausages, with no relation between the 3 types of half dried salami, delicious salami, sausages made of ham, and very different from the cabanos sausages, as concerning the total number of germs (Figure 3.).

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