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STANDARDS OF PRODUCT MARKETING TRACEABILITY FISHERY

СТАНДАРТИ ПРОСТЕЖУВАНОСТІ ТОВАРОПРОСУВАННЯ ПРОДУКЦІЇ РИБНОГО ПРОМИСЛУ

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Abstract. *Currently, for European countries, the issue of organization, implementation and control of integrated multi-year monitoring plans developed in accordance with the requirements of Regulation of the Parliament and the Council of the EU No. 882/2004 is extremely relevant. The principles of tracking (tracking) products as a tool in the system of control and certification of food products are regulated by the requirements of CAC/GL 60–2006. The key elements of the traceability system are: an exclusive list of suppliers; accepting information at the entrance and keeping records (supplier, supplier batch code, operator batch code); separation of batches during processing and storage when batches of incoming raw materials change (batch coding of the final product); sending accompanying records (consignee, supplier batch code; storage of records and return (minimum period). It was established that the mass fraction of lead in the investigated samples of fish products that entered the market of Chernivtsi from the Dnistrovsky district was 0.131 mg/kg (norm - 1 .0 mg/kg), cadmium – 0.030 mg/kg (0.2 mg/kg), arsenic – 0.97 mg/kg (5.0 mg/kg), mercury – 0.011 mg/kg (0.5 mg /kg).The content of HCCG α-isomers - < 0.001 mg/kg (0.2 mg/kg), HCCG β-isomers - < 0.001 mg/kg (0.2 mg/kg), HCCG γ-isomers - 0.001 mg/kg (0 .2 mg/kg); 4,4-DDT – 0.001 mg/kg (0.2 mg/kg) 4,4-DDE – 0.001 mg/kg (0.2 mg/kg); 4,4-DDD – 0.001 mg/kg (0.2 mg/kg). The indicated indicators were somewhat lower in fish products that came from the Vyzhnytsky district of the Chernivtsi region. The number of mesophilic aerobic and facultatively anaerobic microorganisms (KMAFAnM) was 30x103 CFU/g (norm - 1x105 CFU/g), BGCP (coli-forms) in 0.001 g, pathogenic microorganisms (including salmonella), Listeria monocytogenes in 25 g and Staphylococcus aureus in 0.01 g - not isolated. The content of radionuclides Cs137 was < 6.7 Bq/kg for the norm of no more than 130 Bq/kg, Sr90 – < 4.2 Bq/kg (the norm is no more than 100 Bq/kg).*

Key words: *monitoring, tracing, fish products, food products, xenobiotics.*

Introduction.

Control and supervision of products of animal origin ensures the safety of all food products during their production, transportation, storage, processing and circulation, suitability for consumption, compliance with the requirements for their safety and quality indicators [1], guarantees compliance with labeling rules in accordance with DSTU 4518– 2008 «Food products. Labeling for consumers», which entered into force in Ukraine on November 1. 2008 and regulates clear requirements for product packaging and labeling [2].

Food safety is a priority at all stages of the food chain – «from farm to table». According to the Law of Ukraine «On the Safety and Quality of Food Products», producers and companies of the food chain are responsible for the safety of products of animal origin [1; 3; 4]. Food safety risk assessment has the following steps: hazard identification; hazard characteristics; expectation assessment; risk characteristics. The level of development of society and the awareness of nutrition problems have turned food safety into an international problem. WHO and other international structures have been intensively dealing with these issues for more than 40 years.

Today, our country also monitors the content of various toxicants in food products. The state monitoring program defines groups of pollutants that are subject to control. Dangerous toxicants that can accumulate in food products include pesticides, radionuclides, heavy metals, etc. Control bodies must fully fulfill the tasks assigned to them to ensure safety and reduce risks associated with the consumption of food products [5].

Research methodology.

The purpose of the work was to determine the content of some pollutants of chemical (heavy metals, pesticides, radionuclides) and biological (microbiological indicators) origin in live commercial fish and compare the obtained indicators with the requirements of current domestic documents. The material for the study was live commercial fish (crucian carp, carp, crucian carp), grown in various private fish farms. The results of studies of the content of toxic elements showed that the studied fish samples contained more arsenic, less lead, cadmium and mercury.

Research results.

It is known that there are about 6 mln. chemical compounds, 90% of which are of synthetic origin. The vast majority of them are xenobiotics [6]. The introduction of xenobiotics into the environment is primarily related to the anthropogenic burden on ecosystems - the increase in the volume of industrial production, the use of environmentally dangerous technologies in production, the accumulation of dangerous toxic waste, the chemicalization of agriculture, etc. In the environment, xenobiotics undergo transformation processes, as a result of which their physicochemical properties, migration ability, and toxicity to living organisms change. In most cases, the mechanisms of self-regulation of ecosystems are insufficient for the complete transformation of toxic substances into non-toxic compounds, which has negative environmental consequences [4].

The transformation of xenobiotics in the environment greatly complicates the environmental regulation of various pollutants. The negative impact of xenobiotics on living organisms is due to both their direct toxic effect and their accumulation on various links of the trophic chain, resulting in a sharp increase in the concentration of dangerous substances in living organisms [13]. Xenobiotics can affect almost all body systems: cardiovascular, nervous, excretory, respiratory, reproductive, gastrointestinal tract and hematopoietic organs. Among xenobiotics there are substances capable of inhibiting the synthesis of DNA and RNA, and those with mutagenic, teratogenic and carcinogenic properties [3].

Traceability provides information on the suitability, history and source of food products and does not make them safe, but is a management tool that allows for

safety and enables action to be taken if raw materials or products are found to be unsafe (e.g. recall or recall) [9;14] .

The standards of traceability of fishery and aquaculture products are: three standards developed by the Norwegian Institute of Fisheries and Aquaculture on the basis of consensus for registration and exchange of information about traceability in the seafood network (standard of farmed fish in aquaculture, standard of caught fish and technical standard); CEN(EKC) TraceFood (TraceCore XML – electronic traceability data exchange) [7; 8].

The purpose of traceability is to identify the responsible organizations in the food chain, to maintain the safety and/or quality objectives of fishery and aquaculture products, to meet the technical conditions of the customer, to establish their origin or source, to facilitate the verification of specific information about the products, to provide information to relevant interested participants and customers, to comply any local, regional, national or international legislative or regulatory documents, when appropriate - improving the efficiency, productivity and profitability of the organization, facilitating the removal or recall of products [10; 11; 12].

According to Directive 96/23 dated 29.04. 1996 regarding measures to control certain substances and their residual amounts in live animals and products of animal origin, an important part of food quality and safety control for the vast majority of EU countries is the monitoring of the residual amount of xenobiotics in objects of the external environment (soil, water, agricultural product). According to its results, allowable levels and frequency of detection of contaminant residues are established. Such an analysis makes it possible to make changes in the policy of export and import of food products. Monitoring programs are based on the principles of such European documents as EU Regulation No. 178/2002 and No. 882/2004, Council Directive 86/363/EEC, provisions of the EC Commission Recommendation No. 2006/26, which provide for the coordination of its programs aimed at establishing compliance with the maximum - acceptable levels (MDR) of agricultural products. Currently, for European countries, the issue of organization, implementation and control of integrated multi-year monitoring plans developed in accordance with the requirements of EU Parliament and Council Regulation No. 882/2004 [7] is extremely relevant.

The implementation of the traceability system provides for the possibility at any specified stage of the food chain from production to sale to identify the origin of raw materials and the place of its processing, in accordance with the objectives of inspection and certification of fishery and aquaculture products. The responsibility of a certain market operator is foreseen at each stage of the food chain [13; 15; 16].

The need for traceability involves: fulfilling the requirements of the specific conditions of EU food safety, in accordance with Art. 18 of Council Regulation 178/2002 dated 18.01.2002 «On the establishment of general principles and requirements of legislation on food products ...», namely, the traceability of «food, feed, animal feed and any other substance that must be or may be included in food or feed must be established at all stages of production, processing and distribution»; other EU conditions regarding traceability requirements in accordance with Annex III, Chapter VII of Regulation (EC) No. 853/2004 «On establishing special hygiene

rules for foodstuffs of animal origin» (requirements applicable to operators who catch, distribute bivalve molluscs, gastropods, etc.) and Article 12 of Regulation 1005/2008 «Establishment of an EU system for the prevention, deterrence and elimination of illegal, unaccountable and unregulated fishing» (requirement for fishing certification for EU trade in fishery products from January 1, 2010); voluntary certification schemes related to production conditions, creation of a «chain of responsibility» (global GAP - Good Aquaculture Practice; Marine Stewardship Council; Aquaculture Stewardship Council; Earth Islands Institute); application of the most important tools to determine the source of food safety problems (incident management - traceability, withdrawal and product recall; control of the implementation of the pollutant residue monitoring program; risk management through the application of control «from the farm to the table») [4].

The principles of tracking (tracking) products as a tool in the system of control and certification of food products are regulated by the requirements of CAC/GL 60–2006. The key elements of the traceability system are: an exclusive list of suppliers; accepting information at the entrance and keeping records (supplier, supplier batch code, operator batch code); separation of batches during processing and storage when batches of incoming raw materials change (batch coding of the final product); dispatch of supporting records (consignee, supplier lot code; record retention and return (minimum period). In relation to any fishery and aquaculture consignment, the operator must ensure a management and record-keeping process to maintain, as far as is practicable, the integrity of the information provided to the operator by the supplier of fish products; transfer of shipment information to the consignee, which subsequently allows the operator to identify the supplier and any traceability information provided to the operator by the supplier.

Conclusions.

It was established [8] that the mass fraction of lead in the studied samples of fresh-frozen fish products was 0.132mg/kg (norm – 1.0mg/kg), cadmium – 0.031mg/kg (0.2mg/kg), arsenic – 0.98mg/kg kg (5.0mg/kg), mercury – 0.012mg/kg (0.5mg/kg). The content of HCCG α-isomers - <0.001mg/kg (0.2mg/kg), HCCG β-isomers - <0.001mg/kg (0.2mg/kg), HCCG γ-isomers - 0.001mg/kg (0.2mg /kg); 4,4-DDT – 0.001mg/kg (0.2mg/kg) 4,4-DDE – 0.001mg/kg (0.2mg/kg); 4,4-DDD – 0.001mg/kg (0.2mg/kg).

The number of mesophilic aerobic and facultatively anaerobic microorganisms (KMAFAnM) was 30x103CFU/g (norm - 1x105CFU/g), BGCP (coli-forms) in 0.001g, pathogenic microorganisms (including salmonella), Listeria monocytogenes in 25g and Staphylococcus aureus in 0 ,01 g - not highlighted. The content of radionuclides Cs137 was <6.7Bq/kg for the norm of no more than 130Bq/kg, Sr90 – <4.2Bq/kg (the norm is no more than 100Bq/kg) [10].

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Анотація. *Нині для європейських країн надто актуальним є питання щодо організації, впровадження та контролю інтегрованих багаторічних планів моніторингу, розроблених відповідно до вимог Регулювання Парламенту та Ради ЄС № 882/2004. Принципи відслідковування (відстеження) продуктів, як інструменту у системі контролювання та сертифікації харчових продуктів, регламентовані вимогами CAC/GL 60–2006. Ключовими елементами системи простежуваності є: ексклюзивний список постачальників; прийняття інформації на вході та ведення обліку (постачальник, код партії постачальника, код партії оператора); розділення партій під час обробки та зберігання, коли змінюються партії надходження сировини (пакетне кодування кінцевого продукту); відправка супровідних записів (вантажоодержувач, код партії постачальника; зберігання записів та повернення (мінімальний період). Встановлено, що масова частка плюмбуму в досліджуваних зразках рибної продукції, яка поступала на ринок м. Чернівців з Дністровського району становила 0,131 мг/кг (норма – 1,0 мг/кг), кадмію – 0,030 мг/кг (0,2 мг/кг), арсену – 0,97 мг/кг (5,0 мг/кг), меркурію – 0,011 мг/кг (0,5 мг/кг). Уміст ГХЦГ α-ізомерів – < 0,001 мг/кг (0,2 мг/кг), ГХЦГ β-ізомерів – < 0,001 мг/кг (0,2 мг/кг), ГХЦГ γ-ізомерів – 0,001 мг/кг (0,2 мг/кг); 4,4-ДДТ – 0,001 мг/кг (0,2 мг/кг) 4,4-ДДЕ – 0,001 мг/кг (0,2 мг/кг); 4,4-ДДД – 0,001 мг/кг (0,2 мг/кг). Дещо нижчими вказані показники були в рибній продукції яка поступала з Вижницького району Чернівецької області. Кількість мезофільних аеробних та факультативно анаеробних мікроорганізмів (КМАФАнМ) склала 30х103 КУО/г (норма – 1х105 КУО/г), БГКП (коліформи) в 0,001 г, патогенних мікроорганізмів (у тому числі сальмонел), Listeria monocytogenes у 25 г та Staphylococcus aureus у 0,01 г – не виділено. Уміст радіонуклідів Cs137 становив < 6,7 Бк/кг за норми не більше 130 Бк/кг, Sr90 – < 4,2 Бк/кг (норма – не більше 100 Бк/кг).*

Ключові слова: *моніторинг, простежування, рибна продукція, харчові продукти, ксенобіотики.*

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