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PHYTOSANITARY CONDITION AND YIELD OF OILSEED FLAX (LINUM USITATISSIMUM L.) WITH DIFFERENT CULTIVATION TECHNOLOGIES IN THE ARID ZONE OF NORTHERN KAZAKHSTAN

Abstract

The article presents the results of research conducted in 2023 and 2024 on the development and spread of pests, diseases and weeds in the cultivation of oilseed flax using traditional, minimal and zero technology in the conditions of the southern carbonate chernozem of Northern Kazakhstan. When preparing seeds for sowing, the innovative biopreparation Seedspor S was investigated in comparison with the chemical mordant Pilgrim, K.S. and the effectiveness of drugs on seed quality indicators, field germination, on the development and spread of root rot was revealed. During the years of the study, on average, high field germination of seeds was in the variants with the use of a biological preparation, where the excess was 2.8–3.8% of the use of a chemical preparation and 10.5–11.3% of the control variant. However, its effectiveness against root rot was inferior to the chemical variants of the experiment. The use of a set of protective measures in the cultivation of oilseed flax against the background of various technologies ensured a decrease in the level of development and spread of seed infection, soil phytopathogens, diseases, pests, annual and perennial cereals and dicotyledonous weeds during the growing season, which allowed to obtain additional yields by 19.4–25.4% compared with the control variant. Among the studied variants, the highest yield was obtained against the background of the use of minimal technology and averaged 12.5-12.6 c/ha over 2 years.

Key words: flax, flax diseases, seed protectants, weeds, pests, flax yield

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GEOINFORMATION SUPPORT AND ENGINEERING-GEODETIC RESEARCH OF LAND RESOURCES

Abstract

This article shows the processes of conducting engineering and geodetic surveys and providing geoinformation management when using land resources. The main goal of the article is the organization of geoinformation management for carrying out engineering and geodetic research in the work on the use and placement of land resources. The use of geoinformation in land use laws and

guidelines on methods for conducting engineering and geodetic research in the use of land resources. Due to the complexity of the upcoming tasks, settlement lands are divided into many types and varieties. Its forms and content may vary depending on natural and economic conditions, the characteristics of the territory being developed, and require geodetic survey. The purpose of geodetic observations is to obtain quantitative data characterizing the absolute values of deformations in order to implement measures to prevent possible destruction of the object under study. In addition, the development of modern society cannot be achieved without the use of geographic information technologies, since in order to make decisions in any field of activity, a person needs information about the state of the environment, trends in the market for goods and services, environmental conditions. In this regard, a number of important information is aimed at improving the processes of information exchange between individuals and legal entities through the creation of Internet networks; the implementation of these processes should be based on technologies based on geographic information systems.

Key words: *Land resources, research, geographic information systems, Internet, geodesy, engineering process.*

Introduction

Land is a priceless and irreplaceable wealth of society. This is the main natural resource, the material condition for the life and activity of people, the basis for the location and development of all sectors of the national economy, the main means of production in agriculture. and main source of food. Therefore, organizing the rational use and protection of land is the most important condition for the growth of life and well-being of people.

It is necessary to create special measuring systems that include a complex of geodetic control as part of land resources. Analysis of spatial stability parameters makes it possible to solve problems of monitoring the state of operation of structures. Geodetic observations are the acquisition of quantitative data characterizing the absolute values of deformations to prevent possible destruction of the object under study. Geodetic surveys are divided into systematic, urgent and special. Systematic control is carried out according to a pre-established calendar plan. If a sharp change in the normal direction of deformation is observed, then urgent observations are carried out. Special controls are used to determine the causes of deformation [1 - 5].

Another important aspect is determining the required accuracy of geodetic measurements. This accuracy is expressed in regulatory documents as the mean square error. For example, errors should not exceed the following values: 1 mm for buildings and structures built of stone and semi-stone, as well as for buildings with a long service life; 2 mm – for buildings on sandy, clayey and compressible soils; 5 mm – for stone, sediment and other solid structures [1; 6].

Methods and materials

Failure of an existing engineering facility (building or structure) can lead to dangerous emergency consequences. For this reason, early detection of hazards is very important and requires a reliable methodology for systematic, structured and mobile deformation monitoring. Engineering facilities in the cultivated areas of oil and gas complexes; oil and gas pipelines; include oil refineries, gas processing plants, and oil and gas storage facilities. The stability of all these objects must be constantly monitored.

Buildings and structures are subject to deformation under the influence of various natural and man-made factors, both on the foundation and on the structure itself. This, in turn, can have a significant impact on the safety, performance and durability of engineering structures and facilities in the fields. The geometric parameters of a structure have a significant impact on the magnitude of its deformation, especially from the action of external forces. For example, a tall building is subject to much greater wind loads than a low-rise building [7 - 11].

The main natural factors influencing the deformation of buildings and structures include, first of all, the physical and mechanical properties and geology of the rocks that form the basis of the object. The occurrence of deformations under the influence of geological factors depends on the geological structure of the engineering object. For example, the presence of cracks, defects or

distortions in rocks can lead to uneven distribution of loads on engineering structures. In addition, changes in the geological structure of the field due to oil and gas production can cause displacement and deformation of the soil layer on which the structures are built.

In order to increase the validity and efficiency of land management, all activities related to the redistribution, transfer and acquisition of land, the creation of new agricultural enterprises and the reorganization of existing ones, the organization of rational use and protection of land, are carried out on the basis of land resettlement projects [1; 12 - 15].

Due to the complexity of the tasks facing it, settlement lands are divided into many types and varieties. Its forms and content may vary depending on natural and economic conditions, and the characteristics of the territory being developed. Accordingly, the composition and content of land development projects are different, as well as the methodology for their preparation and justification.

Land settlement activities are carried out in a certain order and sequence. There is a procedure established by law, which includes preparatory work, creation, review and approval of the project, execution and issuance of documents, project control. The main place here is the creation of a land resettlement project. This is the most labor-intensive, complex and responsible work, because the calculations divide the territory of the organization for many years.

It is aimed at a planned economy of land management, an administrative-command management system and a centralized distribution of resources. The role of land allotment was reduced mainly to the intersectoral redistribution of land and its plots in order to fulfill the agricultural production plan (state order), as well as the organizational, economic and organizational territorial structure of agricultural enterprises. Due to the monopoly of state ownership of land, the interests of immediate people, the productive and territorial properties of the land were poorly taken into account by land producers, which led to overproduction, depletion of soil fertility, unjustified waste and neglect approved land development projects.

This changed with the decline in the role of the state, the emergence of competition and the massive transfer of land in a transitional economy. The goal here is the maximum satisfaction of the economic interests of landowners and land users, the fullest and most efficient use of the production potential of farms and the lands assigned to them, while observing strict environmental requirements and special land use regimes. They are established by the state. It was necessary to take into account not only economic, but primarily environmental conditions, which significantly change the methodology and sequence of land settlement design [1; 12; 16].

In this article, for the first time, land management issues are considered in a unified system, including the organization and conduct of pre-design work, methods for creating and justifying land management projects, working projects related to the use and protection of land, regional features. and special issues in land use design. At the same time, the continuity of theory, methodology and terminology is maintained, traditional and modern design methods are comprehensively shown.

The development of modern society is impossible without the use of information technology, since in order to make decisions in any field of activity, a person needs information about the state of the environment, trends in the market for goods and services, the state of the environment. In this regard, Kazakhstan has adopted a number of important documents aimed at improving the processes of information exchange between individuals and legal entities through the creation of Internet and Intranet networks. The implementation of these processes should be based on technologies based on geographic information systems.

Geoinformation systems are typically used in institutions that process spatially organized data and are a special case of information systems. Interest in this area of knowledge is constantly growing. In addition, on the pages of many magazines, experts note insufficient attention to information education in Kazakhstan, as well as a lack of scientific and methodological literature in this area. Foreign experts are skeptical about Kazakh information systems. In this regard, it is necessary to stimulate the development of domestic information technologies to enter the world market. Therefore, it is necessary to strengthen the professional knowledge of future specialists. This applies, in particular, to the teaching of academic subjects in higher educational institutions, the basis of which is geographic information technology [1; 15; 17].

Society faces a difficult task: on the one hand, to organize land use, stop the processes of soil erosion, restore and improve them, and on the other hand, to achieve increased production efficiency through rational use. land and land use organization. It can only be solved through land management, the main goal of which is to organize the rational use and protection of land, create a suitable ecological environment, improve natural landscapes and implement land legislation.

The disposal of land in any society is of a state nature. This is the most important lever of the state in the implementation of land policy, land use management and regulation of land relations. Through land allocation, land is divided between industries (industry, transport, agriculture, forestry and urban management, energy, etc.), land plots are provided to citizens, enterprises, organizations, institutions and their withdrawal is carried out, land plots are given to landowners, and land is divided between users.

To correctly determine the location of a development project in the land management system, the following conditions should be taken into account:

First of all, settling lands in the original sense of the word means putting lands in order. The best structuring of land is possible only when all decisions are thought out, comprehensively justified, follow from a specific program of action and take into account specific natural and economic conditions. The organization of land as a natural body, the main means of production in agriculture and an object of socio-economic relations involves solving many problems in the field of soil science, biology, agronomy, technology, economics and organization of production, land reclamation, road construction, planning and construction. Taking into account all the necessary conditions and requirements, it is possible to collect the relevant knowledge, consolidate it and use it in land management only in a whole project that implements the specific plan of the designer. Consequently, the land development project is the main and integral part (attribute) of land development, without which it is impossible to organize the rational use and protection of land.

Secondly, in accordance with the “Basic Rules of Land Management”, the following tasks are solved during its implementation [4; 12; 18]:

- formation of a rational system of land tenure and land use and its improvement;
- creation of equal conditions for the development of all forms of ownership, land use, lease and land management in places of the same quality and location;
- development of recommendations for establishing the regime and conditions for the use of land plots in ownership, use and lease;
- preparation of information on the quantity, quality and location of land to compensate for losses and damage to agricultural and forestry production to owners and land users of land plots during the withdrawal of land tax and land rent;
- determine and ensure the indisputability of the local designation of territories with a special legal regime, territories with special ecological, recreational and protective regimes of administrative-territorial units and territories at the place of residence and economic activity of small peoples and uluses;
- characteristics of cities, urban settlements and rural settlements; justification of priority directions and prospects for the development of land reclamation, environmental protection of lands and the formation of an appropriate investment policy;
- creation of spatial conditions that ensure the rational operation of agricultural production, the introduction of progressive forms of labor organization, improvement of the composition and placement of lands, fields, crop rotations, meadow and pasture crop rotations;
- development of a system of measures to preserve and improve natural landscapes, restore and increase soil fertility, restore damaged lands and develop unproductive lands, protect lands from erosion, floods, flooding, drying out, secondary salinization and waterlogging, compaction and pollution by industrial waste and chemicals, desertification , preservation of disturbed areas and prevention of other unfavorable processes.

Experience shows that these problems can only be solved on the basis of resettlement projects or using the data available in them. For example, to form a rational system of land tenure and land use, it is necessary to reorganize the territory, form and organize new land masses for enterprises, and

eliminate shortcomings in land use. This is achieved through the creation of inter-farm farming projects.

Thirdly, the maintenance of land allotment in Kazakhstan is currently regulated by the current land legislation and is aimed at solving the above problems. Measures for the alienation of land in accordance with the Land Code of the Republic of Kazakhstan include [7; 12; 18]:

- development of forecasts, republican and regional programs, schemes for the use and protection of land resources and land allocation schemes;
- establishing the boundaries of the administrative-territorial structure on the ground;
- eliminating inconveniences when locating land plots, creating new land ownership and land use projects and streamlining existing ones, transferring land plots in kind, preparing documents certifying ownership of land plots and land use rights;
- development of on-farm land management projects and other projects related to the use and protection of land; development of work projects for the reclamation of damaged lands, protection of soils from erosion, floods, landslides, flooding and salinization, improvement of agricultural lands, development of new lands;
- justification for the placement and delimitation of territories with special environmental, recreational and security regimes;
- defining and changing the boundaries of cities, villages and rural settlements;
- carrying out topographic-geodetic, cartographic, soil, agrochemical, geobotanical and other research work.

As can be seen from this list, most of the land management activities, in addition to planning and forecasting land use, develop various programs and schemes for the use and protection of land, as well as prospecting and prospecting work. work related to land use planning. In addition, a number of land management works are carried out in the form of land management drawings, special feasibility studies (feasibility studies) and calculations, other drawings and programs at the local level compiled by land management organizations, pre-project documentation, materials and are used in the preparation of land resettlement projects.

At the same time, the settlement itself, its goals, objectives and content have a negative impact on the settlement project. Since the acquisition of land is not only a state event, but also has an objective nature, its content does not remain unchanged; Over time, new goals and objectives will appear. Therefore, the composition and content of land development projects are also undergoing changes.

Land settlement is a complex socio-economic process; it is constantly evolving and cannot be a one-time event, so land development projects, especially farm projects, must be periodically updated (reconstructed or adjusted).

Finally, there is also the legal process of land development (the process of land settlement). This process always includes the following main steps [4; 12; 18]:

- initiation of land settlement proceedings;
- bots for preparation (preparatory work) for land management, creation of a project, presentation to land management participants);
- approval of the project and its implementation (updating the boundary markings on the authorized land, transferring the main design decisions to nature, etc.);
- generation and delivery of land allotment documents to land allotment participants.

Results and discussion

However, the role of land ownership does not end there. It should be considered as a system of activities, a process of implementing planned activities. Construction of roads for the transition from one type of territorial organization to another, planting of perennial plantings, forest belts, placement of crop rotations, fields, working areas, border regulation, etc. necessary, this is only possible on the basis of appropriate projects. Also obtaining information about the natural and economic conditions of land ownership and land use, conducting topographic-geodetic, soil, geobotanical and other studies and surveys, establishing a certain procedure for the reorganization of the territory, creating a project, review and approval, materialization, examination and control. From this point of view, land

management can be considered as a system of measures for the rational use and protection of land and the creation of sustainable landscapes [12; 18].

The development of modern society is almost impossible, for example, what product is produced, its cost, how to get to the point of sale, etc., without information about Therefore, the purpose of creating information systems is to concentrate information in specialized centers for effective use by large groups of the population (Figure 1) [5; 18]. These centers can be created on the basis of organizations of industry or federal significance. A striking example of such a center is the Federal Real Estate Cadastre Agency, which provides information about land plots and structures located on them to individuals and legal entities. (The word "information" comes from the Latin word informationatio – to report, to explain). In connection with the development of modern society, a large number of products are produced, their cost, place of sale, infrastructure of places of sale, etc. Therefore, in Figure 1, the creation of information systems in this area represents an effective network of concentration of special information centers.

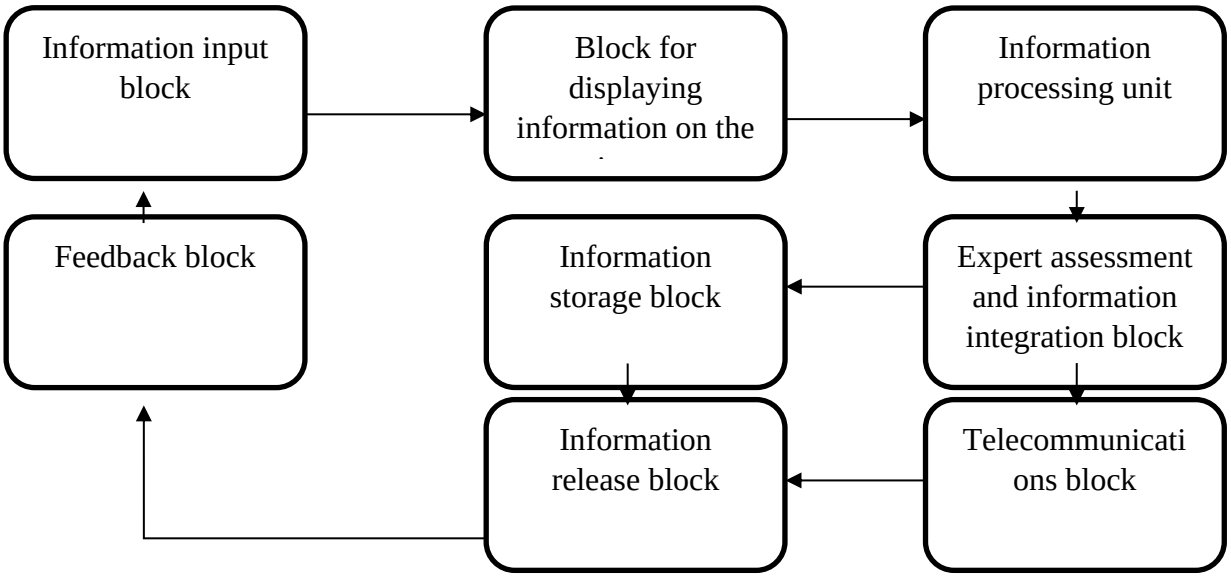

Figure 1. Information system blocks

The term "system" comes from the Greek system and is interpreted as "a whole consisting of individual parts." Thus, the system is a collection of heterogeneous elements that represent the object as a single whole. In computer science, the concept of "system" has many meanings. It is often used to refer to a set of technical tools and programs. In particular, an information system (IS) consists of a set of independent but interrelated elements. The modern understanding of an information system involves the use of a personal computer as the main technical means of information processing. Computers together with software are the technical basis and means of creating information systems. Thus, an information system is an interconnected set of hardware, software and methods that operators use to store, process and provide information to customers. An information system is impossible without a person (operator). Such systems are called ergatic. The operation of an information system for any purpose is ensured by blocks, the content of which can be presented in the form of a diagram [5; 12; 18].

Supplementing the information system with information from various devices (keyboards, information drives, etc.) is provided by an information input unit: The display block includes various forms of presenting information for later viewing and exploration. The information processing unit is one of the centers and is designed to solve problems of its transformation. It is formed on the basis of powerful computer equipment and software and requires highly qualified service personnel. The expert assessment and information integration unit analyzes the received data, evaluates it, transforms it, and integrates it with other types of data. The information storage unit supports relational database servers, which store information about spatial objects of the area, including information

about their location, shape and properties. Spatial objects are understood as objects or phenomena that are uniquely defined in space and characterized by a set of attributes. The telecommunications block is formed through the development of Internet and Intranet networks and ensures the exchange of information. The output unit includes monitors, plotters, printers, etc. b. requires special devices such as. The feedback block is designed to correct the results obtained at the output of the information system. The introduction of information systems helps to obtain the most suitable options for solving problems using automated methods, intelligent and expert systems. They also reduce the amount of daily work for operators by automating the processes of generating reliable information in case of its repeated use [5; 18].

Conclusion

Failure of an existing engineering facility (building or structure) can lead to dangerous emergency consequences. For this reason, early detection of hazards is very important and requires a reliable methodology for systematic, structured and mobile deformation monitoring. For example, oil and gas wells are engineering objects in the cultivated areas of oil and gas complexes; oil and gas pipelines; include oil refineries and gas processing plants, as well as oil and gas storage facilities. The stability of all these objects must be constantly monitored.

Buildings and structures are subject to deformation under the influence of various natural and man-made factors, both on the foundation and on the structure itself. This, in turn, can have a significant impact on the safety, performance and durability of engineering structures and facilities in oil and gas fields. The geometric parameters of a structure have a significant impact on the magnitude of its deformation, especially from the action of external forces. For example, a tall building is subject to much greater wind loads than a low-rise building.

The main natural factors influencing the deformation of buildings and structures include, first of all, the physical and mechanical properties and geology of the rocks that form the basis of the object.

The occurrence of deformations under the influence of geological factors depends on the geological structure of the engineering object. For example, the presence of cracks, defects or distortions in rocks can lead to uneven distribution of loads on engineering structures. In addition, changes in the geological structure of the field due to oil and gas production can cause displacement and deformation of the soil layer on which the structures are built.

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ЖЕР РЕСУРСТАРЫН ИНЖЕНЕРЛІК-ГЕОДЕТИЯЛЫҚ ЗЕРТТЕУ ЖӘНЕ ГЕОАҚПАРАТТЫҚ БАСҚАРУ

Аңдатпа

Бұл мақалада жер ресурстарын пайдалану барысында инженерлі-геодезиялық зерттеулер жүргізіп, оны геоинформациялық басқаруды қамтамасыз ету процесстері көрсетілген. Мақаланың негізгі мақсаты жер ресурстарын пайдалану мен орналастыру кезіндегі жүргізілетін жұмыстарда инженерлік және геодезиялық зерттеулер жүргізу үшін геоинформациялық басқаруды ұйымдастыру. Жер ресурстарын пайдалану барысында инженерлі-геодезиялық зерттеулер жүргізу әдістемесінде жерді пайдалану заңдылықтары мен нұсқауларында геоақпараттық қолданысты пайдалану. Алдыда тұрған міндеттердің күрделілігіне байланысты жерге орналастыру көптеген түрлерге және сорттарға бөлінеді. Оның нысандары мен мазмұны табиғи-экономикалық жағдайларға, игеріліп жатқан аумақтың ерекшеліктеріне байланысты әртүрлі болуы мүмкін және оларға геодезиялық бақылаулар жүргізу қажет. Геодезиялық бақылаулардың мақсаты - зерттеліп отырған объектінің ықтимал қираудан алдын алу жөніндегі іс-шараларды жүзеге асыру үшін деформациялардың абсолютті шамаларын сипаттайтын сандық деректерді алу. Сонымен қатар, қазіргі қоғамның дамуы геоақпараттық технологияларды қолданбай жасау мүмкін емес, өйткені кез-келген қызмет саласында шешім қабылдау үшін адамға қоршаған ортаның жай-күйі, тауарлар мен қызметтер нарығындағы тенденциялар, экологиялық жағдай және т. б. туралы өзекті білім қажет. Осыған байланысты Internet және Intranet желілерін құру арқылы жеке және заңды тұлғалар арасында ақпарат алмасу процестерін жетілдіруге бағытталған бірқатар маңызды ақпараттар бұл процестерді іске асыру геоақпараттық жүйелерге негізделген технологияларға негізделуі керек.

Кілт сөздер: Жер ресурстары, зерттеулер, геоақпараттық жүйелер, интернет, геодезия, инженерлік процесс.

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ГЕОИНФОРМАЦИОННОЕ ОБЕСПЕЧЕНИЕ И ИНЖЕНЕРНО-ГЕОДЕЗИЧЕСКИЕ ИССЛЕДОВАНИЯ ЗЕМЕЛЬНЫХ РЕСУРСОВ

Аннотация

В данной статье показаны процессы проведения инженерно-геодезических изысканий и обеспечения геоинформационного управления при использовании земельных ресурсов. Основная цель статьи является организация геоинформационного управления для проведения инженерно-геодезических исследований в работах при использовании и размещении земельных ресурсов. Использование геоинформации в законах о землепользовании и методических указаниях по методике проведения инженерно-геодезических исследований при использовании земельных ресурсов. В связи со сложностью предстоящих задач земли расселения делятся на множество типов и разновидностей. Ее формы и содержание могут быть различными в зависимости от природных и экономических условий, особенностей осваиваемой территории и требуют геодезического обследования. Целью геодезических наблюдений является получение количественных данных, характеризующих абсолютные значения деформаций, для осуществления мероприятий по предотвращению возможного

разрушения исследуемого объекта. Кроме того, развитие современного общества невозможно осуществить без использования геоинформационных технологий, поскольку для принятия решений в любой сфере деятельности человеку необходима информация о состоянии окружающей среды, тенденциях на рынке товаров и услуг, экологические условия и т.д. В связи с этим ряд важных сведений направлен на совершенствование процессов обмена информацией между физическими и юридическими лицами посредством создания сетей Интернет, реализация этих процессов должна базироваться на технологиях на базе геоинформационных систем.

Ключевые слова: Земельные ресурсы, исследования, геоинформационные системы, интернет, геодезия, инженерный процесс.

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СРАВНИТЕЛЬНЫЙ АНАЛИЗ БИОХИМИЧЕСКИХ ЭЛЕМЕНТОВ В СВЕЖИХ ЛИСТЬЯХ КАПУСТЫ КАЛЕ ПРИ ВЫРАЩИВАНИИ НА РАЗЛИЧНЫХ ТИПАХ ГИДРОПОНИКИ

Аннотация

Во многих странах капуста кале быстро завоевывает популярность, так как кроме ее полезных свойств она еще и холодостойкая культура. Содержание витаминов в ней в несколько раз превышает суточную норму. Это объясняет такие мощные антиоксидантные свойства данного листового овоща. В состав капусты кале так же входит множество минералов, она наиболее богата она кальцием, магнием, фосфором, марганцем, медью и железом. Она обладает уникальным биохимическим составом с большим количеством витаминов, флаваноидов, каротиноидов и минеральных элементов и поэтому является очень полезной овощной культурой. Одна порция капусты кале обеспечивает более 100% рекомендуемой суточной нормы потребления витамина А и более 40% витамина С. Эффективным методом, позволяющим определять витамины и флаваноиды в растительных пробах является высокоэффективная жидкостная хроматография - универсальный аналитический метод разделения и анализа сложных смесей. В настоящее время заметно возрос интерес к содержанию кверцетина и других флавоноидов в различных объектах, что связано с их высокой антиоксидантной, антимутагенной и антиканцерогенной активностью, а также рядом других полезных свойств, которыми обладают эти соединения.

Исследования позволили выявить наиболее адаптированные к каждой из технологий гибриды по накоплению в листьях капусты кале кварцетина, витамина А, витамина С, сухих веществ и питательных элементов при выращивании на различных типах гидропоники. По результатам исследований гибрид Dwart green curlet F_1 рекомендован на аквапонике, а гибриды Scarlet F_1 и Nero di Toskana F_1 - на NFT технологии.

Ключевые слова: *интродукция, капуста кале, квертецин, витамины, гидропоника, хроматография.*