Installed factors affecting quality of biodiesel and defined specific features of its treatment. Provides indicators of quality of biodiesel according to DSTU 6081: 2009.

Biodiesel, methyl ether, glycerol, catalyst, moisture, drying.

631,171 UDC: 519.87

MODEL OF TECHNOLOGY-compensating prognostic VARIABLES application rate Process inputs

OO Brovarets, Ph.D.

The article presents the implementation model prognostic variables-compensation technology standards making process material using information technology systems for monitoring the status of agricultural land, which allows for

revised data on soil derived from the monitoring system to assess the state of agricultural land and adopt strategy of Agrobiological potential field.

***Monitor, model, variable rates of application, prognostic-compensation technology**.*

Problem. Currently, special importance is the question of modern crop production technologies that can improve the competitiveness of agricultural production, which will ensure food security, integration of the global agricultural production, creation of scientific and technological groundwork for a wide range of innovations in various sectors of agriculture.

Analysis of recent research. Integrated automatic control of technological processes [1-10] are the most promising and should ensure the creation of technology with its new economic, social and environmental performance. Important takes the level of integration of information technology systems used in agricultural production, which makes it possible to significantly improve the quality issue resolution process control agricultural production, which is expected intensive development of new technologies in this field.

To solve the problem, ensure quality execution of manufacturing operations in crop-designed prognostic variable compensation

technology standards making process material based on monitoring data farmland.

The purpose of research - Ensure the quality of the technological operations in crop production by developing implementation models prognostic variable-compensation technology standards making process material using information technology systems for monitoring the status of agricultural land.

Results. Scientific concept prognosis - variable compensation technology standards making process material is obtained information on the status of agricultural land (soil conditions and vegetation) on which the use of specially developed mathematical algorithms are processed for the decision to implement the technology of nature in agricultural production. Prognostically-compensation technology standards making process variable material includes the following activities: monitoring of factors that affect the condition of the soil environment; assessment of actual and forecast the future state of the soil environment.

Thus, the required efficiency of crop production core processes in plant (Fig. 1) is provided by the integrated logistics information system and monitoring of agricultural land, which makes it possible to ensure proper quality of manufacturing operations in crop through operational process control in crop. To implement this technology the model implementation prognostic variable-compensation technology standards making process material (Fig. 2). This technology specific to the state of the soil environment makes it possible to select the strategy of Agrobiological as farmland aimed at: the production of organic crop production and reduced specific energy costs, maximize profits, to maximize productivity, etc. (Fig. 2). Obviously, for the proper performance of the quality management process operations necessary condition is the organization of the monitoring system. To assess the environmental objective important operational information on critical factors of human actions on the actual state of the biosphere and forecasts its future state.

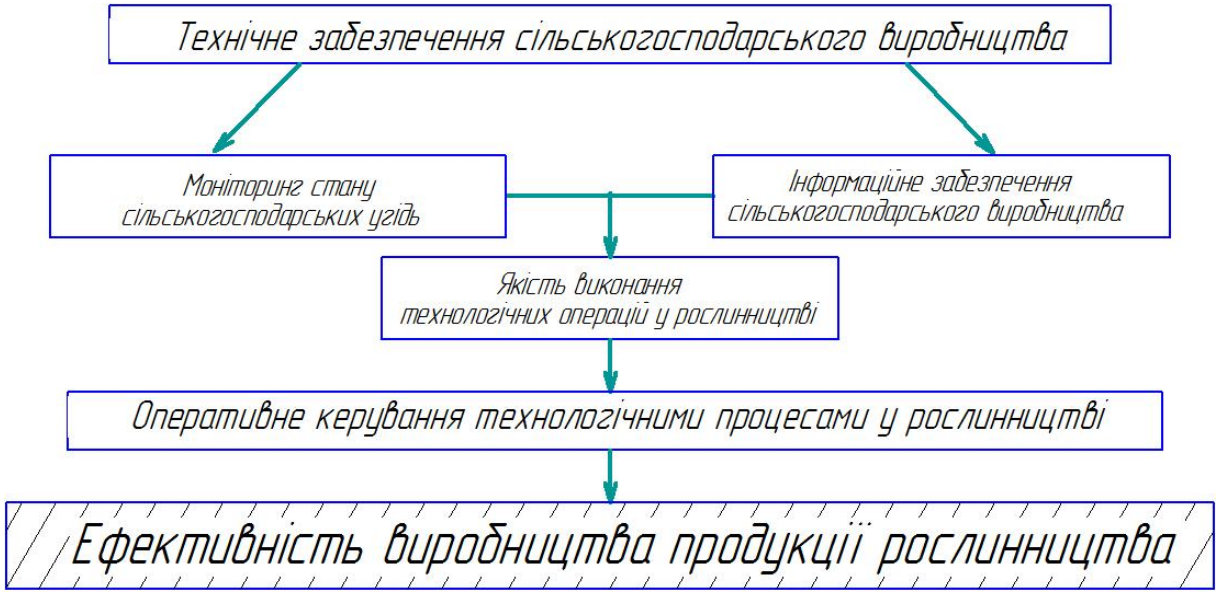

Fig. 1. The impact on the efficiency of crop production by making quality implementation of technological operations.

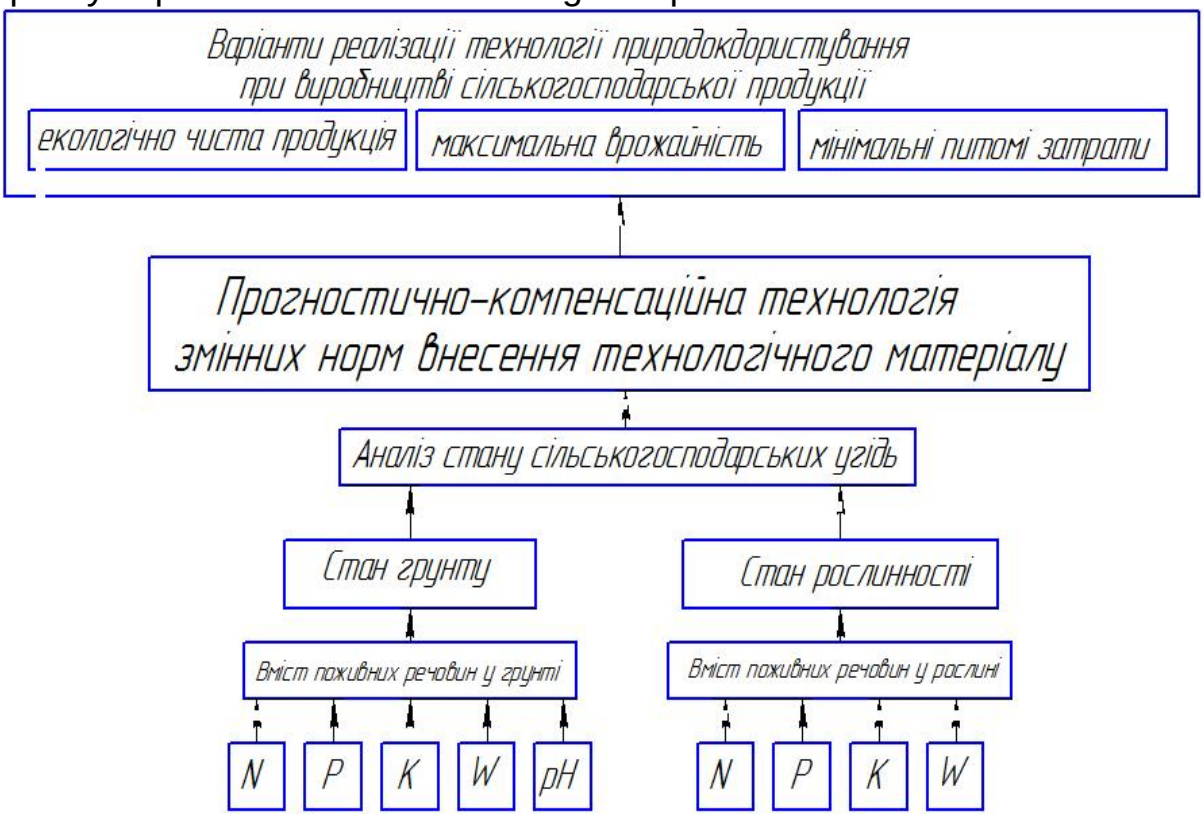

Fig. 2. Model prognostic implementation - variable compensation technology standards making process material using information technology to ensure monitoring of the state of agricultural land.

Effective regulation of the soil environment, becoming a significant role in the first place, effective methods for environmental monitoring - monitoring system, evaluation and prediction of the natural environment. There is a problem of special systems of supervision, monitoring and

evaluation of the natural environment (monitoring) as in the areas of human action, and globally.

This indicates how important it is, on the one hand, to have effective tools to determine the level Agrobiological condition of the soil and, on the other hand, how difficult it is to find effective summary indicators and malovartisni methodology for assessing and recording condition of the soil. No information about the needs of plants in the batteries and their presence in the soil can not get consistently high yields. When using small doses of fertilizer (usually at sowing and fertilizing in operations), it is possible to use the existing agrochemical passports fields 5-7 years ago. But if you are working on a technology intensive (more 120 kg ai / ha), calculation rules fertilization balance conduct and regulatory methods, which are necessary reliable information on the current composition of soil agrochemical. Based on the review of the literature [1-10], which reflect current research and views on studying the problem, identified existing methods and techniques that determine the quality of the processes in modern technologies Plants and proved the feasibility of complexes of means operational status monitoring agricultural land for tsilenapralenoyi effects on soil media work of modern agricultural machinery, while ensuring appropriate quality of technological operations in the plant and to implement prognostic variable-compensation technology standards making process material using information technology systems for monitoring the status of agricultural land.

Traditionally, monitoring land reduced to the analysis of soil samples to determine the chemical composition and properties of soil under laboratory conditions [10]. Sampling for information on the level of soil fertility at each elementary portion of the field is the first, most difficult and time-consuming element. Bold elementary sections and order taking soil samples carried out by developed techniques. Plan a detour and fixing of sampling points is prepared using GPS / GLONASS receiver and software. The collected samples are numbered and appear in the chemical laboratory for analysis. The analysis results are entered into the software, which processes them and publishes a map of the distribution of matter in the field. This card is used to create a flow chart differentiated and making management decisions. Unsolved question of choosing the size and shape of the unit area for each field that depends on many factors. Reducing the area of the unit area increases the number of samples, the accuracy and quality of differential fertilizer and plant protection, but increases the cost of agrochemical field survey. For automated and accelerated the taking of samples and soil samples in the field of elementary areas created hruntoprobovidbyrachi, mounted at various power tools.

Chemical measurements behind closed doors lead to a significant delay between sampling and analysis. A limited number of samples that can be analyzed in any particular feature can lead to incompleteness chemical profile and gives only a partial understanding of the controlled process [8]. However, the final crop yields significantly influences their development during the growing season, which does not take into account the traditional monitoring systems which are based on analysis of soil [10].

Hruntoprobovidbyrachi to automate and speed up the process repeatedly sampling for further analysis and electronic maps of soil fertility. Benefits of using automatic hruntoprobovidbyrachiv shown in Fig. 1.

1. Comparison Chart transactions taking soil samples and fertilization in traditional and modern farming technology.

Number	Operation	Traditional agriculture	Modern agriculture
1.		20 ha	
2.			
3.			
4.		Determined surveyors stake, theodolite, location selection just is not fixed	Determine the Global Positioning System. Sampling fixed with precision 30 cm
5.	Drawing cartograms	Manually	Using the software
6.	Calculation of doses of fertilizers	For the average value for all fields manually	Differentiated for each section of the field, the program automatically
7.	Fertilization	On the established areas with excessive and inadequate nutrient content	Each piece of ground limed as needed, according Cartogram

Today it is necessary to have a large number of sensors to measure the numerical characteristics of the state of the primary means of crop production - soil. Interpretation of timely information about the state of the field variable nature enables effective use of strategies variable standards making process materials. However, information on the level of variability agrobiological parameters on the area of the field is the key to the decision to use or unreasonableness of precision farming technologies in general. That is why, for of such information malovartisni but seek effective methods and ways to register mistsevyznachenyh field data.

In this regard, there is an urgent need to develop research and technical systems monitor the state of agricultural land in modern technologies of crop, use of data, which enable to ensure quality in the performance of a given technological operation. One promising direction using indirect information about the condition of the soil with a reliable conversion algorithm such information objectively necessary data are indicators of soil electrical conductivity and magnetic properties. The modern alternative to traditional agrochemical survey - contact and non-contact methods based on electromagnetic phenomena. Often this measurement, registration, processing, analysis and interpretation of conductive and electromagnetic properties of the soil, making it possible to determine the particle size (mechanical) composition of soil, soil organic matter, salts, moisture, soil contours highlight and assess heterogeneity of soil properties in general.

Effective regulation of the soil environment, maintaining high quality of the biosphere and the ability of nature to play, a significant role acquire in the first place, effective methods for environmental monitoring - monitoring system, evaluation and prediction of the natural environment. Thus, prognostic variable-compensation technology standards making process material includes the following activities: monitoring of factors that affect the environment, and the state of the environment; assessment of the actual state of the soil environment; forecast the future state of the soil environment and assess the condition.

To implement prognostic variable-compensation technology standards making process of the material can be used locally or tape differentiated technology making process material (granular fertilizers, seeds) with use of special devices for individual work items about the machines and devices for monitoring parameters of variability of agricultural fields, based on Data obtained by measuring the nutrient content of the soil (registration conductive properties of the soil sensor electrodes) and measure the nutrient content of the plant (registration optical spectrometry vegetation - vegetation reflectance spectra of natural conditions at varying levels of light colored temperature) that allow for testing large arable fields for a short time during the implementation of technological operations - fertilization, sowing more.

Significant efficiency improvements crop can be achieved in the transition from a solid to a locally differentiated dosed soil or soil and plants. Thus, each process operation performed by operational information received or appropriate cartograms, which is developed on the basis of pre-diverse information. Under the proposed set of modern monitoring systems there is a need to use certain technological operations to ensure the quality of technological operations (Table. 2).

During harvesting or implementation of technological operations onboard microprocessor means combine that moves on a given route map information is removed from the field yield indicating the coordinates.

2. Modern monitoring technology in modern crop technologies.

Workflow	The latest technology	Monitoring systems
Fertilization	Locally-dosed making doryv	Technical systems for monitoring conductive properties of the soil, spectrometric monitoring
Hruntoobrobitok	Strip-till technology	Monitoring of soil depth, modes of working agricultural machinery, soil moisture sensor, the sensor density of the soil
Crop	Differentiated sowing crops	Technical systems for monitoring conductive properties of the soil, spectrometric monitoring
Adding chemicals	Locally-dosed making chemicals	Machine vision systems
Harvesting	Monitoring productivity	Bulk grain sensors, humidity sensor

This information is transferred to the computer, where a special program built cartogram with the release characteristics of certain areas of the field, develop recommendations for further cultivation and plants in this field as relevant thematic cartograms. Dosed cultivation of certain sections of the field is made complex machines with controlled quality performance manufacturing operations on a given route traffic and corresponding program variables cultivation.

The results of the analysis identified key tasks that need to be addressed to ensure quality execution of operations:

– information provision service (implemented for planting and harvesting);

– Operational control provisions of the working body of the car (sold for the main application of solid fertilizers and chemical soil);

– logistics driving accuracy (implemented for the main application of solid fertilizers and plowing).

Our studies make it possible to create a series of prototypes of new technology with controlled quality performance manufacturing operations.

It should be noted prognosis of realization - variable compensation technology standards making process material using information technology systems for monitoring the status of agricultural land, which is

related to the lack of the coefficients of batteries with different soils, organic and mineral fertilizers. Therefore, in practice commonly used data on the availability of soil nutrients (Table. 3). With the aid prognosis - variable compensation technology standards making process material developed a computer prediction of agricultural production for organic crop production.

The doses of fertilizers should be applied at recommended rates background organic fertilizers, moisture, at an average level of soil mobile forms of batteries.

Defining standards fertilizers can be done using data agrochemical soil analysis specific field indicators of soil nutrients, regulatory requirements by the formula:

$$Д = У_п \cdot Н_п \cdot К \quad (1)$$

where $Д$ - Annual rate of active ingredient of nitrogen, phosphorus, potassium is based on the planned yield, kg / ha of active ingredient, $кг / га$;

$У_п$ - The expected yield of seed, $ц / га$;

$Н_п$ - The need for full regulatory elements in 1 kg seed against a background of 30 t / ha manure kg / ha of active ingredient, $\frac{кг / га}{ц}$;

K - Correction factor for the introduction of additional nutrients rate (over 30 t / ha) manure, kg / ha of active ingredient.

3. Availability of soil nutrients.

Number p / p	Batteries for different methods of determining	Availability of nutrients, mg / kg soil		
		low	average	increased
1	Humus,%	1,2-2,5	2,6-4,8	4,9-7,9
2	Nitrogen lehkohidrolizovanyy by Turina, Kononov	less than 40	41-50	More than 50
3	Nitrogen luzhnohidrolizovanyy method Konfilda	less than 150	151-200	more than 200
4	Nitrate nitrogen	less than 10	11-20	more than 20
5	Nitryfikatsiyna capacity of soil	at least 8	9-15	more than 20
6	Phosphorus method Kirsanovs	30-80	81-150	151-200
7	Phosphorus method Chirikov	20-50	51-100	101-150
8	Phosphorus method Machyhina	10-15	16-30	31-45
9	Potassium method Kirsanovs (calcareous soils)	20-50	51-90	91-120
10	Potassium method Machyhina (calcareous soils)	30-60	61-100	101-130

The full annual rate of nitrogen, phosphate and potash fertilizers can also calculate the balance method as follows:

$$Д = \frac{(100 \cdot B \cdot У_{П}) - (30 \cdot P_{Г} \cdot K_{К})}{K_{МД}} - \frac{H_{ОД} \cdot P_{ОД} \cdot K_{ОД}}{10}, \quad (2)$$

where $Д$ - The estimated annual dose of nitrogen, phosphorus or potassium planned harvest seed, kg / ha of active substance; B - Tap the batteries 1 ton yield, kg; $У_{П}$ - Planned yield, t / ha; $P_{Г}$ - The content of mobile forms of battery, mg 100 g soil; $P_{ОД}$ - The content of mobile forms of batteries in organic fertilizers,%; 30 - constant recalculating factor; $H_{ОД}$ - The intended dose of organic fertilizer, t / ha; $K_{К}, K_{ОД}, K_{МД}$ - Battery coefficients according to soil organic and mineral fertilizers.

In implementing prognostic variable-compensation technology standards making process material based on revised data of soil applied the following principles (tab. 4).

4. The principles of the prognostic variable-compensation technology standards making process material.

Recommendations for making technological material			
Soil fertility	The ratio of the price of fertilizer and corn	Previous Culture	The content of nitrogen in the soil
- High; - Average; - Low.	$\frac{\$/_{діючої\_речовини\_N}}{\$/_{кг\_зерна}}$	determined coefficient that varies from 0 to 1 depending on the removal of nutrients precursor	determined nutrient content of the soil

5. Recommendations on the nitrogen to the soil surface.

The ratio of the price of active ingredient N ($ / kg) and corn ($ / kg)	Corn-Corn		Corn-soybean	
	The dose that gives maximum profit	Recommend ations tion-range	The dose that gives maximum profit	The recommend ed range
	N kg / ha			
2.8	174	146-202	134	112-157
5.6	157	134-185	123	101-140
8.4	146	123-168	112	90-129
11.2	134	112-157	95	78-112

Based on calculations developed recommendations for the inclusion of technological material using prognostic variable-compensation technology standards making process material, such as recommendations for the inclusion of nitrogen in the soil surface (tab. 5).

Conclusion. Thus, the model prognosis - variable compensation technology standards making process in plant material allows to analyze complex changes in soil conditions within a field and determine the strategy of Agrobiological potential field. The estimated effect of the introduction of integrated prognostic variable-compensation technology standards making process material using information technology to ensure monitoring of the state of agricultural land, which makes it possible to control the quality of implementation processes of growing crops may be more than 20% [8].

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In Article Present Implementation prognostic model-kompensatsyonnoy technology standards vnesenyya of technological variables with the material-technical Using is information systems STATUS MONITORING selskohozyaystvennыh agreement, kotoraja pozvoljaet based on data utochnennыh soil, poluchennыh here

Monitoring system, STATUS selskohozyaystvennыh rate this agreement and Accept Control Strategy ahrobyolohycheskym BUILDING field.
Monitoring, model, peremennыe norms vnesenyya, prognostic, kompensatsyonnaya technology.

The paper present an implementation model prognostically-compensation technology variable application rates of technological material using information technology systems to monitor the status of agricultural land, which allows for on basis of revised estimates of soil obtained from the monitoring system to assess the state of agricultural land and to take control strategy agrobiological potential field.
Monitoring, model, variable rate application, predictive-compensation technology.

UDC 631,589

EFFICIENCY OPTIMIZATION CONTROL SYSTEM USING GENERALIZED FUNCTIONS DESIRABILITY OF HARRINGTON

VA Miller, A. Dudnik, Ph.D.

A study selection algorithm optimal control decisions based on the use of generalized functions Harrington desirable to improve energy efficiency in the management of biotechnical systems.
Optimization, biotechnical system energy efficiency.

Problem. Operation of biotechnical systems which contain a combination of biological and technical component associated with the use of a significant amount of energy [1,2,7]. Notable examples of such systems are industrial poultry houses built greenhouses, livestock facilities and so on. However, despite the high level of effectiveness of control systems that are able to maintain the required accuracy of the parameters and use powerful computing capabilities of modern automation, still unable to lower power consumption at maximum performance.

Analysis of recent research. Algorithms stabilization process parameters at a given level do not involve the use of a criterion of optimization that ultimately appears in

energy waste. Building management systems that include optimal control algorithm for finding the solution, but take into account the peculiarities of