ANNOTATION

for dissertation work on a subject: «Justification of process of increasing the efficiency of preparation of production fluid at oil production»
for the PhD degree in the specialty 6D070800 – «Oil and Gas Business»,
Baibotayeva Saltanat Elikbayevna.

Relevance of the subject. The volume of oil production in Kazakhstan is constantly increasing, and this requires solving the problem of finding available raw materials for the use of effective and cheap demulsifiers in the collection and preparation of oil in field conditions. Today in the republic there is a great prospect for the improvement of the technology of using available and relatively inexpensive demulsifiers which are effectively destroying oil-water emulsions. It should be noted that when there are many imported and domestic demulsifiers, the process of preparing commercial oil proceeds with relatively large losses, which is due to the high degree of watering, the depth of the oil produced, and various strength properties of oil emulsions. One of the current problems of the development of oil fields is to increase the efficiency of oil field preparation of hydrocarbons. The solution of this problem can significantly increase the degree of oil preparation, reduce the loss of hydrocarbons with drainage water, and thereby improve the ecology of the environment and bring additional profits to the enterprise.

The demulsifiers provide irreversible destruction of the protective layers on the surface of droplets of the emulsified water. The use of produced crude oil is possible on condition that the emulsified water is removed from it, since the presence of salts in the formation water increases equipment corrosion, neutralizes catalysts of petrochemical processes and increases the ash content of the final products of oil refining.

In this work the arisen problem are solved in its entirety by incorporating the waste of oil and fat productions – tar of vacuum distillation of fatty acids, a reagent demulsifier, that has the most effective properties for routine preprocessing of well products from the Kumkol fields. Increasing the efficiency of production and quality of finished products at the economical and rational use of raw materials, fuel and energy and other material resources is the most important and priority direction for the development of any production, which ultimately determines the relevance of this work. Therefore, the use of new highly efficient demulsifiers for the preparation of commercial oil, especially on the basis of secondary resources of local industry, is very important.

The purpose of the work is the use of a modern composite demulsifier based on fatty acid of gossypol pitch for routine preprocessing of high-paraffinic oils from the fields of the South Turgai Trough.

In the framework of this study, the following tasks were set and solved:

- To generalize modern ideas about the mechanism of action and the composition of the demulsifiers for the preparation of high paraffin oils;
- To identify interrelation between structure of compositions on the basis of fatty acids of gossypol pitch and their surface-active properties and also structural and mechanical durability of interphase layers oil-water;
- To define demulsifying ability of the reagent «Gossilvan» by oil preparation;
- To develop mathematical model of destruction of a water oil emulsion by means of composition on the basis of fatty acids of gossypol pitch;
- To define technical and economic indicators of the use of the reagent «Gossilvan» by oil preparation, in comparison with foreign demulsifier

The research methods applied to the solution of tasks. The solution of the tasks was carried out by conducting theoretical, experimental and numerical studies, the analysis of results by means of the software.

Methodology of the work. The methodology is based on a scientific and historical approach to the analysis of the processes of preparation and transportation of high paraffin oils. Empirical and theoretical levels of research are used in the work. For this purpose, a research program was developed, observations and experiments were organized, a description and synthesis of experimental data, their classification, primary and subsequent generalization were carried out. The experimental base of research of this work includes physical, physico-chemical, chemical research methods designed to evaluate the properties of the raw feedstock of the received products.

The object of the study are fatty acids of gossypol pitch, demulsifiers based on them.

The subject of research was the interrelation between structure of a composite demulsifier and its properties.

The scientific novelty of the thesis lies in the fact that for the first time the influence of the proposed composition of the demulsifier «Gossilvan» of complex action in the process of preparing well products in the oil field was studied. Also ways of increase in efficiency of demulsification of the offered demulsifier in the course of oil preparation are proved; In the first it was investigated optimization of the developed composition of the reagent-demulsifier «Gossilvan» in the course of preparation of oil on the oil field;

The practical value of the work

- the demulsifier «Gossilvan» was developed and applied for the destruction of oil-water emulsions in the preparation of oil in the oil field;
- the reagent obtained on the basis of the by-products of cotton oil processing can be used in routine preprocessing of paraffin oils.
- the proposed reagent - demulsifier with demulsification (demulsification) in the routine preprocessing of oil allows to reduce the total water content, including emulsion, to 0.8-1.0%.

The main provisions for the defense.

1. The composition of the demulsifier and the mechanism of destruction of oil-water emulsions in the preparation of high paraffin oils;
2. The interrelation between structure of compositions on the basis of fatty acids of gossypol pitch and their surface-active properties and also structural and mechanical durability of interphase layers oil-water;
3. Determination of the demulsifying ability of the reagent «Gossilvan» in the preparation of oil;
4. Development of mathematical model of destruction of a water oil emulsion by means of composition on the basis of fatty acids of gossypol pitch;
5. Technical and economic indicators of the use of reagent «Gossilvan» in the preparation of oil, in comparison with foreign demulsifiers.

The personal contribution of the author consists in statements of the purpose and theoretical justification and experimental solutions of posed task when developing effective methods for the preparation of well products. The author participated in the project №199 commissioned by the Committee on the Control of Education and the Ministry of Education and Science of the Republic of Kazakhstan, dated «03» .03.2017. on the theme: «Development of technologies for receiving new effective materials for the oil and gas industry from the waste of fat-and-oil industry».

Approbation of work.

Scientific and technological provisions of dissertation work were reported and discussed at: International scientific and practical conference Dedicated to the 50-th anniversary of the Department «Technology and technique of well drilling» (Almaty. 2016), at the III International conference "Industrial Technologies and Engineering" ICITE-2016, M. Auezov South Kazakhstan State University (Shymkent, 2016)., 13th International scientific school of young scientists and specialists, «Problems of Subsoil Development in the XXI century through the eyes of young people», (Moscow, 2016). International scientific and practical conference «Auezov Readings - 15: The third modernization of Kazakhstan - new end ptsii and modern solutions», dedicated to the 120-th anniversary of Mukhtar Auezov Omarkhanovich. (Shymkent 2017)., International scientific and practical

congress «Pedagogy and psychology of the XXI century: Theory, methodology and practice» dedicated to the 25-th anniversary of Independence of the Republic of Kazakhstan (Shymkent 2016). International scientific and practical conference «Modern achievements of production, education and science: problems and prospects» (Shymkent 2017), XII international scientific-practical conference «SCIENTIFIC POTENTIAL FOR LIGHT – 2016» 17-25 septemari, (Sofia, Bulgaria, 2016).

Publications. According to the results of the research, 14 works were published, including one article in the journal included in the SCOPUS database, four articles in publications recommended by the Committee on Education Control and the MES RK, eight reports at international conferences and forums, one article in foreign publications.

As a result of the research, a technology has been developed to apply a new composite demulsifier in the preparation of high-paraffinic oils in the oil field. Industrial tests of their properties have been carried out, which have shown high efficiency for dehydration high- paraffinic oils from the fields of the South Turgai downwarping.

The degree of implementation of the developed and used methods and technologies. Conducted industrial tests for assessment comparative efficiency of demulsifier "Gossilvan", with imported reagents used in the oil fields.

The scope and structure of the work

The dissertation work is presented on 105 pages of typewritten text, includes an introduction, five sections and a conclusion, 24 figures, 12 tables and a list of references from 122 name titles.

In the first chapter of the thesis, a literary review and analysis of the research work on the preparation of oil in the oil field was conducted. According to the literature review and analysis of the research works of authors from other countries of the world, it can be concluded that at the moment there is a problem with the use of domestic, efficient and cheap demulsifiers in the preparation of oil in the oil industry.

The second and third chapters is devoted to experimental research and the rationale for processing the results. A new composition of the developed demulsifier was proposed, the surface-active properties of the reagent were studied, the use and evaluation of the effectiveness of the proposed demulsifier in the destruction of water-oil emulsions. A complex of experimental studies showed that the proposed reagent makes it possible to reduce the cost of preparing oil.

The fourth chapter shows a mathematical model of the process of destruction of oil-water emulsions based on experimental data.

In the fifth chapter, the economic efficiency of the proposed demulsifier «Gossylvan» was calculated.

In conclusion, the main results and conclusions on the dissertation work are presented.