QUALITY CONTROL FOR ROMANIAN MEAT PRODUCTS

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ABSTRACT

Food production, trade and consumption are now globalised. This provides multiple opportunities for harmful bacteria, viruses, parasites or chemical substances to enter the food chain and contaminate food prior to consumption. Food safety may be viewed as a cross-cutting issue and all have a role to play, food producers, manufacturers, distributors and traders are responsible for the food they produce and trade. All products must be safe as possible from pathogens and other contaminants. This study presents an objective picture opposite the meat products quality control. The study results meet european and national regulations and standards for meat products.

INTRODUCTION

Meat comes - like all natural materials - in a wide range of compositional properties. For the meat industry, it is essential to comply with the stricter safety requirements, protect consumer health and uphold their brand reputation and to know the composition of raw meat and other ingredients in order to adapt the recipes for a high-quality production of sausages, salami or other types of meat products. Meat manufacturers must guarantee the safety of their products at every stage: from farms and processing facilities to distribution centers and stores. AII quality control and compliance services help brands and retailers ensure that the meat products in their supply chain are manufactured to their standards, stored and shipped under proper conditions, and comply with the regulations of their destination market.

In addition, the testing of the finished meat products before delivery to the end customer is a crucial step for consumer satisfaction. [1,2]

MATERIALS AND METHODS

Materials and reagents: usual laboratory glassware (flasks, beakers, graduated pipettes, burettes); sulfuric acid (d = l, 84), free of nitrogen; 0.1N hydrochloric acid; 4% boric acid; copper sulfate and potassium sulfate p.a.; 33% solution of sodium hydroxide free from nitrogen and carbonates and 0.1 N solution; Tashiro reagent alcoholic solution; dry and defatted filter cartridges; petroleum ether 40-60 ° C; calcined sea sand; disodium phosphate or anhydrous sodium sulfate; wad fat free; boiling stones; weighing bottle with lid from glass or aluminum; desiccator with lid and hygroscopic substance (preferably $CaCl_2$); sea sand for laboratory analysis; enamel trays; spoons, spatula, celluloid cards.

Facilities: mineralization system; distillation-titration system; extraction [3] apparatus Soxhlet-type with 250 ml flask,

100 ml extractor and condenser/*Soxhterm extractor with extraction cups*; thermo-adjustable oven; analytical balance accurate weighing 0,0001g.

Moisture determination (water content): In a weighing bottle (from glass or aluminum) with a lid and glass rod are inserted 25 ... 30 g of sand and dried for 30 min. in the oven adjusted to a temperature of 103 ± 2 °C. After cooling in a desiccator to room temperature (approx. 30 min.), weighing bottle is weighed. Repeat the operations of heating, cooling, weighing until the difference between the two successive weighings of the weighing bottle with sand does not exceed 0.0002 g. The sand calcined like is used to bring the sample to the drying temperature in a time as low as possible and to ensure a uniform drying throughout the mass of the sample.

Then are inserted 3…5 g of sample (previously prepared for analysis) in the weighing bottle and weighed it accurate to 0,0001 g at the analytical balance. After weighing, is added to the weighing bottle approx. 5 cm^3 of 96% ethylic alcohol and homogenize well with the rod the mixture (the rod will stay all the time in the weighing bottle). The lid next the weighing bottle containing the sand, the rod, the sample and 5 cm^3 ethylic alcohol are inserted in oven initially adjusted at 70-75 °C, where are maintained for 30 minutes, stirring from time to time with the rod to remove the alcohol. Then adjust the oven temperature at 150 °C and held for 1 hour, followed by the weighing. [4]

Determination of protein content: 0,5-2 g of sample, previously prepared, are weighing to analytical balance and the sample weighed is introduced in a Kjeldahl mineralization tube. Then are added 20 ml concentrated H_2SO_4, 1 g $CuSO_4$ and 5 g K_2SO_4 *or catalyst pellets. The tube is attached to the mineralization system. The mineralization system is heating gradually to avoid foaming. Initially the liquid* shows a blackish brown color and then is gradually clarifying. Mineralization is considered finished when the liquid becomes clear. From this point heating is continued for another 30 minutes. After cooling the mineralized has a bluish-green color. Typically, mineralization lasts approximately 2 hours but the products with high fat content is mineralized harder. The digestion tubes can cool to 50-60 °C and added to each 50 ml of distilled water without ammonia. The cooled mineralized is passing in the distillation unit. Add 50-60 ml of 33% NaOH by means of automatic device and 25 ml H_3BO_3 in the manifold cup. The distillation is started and lasts maximum 7 min. (until 100 ml distillate is collected). The distillate is titrated with 0.1N HCl in the presence of Tashiro reagent from green to bluish-gray. [5]

Determination of fat content: 2-3 g of sample, previously prepared, are weighed in an extraction cartridge to the nearest 1 mg. The total mass with the extraction cartridge = wet sample weight. Is added a little sand to the weighed sample in cartridge and is mixed with a glass rod. The rod is cleaned with a skimmed cotton swab and the obtained mixture is added in the cartridge. The extraction cartridge is dried for 1 hour in an oven at 125 °C. Then the cartridge is removed from the oven and can cool in a desiccator. The glass cup extraction is weighed carefully with some boiling stones, to the nearest 1 mg. It is added 40 mL of petroleum ether. The cartridge with the sand and sample is attached to the extraction unit and then it is immersed for 30 min. in the boiling solvent; following 60 minutes of reflux washing with the raised cartridge and then is recovered the solvent. The cup containing the extract with the boiling stones is introduced in a oven at 103 ° C for 30 minutes. To avoid fat oxidation

during drying is recommended do not use temperatures higher than 103 C ± 2˚. Then the cup can cool in a desiccator. The weighing is made to the nearest 1 mg. The drying is repeating to constant weight.

For this determination were used:

- Scientific VELP extraction apparatus;
- Filter cartridges;
- The usual laboratory glassware;
- Analytical Balance Partner AC/220/C/2
- Oven "Air Concept";
- Petroleum ether;

All reagents used were of analytical grade, whole glassware was calibrated by the Romanian Bureau of Legal Metrology. The fat in the sample was extracted to exhaustion with petroleum ether solvent and after removal of solvent extraction was weighed and expressed the result. Pass weighed quantity in a filter cartridge or filter paper envelope made defatted, delete capsule with a cotton ball soaked in solvent defatted whole cartridge is inserted. Sample cartridge is inserted into the extractor unit. The scheduled work times appear:

Immersion: 30 minutes;

Wash: 120 minutes;

Recovery: 25 minutes;

Glass extraction of the device is placed in a constant mass prior to drying oven at 102 ^{0}C, weighed to the nearest 0.2 mg and install the device with a content of 50 ml petroleum ether.

By heating oil ether vapor extraction glasses go through extractor, reaching refrigerant, which condenses and falls as food drops in the cartridge. The ether extract of the fat, bringing with him looked fat product.

After completion of the extraction, the cartridge is removed, and then light petroleum is recovered. Extraction cup dried in oven 1 hour at 102 ^{o}C , then cooled in a desiccator, bring to constant mass and weighed to the nearest 0.2 mg. [6]

RESULTS AND DISCUSSIONS

In the table below are presented some physico-chemical characteristics of studied samples (fat, protein, water, salt and nitrite content).

Table - Physico-chemical characteristics of studied samples

No. Crt.	*Sample*	*Fat %*	*Protein %*	*Water %*	*Salt %*	*Nitrite, mg/100g*
1	*Smoked bacon*	*24,8*	*20*	*21*	*2,2*	0.189
2	*Turkey ham*	*8,1*	*21*	*25*	*1,2*	0.146
3	*Sheep sausages*	*17,6*	*17*	*20*	*2,4*	0.258
4	*Pork pastrami*	*20,4*	*17*	*27*	*2,1*	0.052
5	*Salami*	*30,5*	*21*	*23*	*1,9*	0.321

Turkey ham has the lowest concentration of fat from the studied samples. Sheep sausages and pork pastrami has the same

concentration of protein from all samples. Pork pastrami has the highest concentration of water from the studied samples. Turkey ham has the lowest concentration of salt from the studied samples. In all analyzed preparations, the nitrite was far below the maximum prescribed by regulations.

CONCLUSIONS

Analyzed meat products are prepared according to old recipes of Romanian households and comply with hygiene available regulations of the European Union. The chemical analyzes showed that all analyzed parameters are within the maximum limits allowed by law. Considering all the procedures for manufacturing, characteristics of raw and auxiliary materials, organoleptic properties of final products analyzed in this study, it can be concluded that analyzed meat specialties meet the requirements of Ministry Order no. 690/28.09.2004 for the traditional products certification. [7]

BIBLIOGRAPHY

[1] **Kaferstein, F. K.; Motarjemi, Y.; Moy, M. G.; Quevado, M.**, *Food Safety: A WorldwidePublic Issue, International Food Safety Handbook. New York, 1999*

[2] **Herschdorfer, S. M.** *Quality Control in the Food Industry, Vols. 1–3. New York, 1967, 1968, 1972*

[3] **E. Diacu**, *Instrumental Methods of Analysis, Didactic and Pedagogical Bucharest*, 2005.

[4] *ISO 1442:1997(E), Meat and Meat Products — Determination of Moisture Content (Reference Method), 2nd Ed., International Organization for Standardization, Geneva, Switzerland*

[5] **Savu C**., *Control veterinary food, CERES Publishing House, Bucharest, 1997*

[6] *SR ISO 1443:2008 - Determination of fat content. Meat and meat products*

[7] ****Ministry Order no. 690/28.09.2004 for approving the Norms concerning the conditions and criteria for certification traditional products, Official Monitory (in Romanian) nr.938/14.10.2004.*