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FATS - FATS IN FOOD PRODUCTS AND THEIR PROPERTIES

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ANNOTATION

The article focuses on food production technologies. The industry mainly uses the method of neutralizing free fatty acids with alkali. Alkaline cleaning is common. Thus, a fat-insoluble salt of fatty acids - soap is formed. Its aqueous solution separates from the oil due to its high density. The separated soap mass is called soap stock. The production technology of Sopustok is also reflected.

KEYWORDS: *Phospholipids, pigments (carotene, xanthophyll, gossypol, chlorophyll, hydration, alkaline cleaning, bleaching, deodorization.*

Annotatsiya

Maqolada asosan oziq-ovqat mahsulotlarining ishlab chiqarish texnologiyalar haqida fikr yuritiladi. Sanoatda asosan erkin yog' kislotalarini ishqor bilan neytrallash usuli ishlatiladi. Ishqorli rafinatsiya keng tarkalgandir. Bu usulda yog' kislotalarini yog'da erimaydigan tuzi ya'ni sovun hosil bo'ladi. Uning suvli eritmasi katta zichlik hisobiga yog'dan cho'kmaga tushib ajraladi. Ajralgan sovunli massa soapstok deyiladi. Sopustokning ishlab chiqarish texnologiyalari ham o'z aksini topgan.

Kalit so'zlar: Fosfolipidlar, pigmentlar (karotin, ksantofill, gossipol, xlorfill, gidratatsiya, ishqoriy rafinatsiya, oqlash, dezodoratsiya.

INTRODUCTION

On January 16, 2018, President of the Republic of Uzbekistan Shavkat Mirziyoyev signed a decree "On measures to further ensure food security of the country."

Further ensuring food security of the country, filling the market with quality, safe and affordable food products, strengthening the purchasing power of the population, liberalization of foreign economic activity and the development of a healthy competitive environment, as well as

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eliminating existing systemic problems in this area Individual customs, tax and other benefits, as well as other preferences provided to certain business entities for the import of food products into the Republic of Uzbekistan from February 1, 2018 have been abolished.

It is also necessary to take comprehensive measures to find and attract food carriers for 2018, to create equal conditions for them to enter the market, to conclude contracts, to assist in the transportation and storage of imported products, as well as quality, affordable population. other measures will be developed to fully meet the demand for food products.

Saturation of the market with quality, safe and cheap food products, development of the agrarian complex, introduction of effective mechanisms of social and public-private partnership, timely elimination of threats to the stability of the food market, import of food products The draft law "On Food Security", which defines measures for favorable customs and tariff regulation, has been developed and submitted to the Cabinet of Ministers for a number of tasks [1]. There will be a number of changes in the educational process to ensure the implementation of the above law.

In the age of globalization, in the context of rapid development of science, technology and engineering, the following requirements are set for the education system:

i. development of skills of individual and independent work, as well as creative work with scientific and technical information;
ii. development of original and non-standard thinking and business skills;
iii. individualization of education due to the fact that students have different learning abilities;
iv. the mobility of knowledge, the formation of critical thinking, creativity and dexterity at work, the ability to adapt to changing production conditions.

Of course, it is safe to say that the quality of food professionals is the basis for tomorrow's development. This is due to the role of human resources in the primary processing of all domestic goods produced in our country and their quality delivery to the people.

In this regard, the import of a number of innovative technologies in the field of food.

PROCESSING OF VEGETABLE OILS

Industrially produced vegetable oils contain a mixture of triglycerides and fatty substances. Fatty substances accumulate in the adipose tissue of the plant and the fat is separated and they are called accompanying substances. These substances, even in small amounts in fats and oils, have a significant effect on its properties. These include phosphorus-containing substances (phospholipids), pigments (carotene, xanthophyll, gossypol, chlorphyll), waxes (waxy substances), tocopherols and fat-soluble vitamins, sterols (steroids), free fatty acids, flavors and other odoriferous organic substances, sulfolipids, glycolipids, glycoproteins, phosphoprotein compounds. While some of the accompanying substances spoil the color, smell and taste of the oil, adversely affecting its nutritional and commodity quality, some complicate further processing. Refining is the process of removing fats from their constituents.

Refining is a complex complex of various physical and chemical processes, the application of which allows to separate the accompanying substances from the oil. The nature of these processes is determined by the nature of the oil and the intended use of the refined oil.

In the oil industry, oil refining processes are carried out in the following sequence: hydration - alkaline refining - bleaching - deodorization.

The refining method should be chosen in such a way that the triglyceride content of the oil remains unchanged, the maximum amount of valuable by-products (phosphatides) is removed from the oil and the complete elimination of toxins is ensured.

There are several requirements for refined oils, depending on their purpose. Fats used in food must be refined in a complete cycle: the separation of phosphatides and waxy substances, the loss of free fatty acids, pigments. Oils used for technical purposes are refined in a short cycle. For example, hydrogenated oil is not deodorized.

It is impossible to get rid of all the accompanying substances in one way. Therefore, in practice, several methods are used that combine into one technological scheme.

Hydration of oils. Hydration is performed to isolate phosphatides. The amount of phosphatides depends on the type of oil and the method of obtaining it. For example, forpress soybean oil is 1.0-1.5%, extraction soybean oil is 1.5-3.0%; 0.3-0.7% in forpress sunflower oil, 0.9-1.2% in extraction oil; The phosphatide molecule has a diffuse character: the hydrophobic part is a fatty acid radical; hydrophilic part - the active group (ether, nitrogenous base, hydroxyl, etc.) Although the amount of phosphatides in oils is low and non-toxic, it has a significant impact on the quality of the oil due to its activity. During storage, it forms a precipitate and crushes the oil. They stabilize the emulsion and as a result the phases are difficult to separate, during bleaching phosphatides are adsorbed on the sorbent surface, which increases its consumption.

During hydrogenation, phosphatides reduce catalyst activity. This suggests the need to separate phosphatides from unrefined fats. The basis of the

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hydration process is that the phosphatides interact with water, coagulate, and precipitate.

PHOSPHATIDES ARE USED IN CONFECTIONERY

The amount of hydrating water depends on the amount of phosphatide, its composition, structure, and it varies from 0.5% to 6%. Lack of water leads to incomplete hydrotastia, while excess water forms an emulsion.

During hydration, the number of fatty acids decreases by 0.4-0.5 mg KOH (due to the separation of acid phosphatides), along with phosphatides, proteins and mucous substances are released.

After the hydration process, 0.1-0.2% phosphatides remain in the oil. To remove unhydrated phosphatides, the hydrated oil is treated with concentrated phosphoric acid. Hydration method: In various schemes, a reactor-turbolizer is used to mix water and oil, and separators or plate precipitators are used to phase the oil-phosphatide emulsions.

Hydration technology consists of the following operations

i. mixing of oil with hydrating agent;
ii. an oil-water mixture to form the coagulation process of phosphatides
iii. search;
iv. separation of oil and phosphatide emulsion phases;
v. oil drying;
vi. drying of phosphatide emulsion and obtaining phosphatide concentrate.

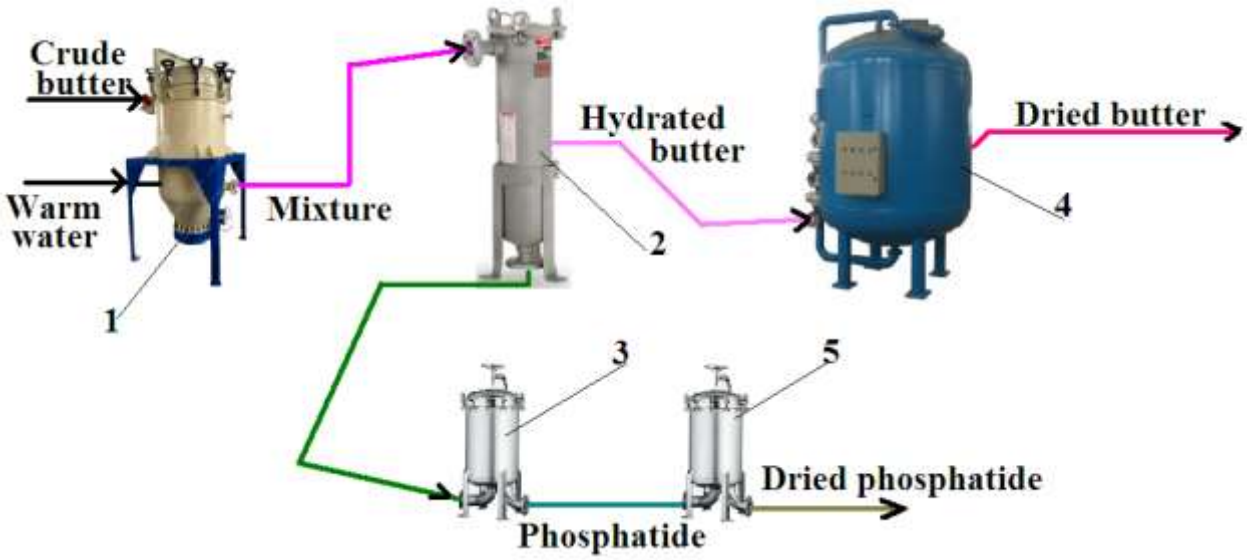

Figure-1: Schematic diagram of the hydration process.

Alkaline refining of oils. Vegetable oils contain a certain amount of free fatty acids, which depends on the quality of the oil. The presence of free fatty acids worsens the quality of fat and reduces its nutritional value. The acid content of the fat used in food should not exceed 0.2-0.3 mg of KOH.

The industry mainly uses the method of neutralization of free fatty acids with alkali. Alkaline refining is common. In this way, a fat-insoluble salt of fatty acids, soap, is formed. Its aqueous solution separates from the oil due to its high density. The separated soapy mass is called soapstock. Due to its high adsorption properties, soap separates the following compounds from oil: phosphatides, proteins, mucous substances, dyes, and due to this, the refined oil is partially bleached. Partial bleaching of the oil is also due to the reaction of the alkali with some coloring satellites (gossypol).

Therefore, an excess of alkali is obtained. Excess alkali depends on the nature and quality of the refined oil. Excess alkali is 5-50% for light oils and 200-300% for dark and difficult to refine oils. The concentration of alkali is from 10 to 300 g / l, depending on the type and quality of the oil. Water is added to the concentrated alkaline solution to prepare a working solution of the desired concentration. Thus, soapstock, which is a waste of the refining process, contains: soap, neutral oil, impurities, a certain amount of alkali, water, additives. Because soapstock contains fatty substances, it is used as a raw material in the production of fatty acids.

The course of the refining process and the structure of the soapstock structure depend on the

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temperature, alkali solution, concentration and process conditions of the oil. The temperature of the process depends on the concentration of the alkali solution. The higher the alkali concentration, the lower the process temperature. Typically the temperature is between 20-25^{0}C (for cottonseed oil) and 80-850C (for sunflower oil).

The technological method of oil refining is selected mainly depending on the color of the oil. Dark colored (cotton, linseed) crude oils are mainly refined periodically, while light colored (soybean, sunflower) crude oils are refined continuously. The periodic refining is carried out in neutralizers with a volume of 5, 10 and 20 t. Refining is carried out as follows:

The crude oil and alkali solution are mixed (1) and the temperature in the neutralizer is raised (60-65^{0}C) until soapstock particles are formed and then cooled (2). The refined oil was drawn through a hinged tube into a washing and drying vacuum apparatus (3). After the soapstock is separated, 0.05-0.3% of soap remains in the oil, which spoils the taste of the oil, oxidizes it and reduces the activity of the catalyst during hydrogenation.

The oil is washed off to remove any remaining soap. Soap content should not exceed 0.05%. Drying is carried out at a temperature of 90-95^{0}C and vacuum (residual pressure 20-40mm.sm.us.). Washed and dried oil is a ready-made refined oil. Soapstock is downloaded to a special bank.

The disadvantage of the periodic method is the long soaping time, the high amount of neutral oil in the soapstock, and the long soaping process of the neutral oil. Soapstock fat content is 30-50%.

In the continuous refining method, neutralization is carried out in mixers, and phase separation is carried out in separators. There are continuous production lines A1-JRN (capacity 80-120 t / h), Alfa-Laval (capacity 80-180 t / h), Westfal (capacity 300 t / h).

Refined oil must have the following characteristics:

Table-1

Color, in red unit.	7	10
Acid number, mg KOH	0.2	0.3
Moisture and volatile substances, %	0.1	0.2
Flash temperature, ^{0}C	232	232

Whitening oils. Of the satellite substances, catarinoids are resistant to alkali, so they do not decompose in alkaline refining. At high concentrations of alkaline solution, carotenoids are sorbed into the soapstock during neutralization and the oil is partially bleached. Carotenoids are actively sorbed on the surface of a solid sorbent.

Unlike carotenoids, chlorophylls react with alkali to form a compound. However, in alkaline refining, it does not completely separate.

Sunflower oil contains carotenoids and chlorophylls, while cottonseed oil also contains gossypol. Adsorption purification method - bleaching is used to remove oil dyes.

Good adsorption depends on the nature and structure of the adsorbed substances.

For example, non-polar (poorly polar) compounds are well sorbed in non-polar adsorbents (in coal) and polarized compounds are well sorbed in polar sorbents.

The nature and structure of all dyes in oils and fats are different. But they each have their own polarity. Therefore, polar adsorbents with selectivity and activity in adsorption refining of oils: natural bentonite soils are obtained from aluminosilicates. More active, with an oil content of 75%, soil-ascanite is used. Adsorbents must be highly adsorbent, dispersed, have a low oil capacity and do not chemically react with oil, and must be oil-free.

The efficiency of the bleaching process is determined by the color of the bleached oil, the amount of sorbent used, the rate of loss and waste, and the amount of bleached oil released.

When activated soil is used during the bleaching process, some isomerization and some glycerides are formed. This leads to a decrease in the quality and shelf life of refined oils and fats. Whitening time is 20-30 minutes.

Prolonged retention of the oil with the adsorbent leads to its oxidation and the oil tastes dirty. It is therefore necessary to minimize the amount of activated soil used for bleaching and the time of soil contact with the oil.

Hydrated, neutralized, washed and dried oils are recommended for bleaching, and the process is carried out under vacuum to reduce oxidation during bleaching.

In recent years, the world has installed hermetic filters for mechanical sedimentation of various designs, and continuous bleaching methods have been introduced. The justification process for all methods is based on the following principle:

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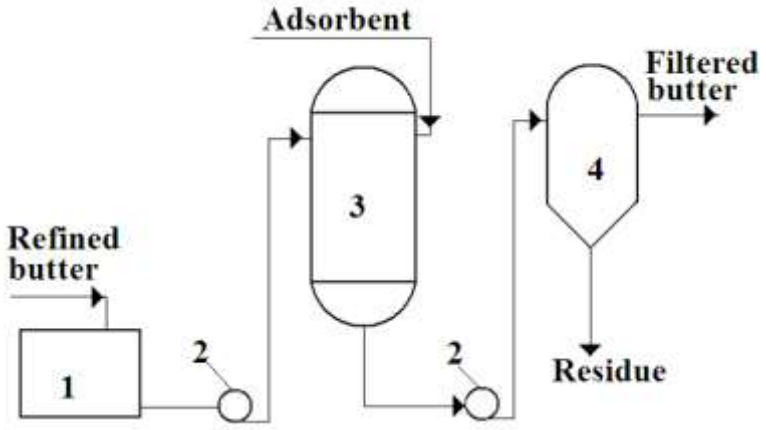

Figure-2. Preparation of oil suspension of adsorbent.

2. deaeration, the process of whitening; The bleaching process is carried out for 20-30 minutes at a temperature of 75-80^{0}C and a residual pressure of 4 kPa (around 40 mm Hg).

3. Separation of the adsorbent using a filter. The pressure in the filtration should be 2.5-3 atmospheres and the temperature should not exceed 85-90^{0}C.

Deodorizing oils. The final stage of the refining process is deodorization (deodorization), the purpose of which is to eliminate the unpleasant taste and odor in the oil. This taste and smell are created by a mixture of complex substances in the oil. These substances include low molecular weight fatty acids (caprine, caprylic), aliphatic hydrocarbons, natural essential oils, aldehydes, ketones, oxy acids. Other toxic organic compounds are also lost during deodorization. The essence of the deodorization process is the evaporation of aromatic substances in the liquid layer.

The effectiveness of deodorization depends on the composition of the aromatic substances, their volatility and the process temperature. As the temperature rises, the volatility of aromatic substances increases. However, too high a temperature can lead to the polymerization and oxidation of oils. When the temperature exceeds 250^{0}C, the oils decompose thermally. Therefore, in order to reduce the temperature when driving aromatic substances, the deodorization process is carried out under the influence of sharp steam under vacuum.

The quality of edible oils also depends on the completeness and completeness of the deodorization process. Therefore, deodorization is one of the main processes in oil refining.

In addition to the general requirements for obtaining high quality deodorized oil, the following requirements must be observed:

i. The oil should not be kept at high temperature for as long as possible during deodorization.
ii. Deodorization of oils must be carried out before deodorization.
iii. iii. 3. Avoid contact with moist air during deodorization and cooling of oils
iv. need to save.
v. If the equipment is stopped after deodorization, it should be degreased and all parts should be washed and cleaned.

Various deodorants are used to deodorize oils:

Periodic (intermittent) deodorizers, Continuous deodorizers (De-Smet, Pinch-Bamag, Ole). The temperature during the periodic deodorization process is 170-210^{0}C, and during the continuous process it is up to 230^{0}C. The residual pressure in the apparatus is 5 mm. equal to a column of mercury. Multi-stage steam projectors (steam pumps) are used to create the vacuum.

Oils and greases should be thoroughly refined before deodorization.

Deodorating oils and greases should be free of soap and bleach residues. If the deodorizing oil contains soap or bleach residue, it is sent for re-filtration.

To maintain the quality of the deodorized oil, 0.6 l of citric acid solution (20%) is added to 1 ton of oil during deodorization.

The steam supplied for deodorization must be free of salt, oxygen and other gases, and the steam must be dry and neutral.

The description of the principle scheme of periodic deodorization is as follows:

The refined oil is vacuumed from the tank into the deodorizer and the deodorizer is half-filled with oil. The oil is heated to a temperature of 100 ^{0}C and the deodorizer is supplied with open steam from

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the bottom barbator. When the temperature reaches 180^{0}C, the amount of steam increases. The vacuum in the deodorizer is created by a block of steam injectors. The residual pressure in the apparatus is 5mm. sim. should not exceed the column. The vapor-air mixture coming out of the deodorizer is sucked into the vacuum system through the drip trap and trapped in the dropper trap.

The deodorization temperature is around 180 ^{0}C for coconut oil and 210-230 ^{0}C for salomas and other vegetable oils.

Deodorization time is about 1.5-3 hours. The deodorized oil is cooled and delivered to the packaging department.

CONCLUSION

Based on the above technologies, we can conclude that the raw materials and materials of the food industry are heterogeneous systems, which are solids and carbonated liquids with different structures. The thermophysical properties of such materials depend primarily on their chemical composition and humidity, which can change significantly during processing. It should be noted that the method and speed of heating or cooling may change the structure and properties of the product. By studying the thermophysical quantities of materials, evaluating the thermophysical properties of food products and correctly linking them to the technological processes of processing, ensures product quality. Therefore, the principle of operation of the hydration process is shown in the first picture above, which highlights the positive effects of improving the amount of COPs in food on human health. In our article, we can not say that all the oils produced today are good, and in this regard, the analysis of the performance of innovative technologies in the field is made.

LIST OF USED LITERATURE

1. *O‘zbekiston Respublikasi Prezidenti Shavkat Mirziyoyev 2018-yil 16-yanvar kuni «Mamlakatning oziq-ovqat xavfsizligini yanada ta’minlash chora-tadbirlari to‘g‘risida»gi farmonni.https://www.xabar.uz/uz/jamiyat/oziq-ovqat-boyicha-yangi-qonun-loyihasi-ishlab*
2. *P. J. Fellows, Food Processing Technology: Principles and Practice 3rd Edition:Woodhead Publishing, USA, 2009*
3. *Y.Qodirov, D. Ravshanov, A. Ruziboev “O’simlik moylari ishlab chiqarish texnologiyasi”. Darslik. “Cho’lpon ”, Toshkent, 2014, - 320 b.*
4. *Vasiev M, Dodaev Q, Isabaev I, Sapaeva Z, Gulyamova Z “Oziq-ovqat tehnologiyasi asoslari”. Darslik. Voris nashriyoti. Toshkent – 2012 y - 400 b*
5. *Adizov R.T. “Don va don mahsulotlarini saqlash texnologiyasi”. Darslik. “Fan”. Toshkent – 2012 y. 432 b.*
6. *Yusupbekov N.R., Nurmuhamedov X.S., Ismatullaev P.R., Zokirov S.G., Mannonov U.V. Kimyo va oziq-ovqat sanoatlarning asosiy jarayon va qurilmalarini hisoblash va loyihalash. - Uslubiy qo‘llanma. T.: Jaxon, 2000. -231 b.*
7. *Abidov B. Neft-gaz sintezi asoslari: o‘quv qo‘llanma/ B. Abidov, O.G‘. Azimov, U.A. Ziyamuhamedova; O‘zbekiston Respublikasi Oliy va o‘rta maxsus ta’lim vazirligi: O‘rta maxsus kasb-hunar ta’limi markazi. – Toshkent: «Faylasuflar» nashriyoti, 2013. – 176 b.*
8. *Мирзаев, С. С., Кодирова, Н. Д., Нуруллаев, М. М., & Хужжиев, М. Я. (2013). Изучение энергозатрат при плазмохимической диссоциации сероводорода. Молодой ученый, (2), 49-52.*
9. *Давронов, Ф. Ф. У., & Хужжиев, М. Я. (2018). Изучение процесса очистки газов физической абсорбцией. Вопросы науки и образования, (3 (15)).*
10. *Хужжиев, М. Я. (2018). Изучение методов конверсии метана в синтез-газ. Научный аспект, 7(4), 852-854.*
11. *Усанбоев, Ш. Х. У., & Хужжиев, М. Я. (2017). Основные свойства катализаторов гидроочистки. Вопросы науки и образования, (5 (6)).*
12. *Кобилов, А. Б. У., & Хужжиев, М. Я. (2017). Механизм поглощения H2S, CO2 и других сернистых компонентов водными растворами аминов. Вопросы науки и образования, (11 (12)).*
13. *Бурхонов, И. У., & Хужжиев, М. Я. (2017). Сравнительный анализ эффективности работы аппаратов воздушного и водяного охлаждения нефтеперерабатывающих заводов.Вопросы науки и образования, (2 (3)).*
14. *Ризаев, Д. Б., & Хужжиев, М. Я. (2017). Очистка газовых выбросов. Вопросы науки и образования, (5 (6)).*
15. *Хужжиев, М. Я. (2016). Очистка и осушка газов растворами гликолей. Наука и образование сегодня, (3), 33-34.*
16. *Хужжиев, М. Я. (2016). Изучение процесса риформинга и подготовки нефтепродукта. Наука и образование сегодня, (3 (4)).*
17. *Хужжиев, М. Я., & Хайдаров, Г. А. У. (2016). Изучение характеристики физических поглотителей для очистки газов.Наука и образование сегодня, (3 (4)).*
18. *Хужжиев, М. Я., & Нуралиев, С. С. У. (2016). Очистка газов водными растворами метилдиэтаноламина. Наука и образование сегодня, (3 (4)).*
19. *Хужжиев, М. Я. (2016). Материалы и реагенты для приготовления промывочных растворов в нефтехимической отрасли. Наука и образование сегодня, (3 (4)).*
20. *Сафаров, Б. Ж., Хожиев, А. Х., Хужжиев, М. Я., Ташпулатов, С. К., & Равшанов, М. М. (2016). Выбор режима разделения газожидкостных систем. Наука и образование сегодня, (3 (4)).*

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21. *Хужжиев, М. Я., & Нуруллаева, З. В. (2015). Полимеризация газообразных углеводородов в жидкое топливо. Молодой ученый, (8), 332-334.*
22. *Nikolayevich, Tsukanov Maksim, and Khodzhiev Mamurzhon Yangiboevich. "ANALYSIS OF DEVELOPMENT OF TECHNOLOGY OF PRODUCTION OF SECONDARY PRODUCTS FROM PYROLYSIS DISTILLATE." EPRA International Journal of Multidisciplinary Research (IJMR): 246.*