ЎЗБЕКИСТОН РЕСПУБЛИКАСИ
ОЛИЙ ВА ЎРТА МАХСУС ТАЪЛИМ ВАЗИРЛИГИ

ФАРҒОНА ДАВЛАТ УНИВЕРСИТЕТИ

FarDU. ILMIY XABARLAR-

1995 йилдан нашр этилади
Йилда 6 марта чиқади

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АЙРИМ СИНТЕТИК КИР ЮВИШ ВОСИТАЛАРИНИНГ КИМЁВИЙ ТАРКИБИ ВА УЛАРНИ СИНФЛАШ

ХИМИЧЕСКИЙ СОСТАВ НЕКОТОРЫХ СИНТЕТИЧЕСКИХ МОЮЩИХ СРЕДСТВ И ИХ КЛАССИФИКАЦИЯ

THE CHEMICAL COMPOSITION AND CLASSIFICATION OF CERTAIN SYNTHETIC LAUNDRY DETERGENTS

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Мақолада ҳозирги кунда ишлаб чиқарилаётган замонавий синтетик кир ювиш воситаларининг кимёвий таркиби ва шу таркиб асосида уларга товар кодлари беришнинг аҳамияти тўғрисида маълумотлар келтирилган.

Аннотация

В статье представлена информация о химическом составе современных синтетических моющих средств, выпускаемых в настоящее время, и о важности присвоения им товарных кодов на основе данного состава.

Annotation

The article discusses the chemical composition of modern synthetic detergents which are on production in present; it further provides information on the importance of assigning them product codes.

Таянч сўз ва иборалар: *товар,синтетиккир ювиш воситаси,энзимлар, алкилбензосульфонатлар, фосфатлар.*

Ключевые слова и выражения: *товар, синтетические моющие средства, энзимы, алкилбензосульфонаты, фосфаты.*

Keywords and expressions: *product, synthetic laundry detergent, enzymes, alkylbenzzenesulfonate, phosphates.*

As a commodity, synthetic detergents play an important role in international import-export practices, and these detergents are one of the most widely used goods in the world.

It is known that the requirements for goods in international economic relations are mainly focused on its quality indicators. Information about other properties of the product is not specified by the manufacturer. This causes problems in determining the international code numbers on the goods in accordance with Foreign Economic Activity (FEA) Commodity Nomenclature (CN). As a result, errors in the payment of customs duties to the state occur as a result of the detection of incorrect code numbers for goods.

In 2017, a new passport specializing in commodity chemistry was proposed. After extensive discussion among scientists, this newly proposed passport was considered by the Higher Attestation Commission under the Cabinet of Ministers of the Republic of Uzbekistan and re-registered by the decision of September 28, 2017 No 242/4, specialty 02.00.09 [1].

According to the new passport, research should be conducted on the technology of production, methods of production, their ecological status, opportunities to enter the world market, chemical theory of production and other areas, in other words, the product has been subjected to be studied in detail.

In the new field of science, new commodity codes based on their chemical composition have been proposed for many goods, and these commodity codes are now being used in practice [2].

The synthetic detergents currently produced are diverse and they are made up of complex substances composed of organic and inorganic chemical compounds. Advances in chemistry have made it possible to create detergents that remove any type of contamination today.

Manufacturers of synthetic detergents have to meet the following requirements:

The product must have a high degree of natural decomposition in water, be economical in production and inexpensive for consumers, have

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a quality brand appearance and be environmentally friendly, not harmful to humans, animals and the environment.

Alkylsulfates, alkylbenzosulfonates, fatty acids, high alcohol sulfoethoxylates and other active additives are used in the production of synthetic detergents.

Scientists such as V.X.Paronyan and V.T.Green have classified modern synthetic detergents into 6 main types according to their appearance [3,432]:

1) .Powdery;
2) Paste like;
3) Liquid;
4) Tablet;
5) Granules;
6) Gel.

According to K.R. Lange, when washing natural, artificial and synthetic fabrics with synthetic detergents, it is recommended to dissolve the detergents in water at 34-60 ºC to prevent fading and deterioration of the fabric [4,240].

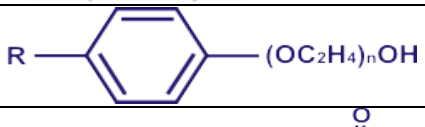
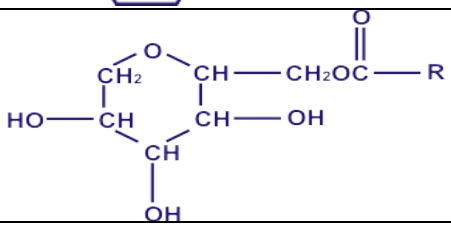
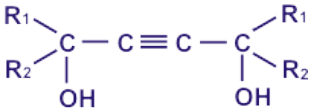
Today, many new types of synthetic detergents are being produced in foreign countries and by domestic manufacturers. Some of these as example include: “Tide”, “Ariel”, “Lotos”, “МИФ”, produced by foreign companies and “Зелёный чай”, “Берёзовая роща”, and “ARTA” synthetic laundry detergents by local manufacturers which are used in hand washing and washing machines.

The main chemical composition of the aforementioned washing powders consist of anionic surfactants, noinogenic surfactants, phosphonates, flavorings, zeolites, polycarboxylates, emulsifiers and other additives. They contain an average of 5-15% of anionic surfactants and 5% of noninogenic surfactants [5,116].

Table 1 below provides information on the chemical composition and structure of some of the anionic surfactants included in this laundry detergent.

Table 1.

Some anionic surfactants in laundry detergents

The name of the compound	Formula
Ethers of high fatty acids and polyglycols	$R-CO-(OC_2H_4)_nOH$
Polyglycolamide	$RCON\begin{matrix}(C_2H_4O)_xH\\(C_2H_4O)_yH\end{matrix}$
Monoalkyl polyethylene glycol	$R-(OC_2H_4)_nOH$
Alkylphenyl ether of polyglycol	
Ether of anhydrosorbite and fatty acids	
N-alkyldiethylenetriamincarboxylic acids	$\begin{matrix}R-NH-C_2H_4\\R-NH-C_2H_4\end{matrix}\!\!>N-CH_2COOH$
N-alkylasparagin acid	$R-NH-CH(CH_2-COOH)-COOH$
N-alkyl-beta-alanine	$R-NH-CH_2-CH_2-COOH$
Ethylenediaminopolypropylene glycol and polyglycol ether	$\begin{matrix}CH_2-N[(C_3H_6O)_n-(C_2H_4O)_xH]_2\\CH_2-N[(C_3H_6O)_n-(C_2H_4O)_xH]_2\end{matrix}$
Dialkyldioxyacetylene	

The composition of the manufactured product must meet the requirements of washing effect, color, odor, chemical composition and others in accordance with the principles of world standards. In addition, the global production of synthetic detergents is controlled by technical, economic and environmental factors. For example, washing laundry at low temperatures is economical. Low temperatures in laundry reduce energy consumption, but at low temperatures the solubility and bleaching properties of synthetic detergents also decrease. In such cases, the demand for nonionic surfactants increases, which gives good results even at low temperatures. Manufactured on the basis of magnesium monoperisulfate, laundry detergents with high biodegradable properties, which can react well with bactericides, celioids and enzymes with bleaching properties even at 20-21 ºC, are among the energy-saving means. These include synthetic detergents with a high concentration of peroxide, containing 30% or more of active oxygen [6].

The presence of enzymes in synthetic detergents also significantly increases the effectiveness of these detergents at low temperatures. Enzymes are biocatalysts of a protein nature that carry out various biochemical and chemical reactions [7].

Enzymes such as protease, lipase, amylase, pectinase and keratinase are used in the production of washing powder.

Enzymes break down proteins at a certain time and under the condition that the temperature of the washing solution does not exceed 40 ^{0}C. It breaks down not only proteins but also other compounds. For example, while the protease enzyme removes blood, milk, eggs, cocoa, and other stains, lipase removes fat and oil stains. The enzyme amylase removes starch-preserving food debris from clothing fabric, while cellulose gives smoothness to wood products and elasticity to fabrics. It also prevents clothes made of cellulose from tingling. Pectinase resistant to alkaline environment removes fruit stains. Keratinase, on the other hand, removes hardened protein stains.

Typically, laundry detergents contain a combination of these enzymes, and they enhance each other's effects [8,192-207].

In Europe (60-70%) synthetic detergent powders contain enzymes and chemical bleaches. In the United States, it has been suggested that enzyme powders be increased by up to 50%. In Japan, 80% of phosphate-free synthetic detergents contain enzymes [9].

Enzymes in laundry detergents in Uzbekistan accounted for 15% in the 1990s, 20-25% in 2000, and 40-45% today. Much research is being done to increase the stabilization of enzymes in synthetic detergents produced in powder form. This has led to the development of a multi-functional synthetic detergent in many developed countries, which simultaneously contains both enzymes and chemical bleaches. Obtaining such means is a difficult task. This is because enzymes can be broken down by peroxides in the powder. Therefore, peroxides are encapsulated when enzymes are added to laundry detergents. Another method of stabilizing enzymes in the composition of a detergent is the use of micro structural protein-modifying additives of the enzyme [10,125].

Phosphates in laundry detergents are one of the most harmful compounds in the environment, and the use of a harmless compound instead remains one of the most pressing issues for many companies.

In many countries, synthetic laundry detergents containing phosphates are limited, and phosphate-free detergents reach 60-100% of their capacity. The need to address this problem is based on the requirements of environmental protection and austerity. Carbonates and aluminosilicates are used instead of phosphates.

Synthetic laundry detergents have high requirements for biochemical degradation [11,528].

As a result of the analysis of goods by FEA CN code numbers through customs examination, important information on their chemical composition, structure, organoleptic, physicochemical and other parameters, as well as production processes of goods is obtained. This, in turn, this allows for the proper naming of goods, the prevention of a number of misunderstandings that may occur in economic relations, and finally the protection of the interests of consumers.

Synthetic detergents are located in commodity position 3402 in FEA CN, where the commodity codes for synthetic detergents are determined by its packaging and storage of

anions, cations, noionogens, alkyletoxy sulfates and alkylaminoxides [12].

The code numbers given in FEA CN for synthetic detergents are mainly alkyl [(benzolsulfonate) oxide] sodium aqueous solutions with a mass fraction of 30% or more but not more than 50%, as well as a mass fraction of 30% or more but 60% aqueous solutions of alkyletoxy sulfate not exceeding and products containing alkylaminoxide aqueous solutions with a mass fraction of 5% or more, but not more than 15% are given code numbers based on their chemical composition. In addition, in this commodity position, the code numbers are given for the packaging of synthetic detergents, anionic active, cationic active and noninogenic surfactants. These code numbers do not provide detailed information about the commodity.

Given the presence of many other chemical compounds in modern synthetic laundry detergents, the codes assigned to these goods in the FEA CN do not provide complete information about the product.

For example, FEA CN does not have a separate brand code for enzyme-containing synthetic detergents.

Based on the above information, taking into account the fact that enzyme-containing synthetic detergents are widely produced and sold today, we propose to assign this brand of synthetic detergents such as “Tide” , “Ariel”, “Lotos”, “МИФ”,“Зелёный чай”, “Берёзовая роща”, “ARTA” commodity code of 3402 20 900 1 according to FEA CN.

On the basis of this specialization, the assignment of brand codes to all types of synthetic detergents based on their chemical composition has become of great scientific and practical importance. At the same time, the clarification of the commodity codes for synthetic detergents in the FEA CN will inevitably bring significant benefits to the economy of our country.

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