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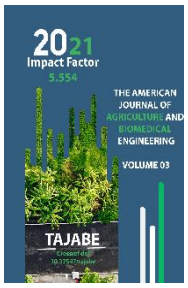

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Study And Evaluation Of Key Indicators Of Quality And Safety Of Oil And Fat Products

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ABSTRACT

The article deals with the basic terms and definitions of oil and oil products, technological processes, their classification, safety requirements, sanitary norms and rules, permissible levels of hazardous substances, requirements for production processes, packaging and labeling requirements. , as well as identification and conformity assessment processes. All of these processes are the basis for the production of oil and oil products and the provision of quality and safety indicators.

KEYWORDS

Consumable oil, nutritional value, quality, product safety, sanitary norms and regulations, production processes, packaging, marking, identification, conformity assessment, standard, technical regulation.

INTRODUCTION

The problem of food quality and safety is a complex problem that requires a lot of effort to solve, both raw material suppliers and scientists - biochemists, microbiologists and manufacturers, technologists, engineers, sanitary-epidemiologists services, government agencies and of course consumers. The urgency of the problem of food quality and safety is growing every year, as it is the quality and safety of food that is one of the key factors determining human health and the preservation of the gene pool.

In modern economic conditions, product quality has become the most important factor in the competitiveness of the enterprise. Naturally, in market relations, the manufacturer strives to achieve sustainable

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quality of its products, using all the tools developed by global and local practice. One of the urgent tasks of food safety is to study and analyze best practices in the field of production, processing and quality assessment, as well as the sale of safe food products to the population. It is necessary to ensure that they are evaluated for quality and safety in accordance with the requirements of international standards, using modern testing methods and measuring and testing tools [1-3]. The purpose of this scientific article is to describe and evaluate the quality of various consumable oils in accordance with the characteristics consumed and the requirements of applicable standards and technical regulations.

Terms and definitions related to oil products, technological processes:

Fat and oil products - nutritional supplements and other ingredients based on vegetable oils or vegetable fats and animal fats and oils (including marine mammalian and fish oils), vegetable oils and products obtained with or without the addition of water;

Edible fat and fat products - fat and fat products used for cooking or in various branches of the food industry.

Oily raw materials - seeds and fruits of oily plants, oily parts of plant species;

Vegetable oil - a mixture of glycerides of fatty acids and related substances, extracted from fatty raw materials, with a fat content of not less than 99 percent;

margarine - with or without the addition of animal fats or their mixtures of modified and (or) unmodified vegetable oils, with or without the addition of water, milk and (or) processed products, as well as nutritional supplements and ingredients with a mass fraction of fat not less than 20 percent prepared emulsion high-dispersion oil product;

Mayonnaise - the same emulsified product of the lower dispersion prepared with or without the addition of refined, deodorized vegetable oils, water, egg products in the amount of not less than 1 percent when converted to egg yolk (dry), processed dairy products, nutritional supplements and other nutritional ingredients;

Household soap - a product consisting of sodium or potassium salts of natural fatty acids, with the addition of synthetic, resinous or naphthenic fatty acids (with or without them) and other additives to improve the consumer properties.

Refining - the following purification processes of products derived from the processing of vegetable oils and (or) fats, (or) animal fats and vegetable oils: hydration, neutralization, washing, drying, bleaching, filtration, deodorization or degreasing of fats and (or) animal fats consists of a complex of some of these processes according to the application of fats and products derived from the processing of vegetable oils;

Hydration - processing of phosphorus-containing substances in vegetable oils and (or) fats by chemical, mechanical and other means;

Deodorization - removal of volatile, odorous and flavoring substances under vacuum with

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heated steam from vegetable oils and (or) fats;

Neutralization by distillation - a high-temperature process of removal of free fatty acids, odorants and other volatile substances by driving under vacuum with heated steam;

Distillation - the process of purification by evaporation and condensation of the formed vapors;

Fractionation - is the thermomechanical separation of vegetable oils into fractions.

Table 1. Types of vegetable oils depending on the source of fatty raw materials

T/r	Types of oils	Name of raw material	Botanical name
1.	Apricot oil	Apricot (bean seed)	Prunus armeniaca Linnaeus: syn. Armeniaca vulgaris Lamarck
2.	Peanut Butter	Peanut	Arachis hypogaea Linnaeus
3.	Watermelon oil	Watermelon (seeds)	Citrullus lanatus (Thumb.) Matsumet Nakai Citrullus spp.
4.	Birch oil	Birch	Fagus sylvatica Linnaeus
5.	Grape oil	Grapes (seeds)	Vitis vinifera Linnaeus
6.	Cherry oil	Cherry (bean seed)	Prunus cerasus LinnaeusRosaceae
7.	Mustard oil: brown; Indian; black; white mustard oil; field mustard oil.	Mustard (seed): brown; Indian; black; white; field.	Brassica Linnaeusjuncea Czernajawet cossonnigraW.D.J. Koch Sinapis alba Linnaeus Sinapis arvensis Linnaeus
8.	Cedar oil	Cedar (walnut)	Pinus cembra L.
9.	Coconut oil	Copra	Cocos nucifera Sinapis Linnaeus
10.	Corn oil	Corn (seeds)	Zea mays Linnaeus

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11.	Sesame oil	Sesame seeds	Sesamum indicum Linnaeus
12.	Kanakunjut oil	Kanakunjut (seeds)	Ricinus communis Linnaeus
13.	Flaxseed oil	Flaxseed (seeds)	Linumusilatissimum Linnaeus
14.	Almond oil	Bitter almonds (walnuts)	Prunus dulcis (Miller) DA. Webb var. amara (DeConaolle) Buchheim: syn. Prunus amygdalusBatsch var. amara (DeConaolla) Focke
15.	Walnut oil	Walnut (seeds)	Aleurites moluccana (Linnaeus), Wildenow. syn.Aleurites triloba Juglans regia Linnaeus
16.	Olive oil	Olive (core) Olive (pericarp	Olea europaea Linnaeus
17.	Palm oil	Oily palm (pericarp of the fruit)	Elaeisguineensis Jacquin.
18.	Palm oil	Oily palm (bean seeds)	Elaeisguineensis Jacquin.
19.	Peach Oil	Peaches (seeds)	Prunus persica (hinnacus) Batsch
20.	Sunflower oil	Sunflower (seeds)	Helianthus annuusLinnaeus
21.	Wheat oil	Soft wheat (grain)	Triticum aestivum Linnaeus: emened. Fiori et Paoletti Triticum durum Desfontaines
22.	Rapeseed oil	Rapeseed (seeds)	Brassica napus Linnaeus
23.	Rice oil	Rice	Oryza sativa Linnaeus
24.	Maxsar oil	Maxsar (seeds)	Carthamustinctorius Linnaeus
25.	Plum oil	Plum (bean seeds)	Prunus domestica Linnaeus
26.	Soybean oil	Soybeans	Glycine max (Linnaeus) Merrill

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27.	Tomato oil	Tomato (seeds)	Lycopersicon lycopersikum (Linnaeus), Karsten ex Farwell syn, Lycopersicon esculentum P. Miller;
28.	Cumin oil	Cumin (seeds)	Carum
29.	Pumpkin oil	Pumpkin (seeds)	Cucurbita maxima A.N. Duchesne Cucurbita pepo (Linnaeus)
30.	Cottonseed oil	Cotton (seeds)	Gossypium spp.
31.	Hemp Oil	Hemp Seeds	Cannabis ruderalis

RESEARCH METHODS

Safety requirements for fat and oil products: Non-edible fat and fat products during the shelf life of edible fat and fat products using the fat and fat products in circulation for the specified purpose must not harm human life and health during storage [4-7].

During the production, packaging, storage, transportation, circulation and utilization (processing) of petroleum products must comply with the requirements of sanitary rules, norms and hygienic standards, which must be complied with, established by the Technical Regulation.

Sanitary rules, norms and hygienic standards: Toxic elements of food fats, mycotoxins and radionuclides, pesticides, antibiotics, dioxins, transisomers of fatty acids, indicators of oxidative degradation, benz (a) pyrene, cyanide, erucic acid and gossypol should not be higher than the given level.

Table 2. Permissible amount of toxic elements in dietary fats and oils

Product Name	Indications	Fixed amount not more than mg / kg
Vegetable oils (all types), fractions of vegetable oils.	Lead	0,1
		0,2 (for peanut butter)
	Margimush	0,1

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	Cadmium	0,05
	Mercury	0,03
	Iron	1,5 for refined oils
		5,0 for a mixture of unrefined oils, refined and unrefined oils
	Copper	0,1 for refined oils
		0,4 for unrefined oils
Refined deodorized hydrogenated oils (fats); refined deodorized pereterified oils (fats); special oils (bread, confectionery, baking oils, etc.).	Lead	0,1
	Margimush	0,1
	Cadmium	0,05
	Mercury	0,05
	Nickel	0,7 hydrogenated refined and deodorized oils (fats) and products containing hydrogenated oils and fats учун
Margarines.	Lead	0,1
	Margimush	0,1
	Cadmium	0,05
	Mercury	0,05
	Nickel	0,7 products containing hydrogenated oils and fats
	Iron	1,5 (except margarines with cocoa products)
	Copper	0,1 (except margarines with cocoa

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		products)
Milk fat substitutes; Cocoa butter equivalent; SOS-type cocoa butter enhancers; POP-type cocoa butter substitutes; Nolaurin non-tempered cocoa oil substitutes; Laurin type non-tempered cocoa butter substitutes.	Lead	0,1
	Margimush	0,1
	Cadmium	0,05
	Mercury	0,05
	Nickel	0,7 таркибида гидрогенизацияланганмойлар ва ёғлар мавжуд маҳсулотлар
Mayonnaise; mayonnaise sauces; vegetable oil-based sauces; cream based on vegetable oils.	Lead	0,3
	Margimush	0,1
	Cadmium	0,05
	Mercury	0,05
Vegetable-oil spreads; vegetable-butter spreads; vegetable oil melted mixtures; vegetable-butter melted mixtures.	Lead	0,1
		0,3 for cocoa product added types
	Margimush	0,1
	Cadmium	0,03 for vegetable-butter products
		0,05 for vegetable oils
		0,2 for cocoa product added types
	Mercury	0, 03 for vegetable-butter products
		0,05 for vegetable oils
		0,2 for cocoa product added types
	Nickel	0,7 products containing hydrogenated oils and fats

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	Iron	1,5 (except for spreads and melted mixes with cocoa product)
	Copper	0,1 for vegetable oils (except cocoa products)
		0,4 for vegetable-butter types (except for cocoa products)
Distilled glycerin.	Iron	2,0
	Lead	5,0
	Margimush	0,3

Table 3. Residual content of pesticides in oil products, permissible levels of radionuclides, mycotoxins, antibiotics and dioxins

Product name	Indicators	The permissible amount is not more than mg / kg
Vegetable oils (all types), fractions of vegetable oils; refined deodorized hydrogenated oils (fats); refined deodorized pereeterified oils (fats); special oils (bread, confectionery, baking oils, etc.); margarines; mayonnaise; cream based on vegetable oils; milk fat substitute suppressors;	Mycotoxins: aflatoxin V1	0,005 (except refined oils)
	Radionuclides: cesium-137	40 Bk / kg (for vegetable oils)
	strontium-90	60 Bk / kg
	Pesticides: GXTsG (abg-isomers)	0,05 (for refined oils)0,2 (for unrefined oils)
	DDT and its metabolites	0,1 (for refined oils)0,2 (for unrefined oils)
	Polychlorinated biphenyls	3,0 (for products containing

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cocoa butter equivalent; SOS-type cocoa butter enhancers; POP-type cocoa butter substitutes; Nolaurin type non-tempered cocoa butter substitutes; Laurin type non-tempered cocoa butter substitutes.		fish oil)
	Dioxins	0,00000075 01.01.2021 (recalculated to the amount of fat in the product for vegetable oils) The probability of its presence in the oil is determined in cases where it is reasonably assumed
Vegetable-oil spreads; vegetable oil-melted mixtures; vegetable-butter spreads; vegetable-butter melted mixtures.	Mycotoxins: aflatoxin V1	0,005
	Radionuclides: cesium-137 Strontium-90	100 Bk / kg (for vegetable butter products) 60 Bk / kg (for vegetable oil products) 80 Bk / kg
	GXTsG (abg isomers)	When recalculating the amount of fat1,25 (for vegetable oil products) 0.05 (for vegetable oil products)
	DDT and its metabolites	When recalculated to the amount of fat 1.0 (for vegetable oil products) 0.1 (for vegetable oil products)

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	Antibiotics ** (for vegetable-butter products)	
	chloramphenicol (chloramphenicol)	not allowed <0.0003 mg / kg
	Tetracycline group	not allowed <0.01 mg / kg
	streptomycin	not allowed <0.2 mg / kg
	penicillins	not allowed <0.004 mg / kg

Table 4. Residual content of pesticides in oil products, permitted drugs of radionuclides, mycotoxins, antibiotics and dioxins

Product name	Indicators	The permissible amount is not more than mg / kg
Vegetable oils (all types), fractions of vegetable oils; refined deodorized hydrogenated oils (fats); refined deodorized pereeterified oils (fats); oils for special use (bread, confectionery, baking oils, etc.); margarines; mayonnaise;	Mycotoxins: aflatoxin V1	0,005 (except refined oils)
	Radionuclides: cesium-137	40 Bk / kg (for vegetable oils) 60 Bk / kg
	strontium-90	80 Bk / kg
	Pesticides: GXTsG (abg-isomers)	0.05 (for refined oils) 0.2 (for unrefined oils)
	DDT and its metabolites	0.1 (for refined oils) 0.2 (for

cream based on vegetable oils; milk fat substitutes; cocoa butter equivalent; sauce-type cocoa butter enhancers; POP-type cocoa butter substitutes; Nolaurin type non-tempered cocoa butter substitutes; Laurin type non-tempered cocoa butter substitutes.		unrefined oils)
	Polychlorinated biphenyls	3,0 (for products containing fish oil)
	Dioxins	0,00000075 01.01.2021 Effective from (recalculated to the amount of fat in the product for vegetable oils) The probability of its presence in the oil is determined in cases where it is reasonably assumed
Vegetable-oil spreads; vegetable oil-melted mixtures; vegetable-butter spreads; vegetable-butter melted mixtures.	Mycotoxins: aflatoxin V1	0,005
	Radionuclides: cesium-137 Strontium-90	100 Bk / kg (for vegetable butter products)60 Bk / kg (for vegetable oil products) 80 Bk / kg
	GXTsG (abg-isomers)	When recalculated to the amount of fat 1.25 (for vegetable-butter products) 0.05 (for vegetable oil products)
	DDT and its metabolites	Calculated to the amount of fat 1.0 (for vegetable-butter

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		products) 0.1 (for vegetable oil products)
	Antibiotics ** (for vegetable-butter products)	
	chloramphenicol (chloramphenicol)	not allowed <0.0003 mg / kg
	Tetracycline group	not allowed <0.01 mg / kg
	streptomycin	not allowed <0.2 mg / kg
	penicillins	not allowed <0.004 mg / kg

Requirements for the production of petroleum products: Excludes contamination of production facilities (shops, warehouses, departments and other buildings) and technological equipment used in the production of petroleum products, raw materials, semi-finished products and finished petroleum products should be in position.

In the production (preparation) of feed oil and fat products related to safety requirements,

manufacturers must develop, implement and enforce procedures based on the principles of XACCP (Hazard Analysis and Critical Control Points) [8-11]. Technological processes for the production of petroleum products must be carried out in accordance with the procedures and conditions established by the regulations in the field of technical regulation to prevent contamination of raw materials, semi-finished products and finished products. Enterprises producing petroleum products must pass an environmental impact assessment in the manner prescribed by law and comply with environmental standards approved by the competent authority. Raw materials, ingredients, feed additives, technological means used in the production of petroleum products must comply with the requirements of regulatory documents in the field of technical regulation.

The safety of oil products in the production process must be ensured as follows:

a) Selection of technological processes and methods of their implementation at all stages (departments) of production of oil products;
b) Selection of the optimal sequence of technological processes that exclude contamination of food and oil products;

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c) Control over the operation of process equipment;
d) Ensuring the safety of raw materials and feed additives required for the production of oil and fat products;
e) Storage of oil production facilities, process equipment and equipment used in conditions that exclude contamination of feed oil products;
f) Selection of methods and sequence of sanitary cleaning, disinfection, disinsection and deratization of production facilities, sanitary cleaning and disinfection of technological equipment and devices used in the production of oil products.

Sanitary cleaning of production facilities and process equipment, the sequence of disinfection, disinsection and deratization should be determined at intervals that exclude the risk of contamination of oil products. The sequence of cleaning operations is determined by the manufacturer.

Requirements for packaging of fat and oil products: The packaging of fat products, the shelf life of edible fat products and the shelf life of non-edible fat products should ensure that product safety and identification marks do not change during handling.

In case of damage to the consumer packaging of edible oil and fat products, it must be withdrawn from circulation by the owner of fatty products independently or on the notice of the competent authorities.

Packaging in contact with oil products (materials used for packaging) must comply with the requirements of the General Technical Regulation on the safety of packaging in contact with food.

Used packaging material must be able to be recycled, disposed of and destroyed in order to ensure human life, health and environmental safety.

Requirements for the marking of oil products: The marking of oil products is carried out in accordance with the requirements of the General Technical Regulation on the safety of food products.

Information on the labeling of food and fat products shall be stated in the state language. This information may also be expressed in other languages, provided that its content is the same as the content of the information in the state language.

The marking on the packaging of edible oil and fat products must be clear, easy to read, clear and not confusing to consumers, while the inscriptions, signs, symbols must differ from the background on which the marking is placed [10-13]. The nutritional value of fat products (energy value per 100 grams of product, proteins, fats, carbohydrates, vitamins, macro- and micronutrients) is indicated. Information on the energy value of proteins, fats, carbohydrates and calories is given in cases where their value per 100 grams of food is at least 2%, at least 5% of the recommended daily intake for minerals and vitamins.

Information on the presence of genetically modified organisms for imported fats and oils is provided in accordance with the requirements of the legislation.

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In the information provided to the consumer, the volume and basic dimensions of fat and oil products, gross, net mass are indicated on the package (container) in the metric measurement system (International System of Units).

The date of manufacture (manufacture) of fat and oil products is indicated on the label or on the packaging (container) with the words "Manufactured (manufactured ...) (date)".

Requirements for storage of oil products: Storage of oil products should be carried out in warehouses and other buildings where storage conditions are available to ensure their safety and integrity during their shelf life or shelf life.

Process equipment installed in warehouses and other buildings must be equipped with measuring instruments to monitor storage conditions.

Sanitary cleaning (disinfection, disinfection, etc.) should be carried out in warehouses and other buildings where oil products are stored, as well as in refrigerators.

In order to prevent spontaneous combustion of fat products, it is not allowed to store them together with petroleum products, toxic flammable chemicals and other types of fat products that can cause damage.

Requirements for transportation of oil products: Transportation of oil products is carried out in vehicles that ensure their safety and integrity.

Vehicles transporting edible oils and fats must be suitable for these purposes. Transport conditions are determined by the load. These conditions must meet the requirements set by the manufacturer for transportation.

It is not allowed to transport oily products together with cargoes that contaminate their packaging and have a strong (foreign) odor.

Sampling, identification and conformity assessment and testing of oil products: Identification means the determination of the similarity of the oil products submitted for the purpose of conformity assessment to the accompanying documents and the exact markings indicated on the label.

Identification of fat and oil products is carried out on the basis of product name and (or) characteristics of the product, specified in this Technical Regulation in the description of this product, visually and (or) organoleptic and (or) analytical methods.

Identification of oil products is carried out in one and (or) several ways:

- By name - the name of the oil product specified in the label on the consumer packaging and / or the shipping documents of the product and its use in determining the type of oil products compared with;
- Visual method - by comparing the appearance of a fat-oil product;
- Organoleptic method - is defined by comparing the organoleptic characteristics of fat and oil products with the characteristics of the definition given for these fat products in this Technical regulation.

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The organoleptic method is used without the possibility of naming and visually identifying the fat-oil product. In the presence of signs of microbial spoilage in the product, the evaluation of the organoleptic characteristics of the product is excluded; Naming of oil products from the method of analysis is used when it is impossible to identify by visual or organoleptic methods. test methods of physicochemical parameters (erucic acid, fatty acid content and trans isomers of fatty acids in vegetable oils) are used.

Conformity assessment: Conformity assessment of oil and gas products in accordance with the requirements of standards and technical regulations is carried out in the following forms:

- Confirmation of conformity of oil products;
- State control (inspection);
- New type of oil - state registration of oil products.

Assessment of compliance of production, storage, transportation and sale of oil products with the requirements of this Technical regulation is carried out in the form of state control (inspection) over compliance with the established requirements for oil products.

Sampling and testing: The necessary test methods for assessing the compliance of oil products with the requirements of the Technical Regulation, as well as sampling methods are carried out in accordance with the regulations in the field of technical regulation.

CONCLUSIONS AND RECOMMENDATIONS

An increase in the standard of living has led to a change in the attitude of the consumer himself towards food products.

Ensuring and improving the quality and safety of food is an ongoing process, and it should be managed by a well-organized system, the strategy of which is to extend quality management to all structural divisions, and the tactics is to combine new progressive technology with professional training of personnel.

An important issue in the field of ensuring the quality and competitiveness of products is the actualization and harmonization of the requirements and indicators of the national standards of the republic with the requirements of the standards of the international organization ISO and the standards of industrialized countries.

CONCLUSION

Based on the analysis, ensuring and improving the quality and safety of edible oil, the current system of standardization and assessment of the quality of food products in the republic, sanitary norms and rules, it is recommended that the following measures be taken to improve work for the high-quality and safe organization of edible oil production:

- To comply with the current requirements of the legislative acts of the republic and international norms and rules;
- To organize continuous professional development of executives and engineering and technical specialists;
- To improve educational processes for

training highly qualified personnel, taking into account modern scientific achievements and advanced manufacturing experience;

- Equipping production processes and testing laboratories for assessing the quality of finished products with timely instrumentation and testing means;
- Harmonizing regulatory documents with the level of requirements of international standards, applying international best practices.
- Continuous improvement of the quality management system.

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