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Семирненко С.Л. Расчет энергетического потенциала соломы озимой пшеницы

Статья посвящена вопросам использования соломы для энергетических потребностей в условиях конкретного региона. В статье определены параметры, которые влияют на потенциал соломы, доступной для энергетического использования. Разработана методика расчета коэффициента энергопотребления соломы озимой пшеницы (по технологическим соображениям) для оценки ее потенциала.

Предложенная оценка энергопотенциала соломы и приведенный расчет коэффициента энергопотребления соломы озимой пшеницы могут быть применены для расчета энергетического потенциала той или иной зерновой сельскохозяйственной культуры любого региона или хозяйства.

Ключевые слова: *биомасса, солома, ресурс, озимая пшеница, экологическая безопасность, коэффициент, энергопотенциал, энергопотребление, биотопливо, калорийный эквивалент.*

Semirnenko S. Calculation of energy potential of winter wheat straw

Article is devoted to the use of straw for energy in a particular region. Using 20% of resources in Ukraine straw (the straw lost each year) for energy will improve the environmental situation and partially own energy resources agriculture. An important prerequisite for successful use of biomass for energy production is a correct assessment of potential on the basis of statistical data on these stages serve as the basis for calculating the operational and technological and economic performance, which in turn must convince the producer or investor's perspective of a another project. Using approximate quantitative and qualitative indicators could lead to erroneous and inefficient technology and administrative decisions.

In this article the parameters that influence the potential of straw available for energy use. Adjusted Calculation of energy use wheat straw (for technological reasons) to assess its potential. The basis of calculation laid estimate theoretically possible and technically accessible straw biomass energy potential of a crop on total gathering of culture. As a single, generalizing energy meter to compare the effectiveness of different fuels and cumulative accounting is used conventionally natural rate - tons of fuel.

In order to use only the power of winter wheat straw instead of 20% of all cereal straw, we find a cost-effective use of energy coefficient of winter wheat straw as the ratio of economic power potential cereal straw to straw technically feasible potential of winter wheat.

The proposed evaluation of the energy potential of straw and method calculation of energy use wheat straw can be used to estimate the energy potential of a grain crop any region or sector.

Keywords: *biomass, straw,resource, winter wheat,environmental safety, coefficient, energy potential, energy use,biofuels,caloric equivalent.*

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PRODUCTION OF ENVIRONMENTAL FERTILIZERS BY UKRAINIAN PHOSPHATE INDUSTRY

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Fertilizer consumption had increased rapidly until the mid- 1970s due to the continued expansion of the fertilizer production capacity and concerted efforts by the government to encourage fertiltzer application by providing fertilizer subsidies and various agricultural extension services.Many organic materials serve as both fertilizers and soil conditioners—they feed both soils and plants. This is one of the most important differences between a chemical approach and an organic approach toward soil care and fertilizing. Soluble chemical fertilizers contain mineral salts that plant roots can absorb quickly. However, these salts do not provide a food source for soil microorganisms and will even repel earthworms because they acidify the soil. Over time, soils treated only with synthetic chemical fertilizers lose organic matter and the all-important living organisms that help to build a quality soil[1-3].

The increase in yield per hectare was due largely to the improvement in biological/genetic technology and production techniques as well as the continuous application of fertilizers and pesticides. The Sumy State Research Institute of Fertilizers & Pigments (MINDIP) had successfully coordinated with the Sokolovski Soil and Agro-Chemistry Institute (Kharkov) and Agrarian Research Centre "AKCO" (Kyiv) in developing high-yielding organic-mineral fertilizers. These complex fertilizers were found to be as effective alternative and

complement for the traditional mineral products. The agronomic effectiveness of new fertilizers produced by the Sumy Phosphate Corporation (SumyKhimprom) has been studied by conducting pot and field trials with wheat and maiz as test crops at Sumy and Kharkov regions.

Keywords: *fertilizers, environment, fertility properties,organic components,yield increase.*

PHOSPHATE PHERTILIZERS WITH ORGANIC COMPONENTS GRANPHOS is a long-time action fertilizer produced by composition of N, P, organic matter and Ca, Mg accompanying elements. According to the environmental recommendations it may be used in spring with N-K or in autumn with K-fertilizer. Quantity ratio of fertility components can vary (Table.1)

GRANPHOSKA is an improved fertilizer with NPK – 1:18:5; $P_2O_{5\ total}$ – 17,8%; $P_2O_{5access.}$-15,8%; N – 0,85%; $K_2O_{total.}$ - 4,5%; H_2O – 0,5%;

GUMIAGROPHOS (Table 1) is produced with phosphate wastes and adding $(NH_4)_2SO_4$. Percentage of active ingredients are N – 1,8 %, $P_2O_{5\ total}$>9%; $P_2O_{5\ access}$>7.8%; K_2O >1.5%; organic matter – 1%.

AMMOPHOS is traditional fertilizer product including N – 10.9 %; $P_2O_{5\ total.}$ – 49.3%; $P_2O_{5\ access}$ – 45.4%; H_2O – 0,3%; pH of 10% suspension – 4.45%; Cd – 22.7 mg/kg; Pb – 33mg/kg; As – 2,5 mg/kg, organic matter – 1,2 %.

MELIORANT is a long-time fertility composition also produced with phosphate wastes and organic ingredients for treatment of saline and contaminated soils [4-5]. Percentages of active ingredients are $P_2O_{5\ total}$> 8%, $P_2O_{5\ access}$>7%, CaO > 20%, S > 7%. The basal optimal dose of MELIORANT is 2-3 t/ha. The observations suggest that the application of mineral-organic fertilizer may not alter the soil pH improving fertility properties, but also fix the dangerous chemicals (Table.2).

Table 1 Agro-chemical Characteristics of GRANPHOS fertilizer

Tested property	Quality Standard			
	A	B	CA	
			First-class	Ordinary
$P_2O_{5\ total}$ %, not less than	29	29	26	15
water %, not more	3	3	3	3
N_{total} % ,not less than	1	-	2	1

Table 2 Influence of mineral-organic fertilizer on fertility properties of soils

No	Type of fertilizer	Test depth, sm	pH	Content, %		Fertility content mg/100 gsoil				
				C_{total}	humus	$N\text{-}NH_4$	$N\text{-}NO_3$	$N_{mineral}$	P_2O_5	K_2O
1	Control (unfertilized)	0-5	5,0	2,05	3,53	0,54	0,05	0,59	12,00	6,25
		8-10	5,1	1,95	3,36	0,44	0,04	0,48	12,87	5,81
		15	5,0	1,87	3,22	0,44	0,04	0,48	10,94	5,12
2	“Gumiagrophoska”	0-5	5,1	2,11	3,64	0,78	0,04	0,82	16,50	7,48
		8-10	5,3	1,99	3,43	0,73	0.05	0,78	23,40	6,00
		15	5,1	1,99	3,43	0,74	0,12	0,86	22,40	7,80
3	“Super phosphate”	0-5	5,1	2,08	3,59	0,69	0,06	0,75	16,40	7,40
		8-10	5,1	2,02	3,48	0,64	0,12	0,76	23,40	6,00
		15	5,1	1,99	3,43	0,64	0,17	0,79	19,30	6,20

AGRONOMIC AND ENVIRONMENTAL EVALUATION

Maize crops in three different cases were studied in field trials (Tables 3, 4). These experiments have demonstrated that using environmental mineral-organic fertilizer presented no problem for agrotechniques with yield growth to 1.5 times average. Shoot and root growth, as well as the plant height, improved in maize at the optimal dosage, compared to unfertilized control field.

Table 3 Test Results of Fertilizer Application in field (2006)

Type of fertilizer	Test repetition			Maize yield, Cent./Ha	Yield increase		Plant height, sm
	1	2	3		Cent./Ha	%	
Control(unfertilized)	199	186	214	199	-	-	112
Ammophos	357	378	378	371	172	86	175
Super phosphate	271	278	292	280	81	41	159
Granphoska	278	321	343	314	115	58	160
Gumiagrophos	299	250	314	288	89	45	178

Table 4 Test Results of Fertilizer Application in field (2007)

Type of Fertilizer	Plant weight, kg (4 repetitions)	Maize yield, Cent./Ha		Yield increase	
		per m^2,kg	per Ha,kg	Cent./Ha	%
Control (unfertilized)	2.14	5.99	428	-	-
Gumiagrophoska	3.73	10.44	746	318	74
Superphosphate	2.35	6.55	468	40	9
Guano	3.18	8.90	636	208	48

SUMMARY AND CONCLUSIONS

i) The fertilizer policy is being critically reviewed in recent years because of the growing annual deficit.

ii) The main issues in the formulation of the fertilizer policy are: the degree of government intervention in the determination of fetilizer prices and marceting costs as well as the time schedule of the rationalization of the fertilizer industry.

iii) The experimental data with maize showed that complex lower mineral-organic fertilizers were as effective as the traditional expensive fertilizer for all the plant growth parameters studied.

iv) There were number limitations for this trend, chief among which is that fertilizer industry may have to reduce the current production capacity. But the government intervention in fertilizer marketing is unavoidable in promoting any fertilizer application.

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Вакал С.В., Шандиба О.Б., Шпетний Д.М. Виробництво екологобезпечних добрив фосфатними підприємствами України

Підвищення врожайності сфльськогосподарських культур значною мірою залежить як від прогресу в біотехнологіях та генетиці, так і систематичного застосування добрив та пестицидів. Промисловість мінеральних добрив має широкий спектр сучасних технологій, що враховують інженерні та екологічні аспекти виробництва. Традиційне співвідношення N, P, K повинне бути змінене шляхом включення комплексу мікроелементів та органічних компонентів. В статті розглядаються агрономічні та екологічні переваги органо-мінеральних добрив нового покоління в порівнянні з традиційними суперфосфатом та аммофосом.

Ключові слова: *добрива, навколишнє середовище, родючість, органічні компоненти, врожайність.*

Вакал С.В., Шандыба А.Б., Шпетный Д.Н.Производство экологически безопасных удобренийфосфатными предприятиями Украины

Повышение урожайности сельскохозяйственных культур в значительной степени зависит как от прогресса в биотехнологиях и генетике, так и систематического применения удобрений и пестицидов. Промышленность минеральных удобрений имеет широкий спектр современных технологий, которые учитывают инженерные и экологические аспекты производства. Традиционное соотношение N, P, K должно быть изменено путем включения комплекса микроэлементов и органических компонентов. В статье рассматриваются агрономические и экологические преимущества органо-минеральних удобрений нового поколения по сравнению с традиционными суперфосфатом и аммофосом.

Ключевые слова: *удобрения, окружающая среда, плодородие, органические компоненты, урожайность.*

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