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MICROSTRUCTURE ANALYSIS TO DETECT ADULTERATION OF COOKED SMOKED SAUSAGES

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Problem Statement.

Various sausage products are a traditional part of the Ukrainian diet. Therefore, the main task of the Ukrainian meat processing industry is to meet the high demand of consumers by increasing production and ensuring a wide range of products. However, in recent years, the difficult economic situation in the country has led to a shortage and increase in the cost of raw materials. Today, producers prefer to produce according to their own specifications, introduce new recipes or resort to product adulteration. Research data show that up to 80% of domestic sausage products on the market are falsified by one or more quality indicators [1, 3, 4].

In this context, the question of effective identification of sausage products arises. Traditionally, organoleptic, rheological, physical and biochemical methods are used for identification. However, these methods are no longer sufficient for objective analysis. They cannot effectively identify the components of the finished product. Currently, microstructural analysis is the main method used to identify the composition of finished meat products [1, 2, 5].

The objective of the study was to identify cooked smoked sausages using the microstructural analysis method.

Materials and methods.

Samples of top quality cooked smoked sausages produced according to DSTU 4591:2006 «Cooked smoked sausages. General technical conditions» were the material of the study.

The study was conducted in accordance with DSTU 7063:2009 «Semi-finished meat products and minced meat and vegetable products. Determination of components by microstructural method» and guidelines «Examination of sausage products by histological method» (Lviv, 2012) [2].

Results and Discussion.

Microstructural analysis of preparations from samples of cooked smoked sausages (Fig. 1-4) revealed unverified tissues with the inclusion of islands of lumbar striated muscle (in the amount of 20-70%), adipose (samples No. 1-5), connective (samples No. 1-5) and cartilaginous (samples No. 3-4) tissues. All examined tissues showed signs of necrobiosis of 2-3 degrees.

Inclusions of polysaccharide additives and soy isolate were detected in all samples. Droplets of fat of non-animal origin were observed in sample No. 1 and unverified inorganic inclusions were observed in sample No. 4.

The results of the microstructural analysis indicate that all the samples of cooked smoked sausage examined were qualitatively adulterated. The samples showed a low content of low quality

muscle tissue, inclusion of connective and cartilaginous tissue, impurities of non-animal fats and organic impurities, which are not allowed for cooked smoked sausages produced according to DSTU, especially for the highest quality products.

Conclusions.

1. The microstructural analysis of the samples of cooked smoked sausages revealed that they contain low quality meat raw materials and ingredients not provided for in the recipe.
2. All the samples tested are qualitatively adulterated and do not comply with the national standard.

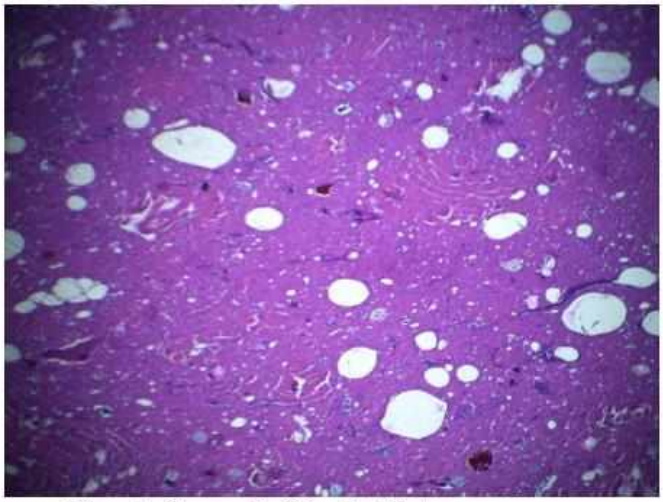


Fig. 1. Sample No. 1. Heterogeneous unverified tissue, inclusion of fat droplets and islands of lumbar striated muscle tissue *(Hematoxylin and eosin,* x*40)*

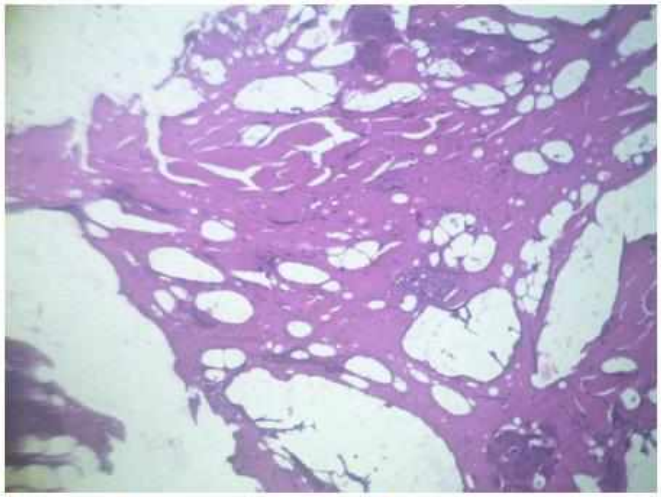


Figure 2. Sample No. 2. Lumbar striated and adipose tissue in the state of 2-3 degree necrosis *(Hematoxylin and eosin,* x*100)*

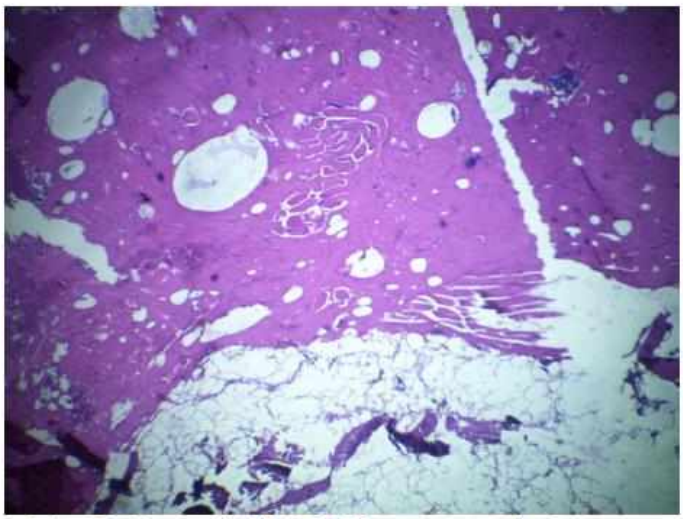
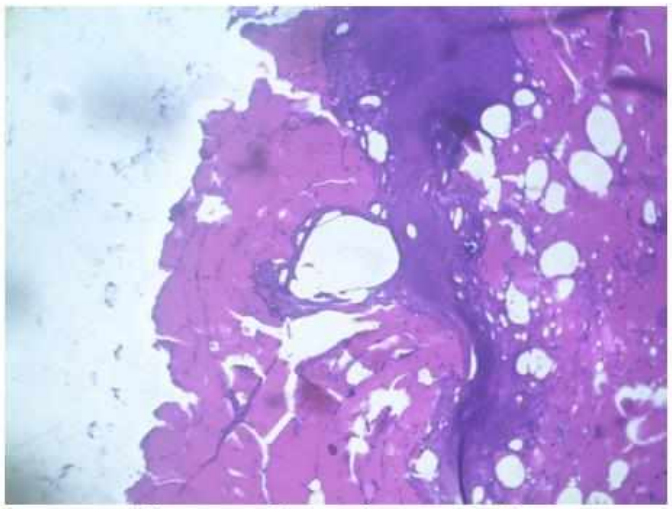


Fig. 3. Sample No. 3. Unstructured tissue, inclusion of fat droplets, islands of lumbar striated muscle, adipose and connective tissue



(Hematoxylin and eosin, x*40)*

Figure 4. Sample No. 4. Lumbar striated muscle fibers, hyaline cartilage *(Hematoxylin and eosin,* x*100)*

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OVARIAN CYSTS AND COWS`REPRODUCTION

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The main task of reproduction is to provide the population with environmentally friendly food production.

The quantity and quality of sexual cycles are significantly influenced by housing conditions, feeding, environmental temperature, and stresses. Normal feeding ensures normal hormonal levels in the blood, which contributes to the functioning of the reproductive system of cows and heifers. It is limited to quantity of offspring and the efficiency of reproduction.

Due to the agricultural crisis in Ukraine, the effectiveness of breeding in dairy cattle reduced due to a shortage of breeding of cows (on the south region of Ukraine).

Recently, there has been an import of highly productive dairy cattle and embryos from Western European countries.

The ovary is a gland of double secretion, it performs generative and hormonal functions [1]. In highly productive dairy herds, non-inflammatory gynecological diseases (dysfunction) of the ovaries and uterus take first place. These organs have an increased functional and physiological load associated with insemination, pregnancy, childbirth, which are aggravated by chronic stress (environmental, emotional, feeding). If these negative factors combine, then a blockage of sexual function occurs, which manifests itself through dysfunction of the uterus and ovaries [2]

Long-term exposure of females to these stress factors leads to the release of the anterior pituitary gland of the hormone lutropin, which controls the maturation of follicles and ovulation. Cysts are gynecological diseases of dysfunctional nature. There is no consensus among researchers to the etiology and pathogenesis of follicular and lutein ovarian cysts in cows [3].

Follicular, and then luteal cysts, form from persistent follicles with low progesterone levels. Their occurrence is preceded by feeding feeds that contain phytoestrogens in significant quantities (corn silage, moldy hay, straw, haylage [4].