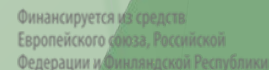




# Partner 3: **FSBSI VIZR** work program and preliminary results in accordance with the objectives of the grant contract 1905165-KS1798 – Environmentally Friendly Smart Organic Agriculture (EFSOA)





# Partner 3: **FSBSI VIZR**

## Tasks and work activities



- Working up stock cultures and inoculums for liquid and solid-phase fermentation of strains producing biologics.
- Producing batches of biologics for field trials: Kartofin, SC and Phytolar, G and their quality assessment.
- Conducting pre-planting treatment of potato tubers with biologics and setting up field trials for assessment of their efficacy on the potato variety “Udacha” at the Experimental Station of the Institute for Engineering and Environmental Problems in Agricultural Production.





# Partner 3: **FSBSI VIZR**



## Tasks and work activities

- Production and quality assessment of trial batches of the biologic Kartofin, SC for spraying plants of the potato variety “Udacha” during the vegetation period.
- Assessing efficacy of the biologics Kartofin, SC and Phytolar, G in the field trials at the Experimental Station.
- Biometric accounting of “Udacha” potato variety plants development.
- Phytopathological accounting of diseases incidence and development in plants of the potato variety “Udacha”.
- Accounting for the harvest and phytosanitary condition of “Udacha” variety potato tubers.





# Partner 3: **FSBSI VIZR**

## Tasks and work activities



- Producing trial batches of the biologic Kartofin, SC and its quality assessment for treatment of potato tubers before their storage (potato variety “Udacha”).
- Preliminary assessment of the efficacy of the biologics Kartofin, SC and Phytolar, G in organic technologies for growing potatoes of the variety “Udacha”.
- Statistical processing of the data obtained in field trials for efficacy of the biologics Kartofin, SC and Phytolar, G in organic technologies for growing potatoes of the variety “Udacha”.





# Field Test Scheme for Biologics Kartophin, SC and Phytolar, G



Potato biological protection system	Biologic	Biologic application rate	Working fluid flow rate	Disease/harmful object	Way and time of treatment, limitations	Number of treatments
Base Option	Kartophin, SC	3 lt	10–15 lt	Blackspot, late blight of potato, bare patch, fusariose, blackleg	Pre-planting treatment of tubers	1
		3 l/ha	250–300 l/ha		Spraying plants during the growing season: 1 <sup>st</sup> seedling, subsequently at 10 days interval	3
		3 lt	10–15 lt		Potato Tuber Diseases (types of potato scab, bare patch, bacteriosis)	Processing of tubers before storage
Modified Base Option	Kartophin, SC	10 kg/ha	-	Soil-inhabiting phytopathogenic micromycetes	Soil application during planting	1
		3 l/ha	300 l/ha	Blackspot, late blight of potato, bare patch, fusariose, blackleg	Spraying plants during the growing season: 1 <sup>st</sup> seedling, subsequently at 10 days interval	3
		3 lt	10–15 lt	Potato Tuber Diseases (types of potato scab, bare patch, bacteriosis)	Processing of tubers before storing	1



# Partner 3: FSBSI VIZR

## Results



- Following liquid and granular multirecycled trial batches were developed for efficacy field trials on potatoes of the “Udacha” variety: Kartofin, SC based on *Bacillus subtilis* I-5 12/23 – 5 l,  $8.2 \times 10^{10}$  CFU/ml; 1.5 l,  $9.3 \times 10^{10}$  CFU/ml; 1.5 l,  $8.7 \times 10^{10}$  CFU/ml; Phytolar, G based on *Trichoderma asperellum* T-36 – 3.5 kg, titer  $1.3 \times 10^{11}$  CFU/g;
- When assessing the quality of biologics' trial batches, contamination with foreign microbiota wasn't detected in any of the batches. Each trial batch contained only the producer strain with the specified production titer.





# Partner 3: FSBSI VIZR

## Results



- All the trial batches were transferred for the pre-planting treatments of “Udacha” variety potato tubers and further plants processing during the growing season to the Experimental Station of the Institute for Engineering and Environmental Problems in Agricultural Production, branch of FSBSI “Federal Scientific AgroEngineering Centre VIM”.
- Treatments were carried out in accordance with the Work Program of the Grant Contract 1905165 – KS1798 “Environmentally Friendly Smart Organic Farming” (EFSOA).



# Effect of biologics on potato plants' biometrics in the variety "Udacha"



Biologics	Plant height, sm ± SEM		Productive/flowering stems number, ± SEM		Leaf tiers number, ± SEM	
	budding phase	flowering phase	budding phase	flowering phase	budding phase	flowering phase
Control 1 (without treatment)	23.8±0.4	37.3±0.8	3.6±0.1	0.7±0.1	5.2±0.1	6.6±0.1
Control 2 + N80 (without treatment)	24.1±0.5	39.2±0.7	3.6±0.1	0.7±0.1	5.1±0.1	6.5±0.1
Kartophin, SC	27.9±0.3 ***/**	36.4±0.4	4.3±0.1 ***/**	1.1±0.1 ***/**	5.9±0.1 ***/**	8.3±0.1 ***/**
Kartophin, SC + N80	29.3±0.3 ***/**	39.1±0.6	4.3±0.1 ***/**	1.5±0.1 ***/**	5.9±0.1 ***/**	9.3±0.1 ***/**
Kartophin, SC + Phytolar, G + N80	25.1±0.3 */**	39.6±0.4 **/*	4.4±0.1 ***/**	1.8±0.1 ***/**	5.5±0.1 **/**	9.5±0.1 ***/**



# Effect of Biologics on the yield of potato tubers in the variety "Udachya"



Biologic	Biological yield, t/ha ± SEM	Standard yield, t/ha ± SEM
Control 1 (without treatment)	20.8±0.6	20.2±0.5
Control 2 + N80 (without treatment)	25.1±1.7	24.1±1.8
Kartophin, SC	23.1±2.4 <sup>*/*</sup>	22.5±2.3 <sup>*/*</sup>
Kartophin, SC + N80	25.8±1.7 <sup>**/*</sup>	25.1±1.7 <sup>**/*</sup>
Kartophin, SC + Phytolar, G + N80	27.4±3.6 <sup>**/**</sup>	25.3±3.6 <sup>***/*</sup>



# Biologics' efficacy on "Udachya" potatoes in control of diseases (Desease Incidence)



Biologics	Biological efficacy, %			
	budding phase	flowering phase	plants closing phase	before harvesting phase
<b>Control 1 (without treatment)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Control 2 + N80 (without treatment)</b>	<b>100.0</b>	<b>43.8</b>	<b>49.3</b>	<b>24.4</b>
<b>Kartophin, SC</b>	<b>100.0</b>	<b>86.8</b>	<b>82.2</b>	<b>57.1</b>
<b>Kartophin, SC + N80</b>	<b>100.0</b>	<b>89.9</b>	<b>86.1</b>	<b>37.1</b>
<b>Kartophin, SC + Phytolar, G + N80</b>	<b>100.0</b>	<b>94.5</b>	<b>80.8</b>	<b>53.1</b>



  
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# Biologics' efficacy on "Udacha" potatoes in control of diseases (Desease Development)



Biologic	Biological efficacy, %			
	budding phase	flowering phase	plants closing phase	before harvesting phase
Control 1 (without treatment)	0	0	0	0
Control 2 + N80 (without treatment)	100.0	48.8	46.1	25.6
Kartophin, SC	100.0	88.7	81.2	66.1
Kartophin, SC + N80	100.0	92.1	84.8	43.8
Kartophin, SC + Phytolar, G + N80	100.0	95.3	83.8	67.3



# Partner 3: **FSBSI VIZR** Conclusions



The positive effect of the applied biologics was reliably established in organic farming of potatoes.

**THANKS FOR YOUR KIND  
ATTENTION!!!**

