



LIPOSAM. Microbial polysaccharides to improve uptake of biocontrol and not only

Healthy Land BTU-CENTER
LIPOSAM
BIOLOGICAL ADHESIVE

LIPOSAM
BREATHING AND PHOTOSYNTHESIS

- Fixes pesticides, fertilizers and stimulants on the surface of the leaf and prevents them from dripping
- Increases draught resistance of a plant
- Prevents washing of soil herbicides

Head of International Department
Dmytro Yakovenko



Current situation in Ukraine

- russia's invasion of Ukraine lasts 266 days
- Currently, 15-20% of Ukraine's territory is occupied by russia
- >6,303 civilian deaths according to the UN (including 397 children), 9,602 injured
- 7.7 million of Ukrainians are refugees in Europe
- 6.2 million of Ukrainians are temporarily displaced throughout Ukraine
- 350+ billion EUR needed to recover economics of Ukraine after invasion
- 30-40% of the energy sector destroyed; attacks on infrastructure continue daily



BTU-CENTER FACTS AND FIGURES

MANUFACTURER OF MICROBIAL AND ENZYME PREPARATIONS SINCE 1999



Biologicals for agriculture



6 dietary supplements and
1 prescription drug



Pollution destructors and biopolymers
for the oil and gas industry

- 64 biologicals for agribusiness
- 57 biologicals comply with EU organic certification
- 18 countries of presence
- > 3 000 000 pcs are sold in agroshops annually
- >20 scientists gathered in Institute of Applied Biotechnology

> 450 employees

10 000 t/year

4 000 000 ha/year

> 2 000 trials

**> 300 million €/year
agri-companies earn**



TOP MICROBIAL PRODUCTS



Soil improver



Bioadhesive



PK-mobilizer



N-fixer



Trials

>120

>300

>350

>150



Success rate

90%

83%

86%

86%



Coverage per annum

>2 mln ha

>2 mln ha

>150 K ha

>130 K ha



+ to income

>90 €/ha

>30 €/ha

>160 €/ha

>155 €/ha



Return on investment

300-500+%

200-999+%

200-600+%

200-999+%



Countries of presence

14

12

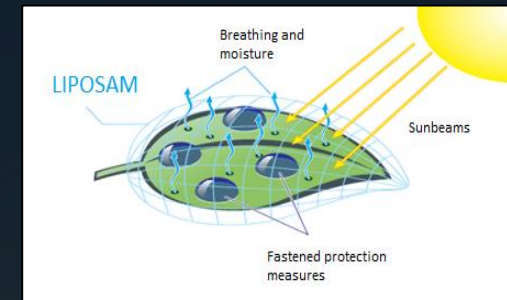
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The biopreparation is based on complex of natural exooligopolysaccharides with strong links between monosaccharides. LIPOSAM® is a sticking agent-carrier for tank mixtures of plant protection agents, biostimulants and foliar fertilizers. The biopreparation contains biopolymer of bacterial origin and is allowed for organic farming



FUNCTIONS

- ✓ fixes the biopreparations and other plant protection and nutrition preparations on the planting material;
- ✓ forms a protective elastic grid that retains moisture;
- ✓ provides high efficiency of soil herbicides under adverse weather conditions;
- ✓ operates in a wide range of temperatures up to 50 °C;
- ✓ sorbent-carrier, acts as antistressant and increases the drought tolerance of plants.

COMPOSITION

- ✓ Complex of natural exooligopolysaccharides with strong links between monosaccharides

SHELF LIFE

3 years at 0 °C - 20 °C

WAYS OF APPLICATION



Together with soil herbicide 0.50-0.80 l/ha



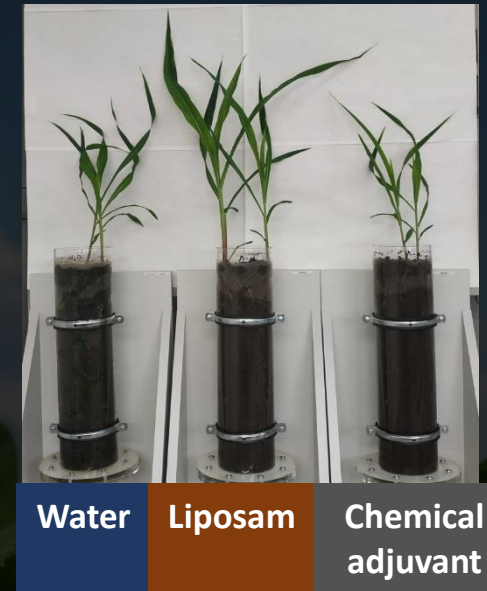
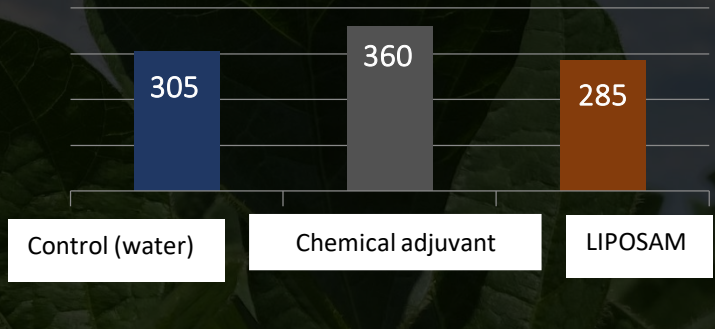
Seed treatment 0.15-0.30 l/t



Foliar application 0.15-0.30 l/ha



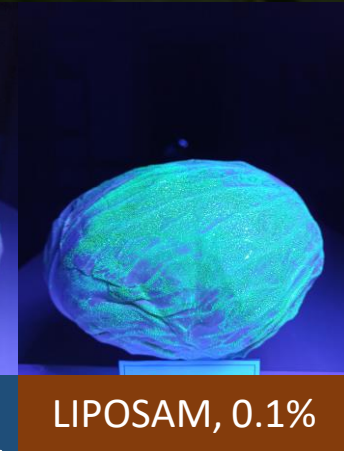
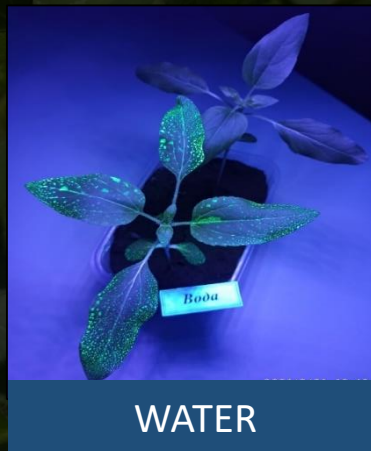
Influence of Liposam on water holding capacity in the 0-50 cm soil layer in strong rain model, amount of leachate obtained during 2 months



Parameters	% of active substance remained on the leaves after rain simulation		
	Water	LIPOSAM	Proportion of fixation due to the use of LIPOSAM
Crop	30 min. after application		
tobacco	20	42	+22 (+100%)
sunflower	25	36	+11 (+50%)
corn	17	31	+14 (+100%)
	60 min. after application		
tobacco	26	62	+36 (+138%)
sunflower	26	50	+24 (+92%)
corn	26	50	+24 (+92%)
cabbage	17	46	+29 (+170%)
apple	4	24	+20 (+500%)

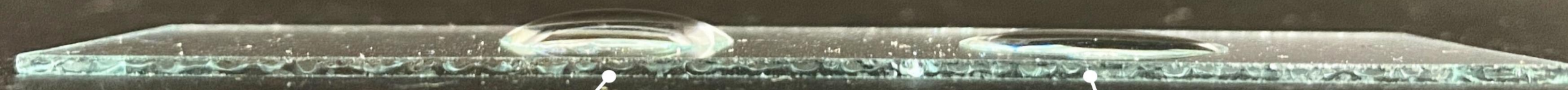
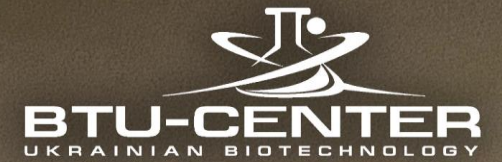
Plants leaves, treated with paint, after 3-5 min of rain modeling

Fluorescent paint model for adhesion assessment





AS AN ADJUVANT



WITHOUT LIPOSAM

LIPOSAM

LIPOSAM reduces surface tension and promotes better distribution of aqueous solutions of preparations on the surface

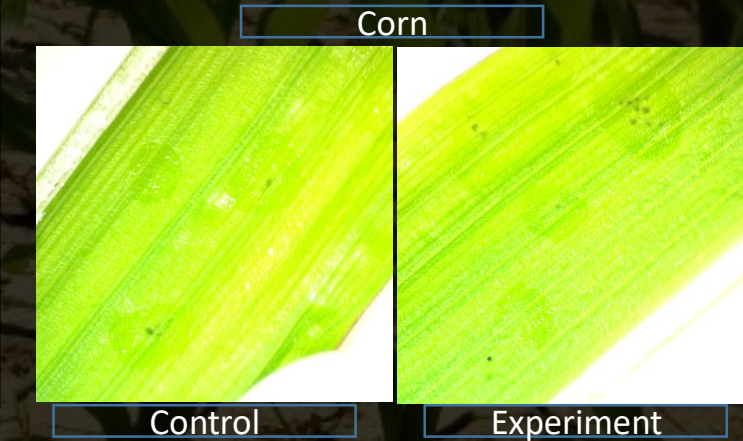
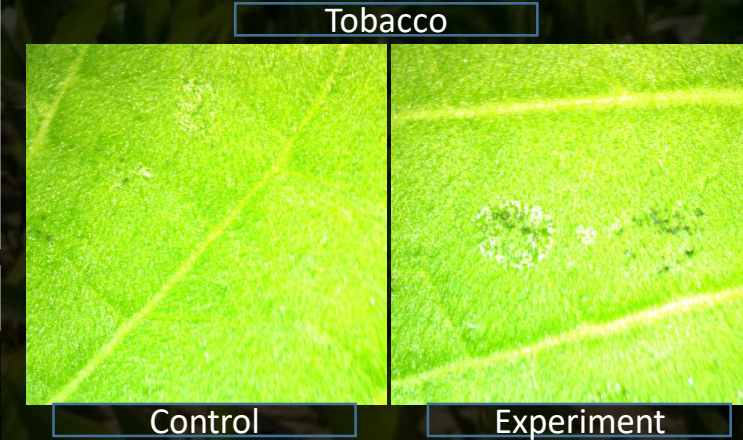
Scheme of the experience:

Model "Downpour":

1. *T. harzianum* 0,1 ml + sterile water, diluted 1:2 (control),
2. *T. harzianum* 0,1 ml + sterile water, diluted 1:2 + Liposam – 0,5 L / 100 L of water).

Note: - The initial *Trichoderma* conidia count was $3,5 \times 10^7$ CFU/cm³

Type of trial	Model: downpour	
	Tobacco	Corn
	Proportion of <i>T. harzianum</i> conidia fixation on the leaf, %	
	Timing 30 min	
Control (<i>T. harzianum</i> + sterile water diluted 1: 2)	0,0	0,0
Experiment (<i>T. harzianum</i> + sterile water (dilution 1: 2) + Liposam)	33,0	33,0
Timing 60 min		
Control (<i>T. harzianum</i> + sterile water diluted 1: 2)	33,0	0,0
Experiment (<i>T. harzianum</i> + sterile water (dilution 1: 2) + Liposam)	66,0	33,0

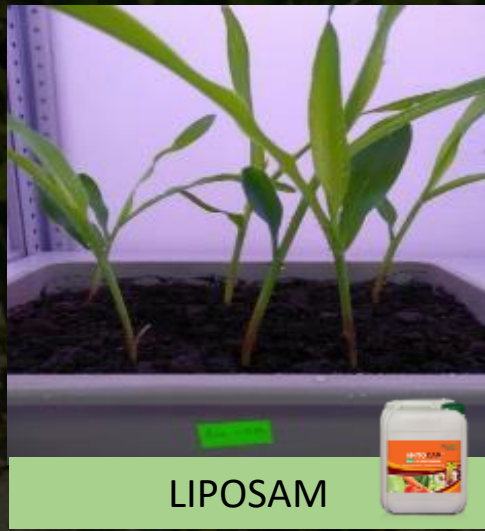
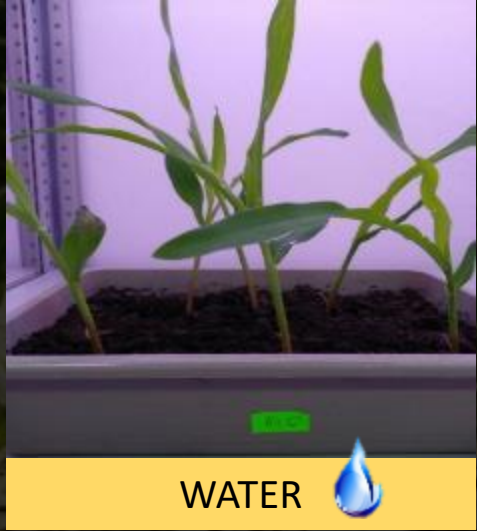


*After incubation for 30 and 60 min, the solutions were washed off with 10 ml of sterile water using a syringe with a needle, which created a greater rate and intensity of washing off.



TO IMPROVE DROUGHT TOLERANCE OF PLANTS.

LAB TESTS, 2020

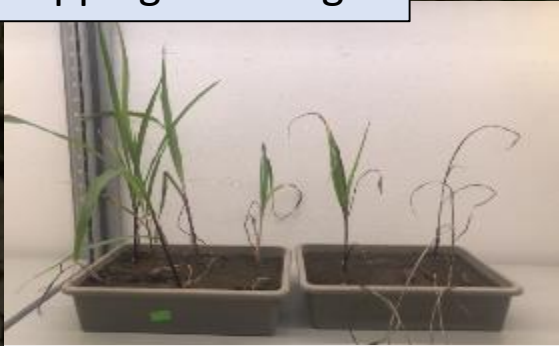


24.04.20
Working solution with **LIPOSAM**, water applied to the plants and stop watering

02.05.20
1 day after watering



30.04.20
6 days after stopping watering



2 repetition of the experiment



AND BIOSTIMULANTS TO IMPROVE DROUGHT TOLERANCE OF PLANTS IN FIELD (EAST REGION OF UKRAINE), 2021



№	Variant	Crop	Biological yield, t/ha				
			I	II	III	Average	Increase to control
1	Control	Corn	8,96	8,37	7,88	8,40	C
2	Liposam 1 L/ha	Corn	9,97	8,88	8,83	9,22	+0,82
3	Organic Balance 0.5 l/ha + Azotohelp 0.3 l/ha + Liposam 0.25 l/ha	Corn	10,37	9,48	10,17	10,0	+1,60
4	Control	Sunflower	3,05	3,12	2,98	3,05	C
5	Liposam 1 L/ha	Sunflower	3,86	3,84	3,78	3,83	+0,78
6	Organic Balance 0.5 l/ha + Azotohelp 0.3 l/ha + Liposam 0.25 l/ha	Sunflower	3,99	3,84	3,8	3,88	+0,83



LSD_{0.05} - 0,28 – sunflower/ 1,09 - corn



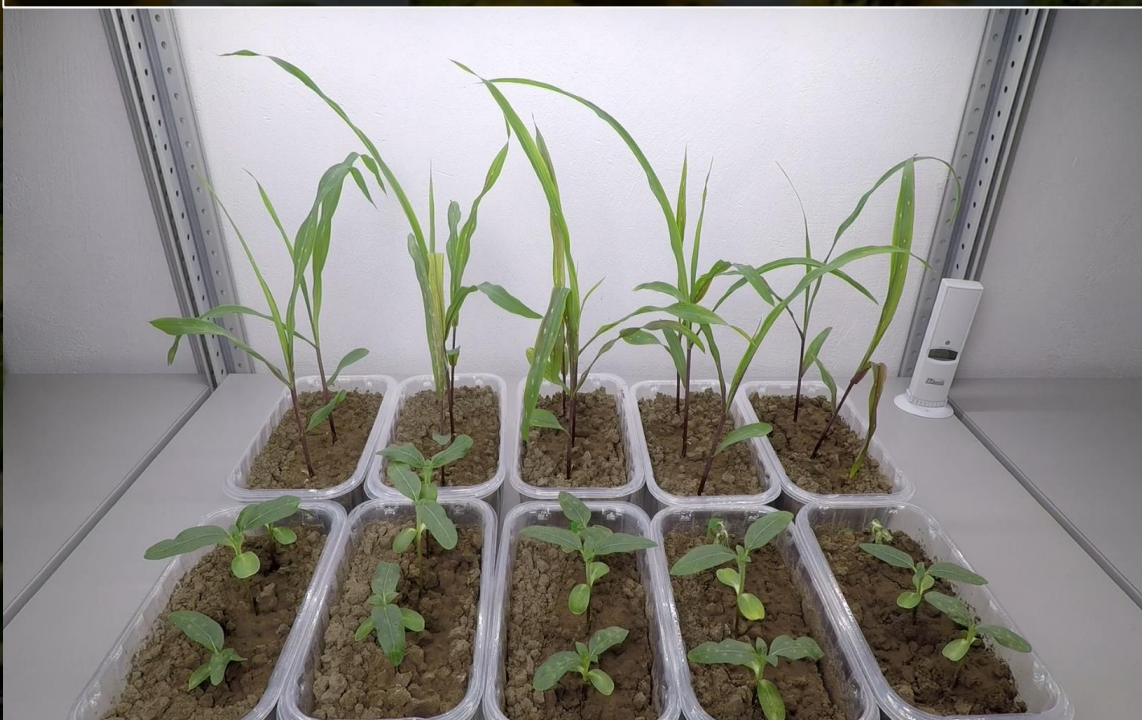
TO IMPROVE UPTAKE OF BIOCONTROL (BS), 1

Objective: To investigate the possibility of increasing the effectiveness of *Bacillus subtilis* when applied together with Liposam (foliar).

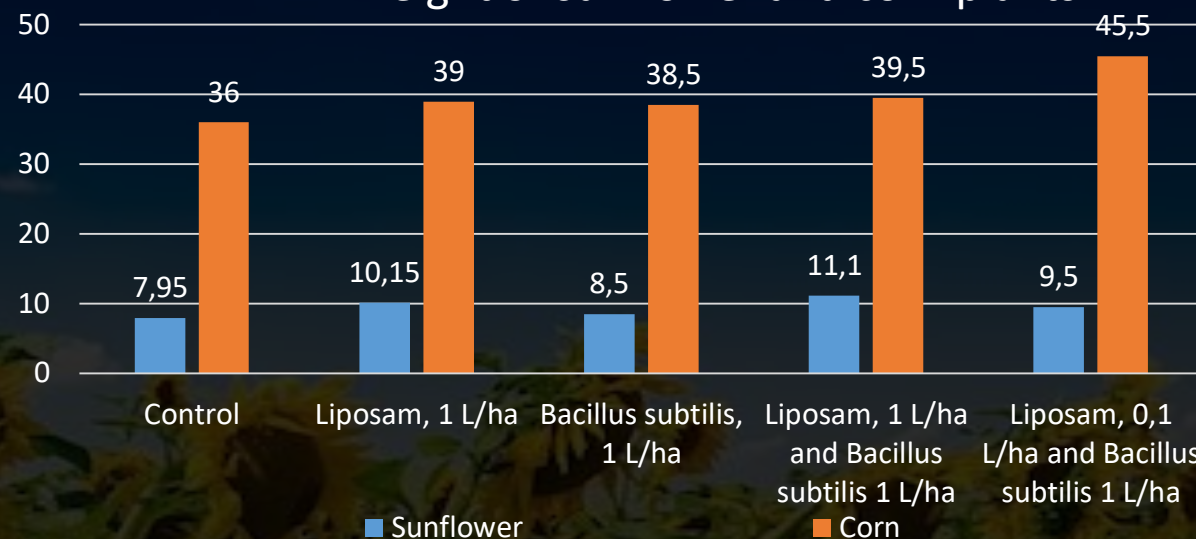
Study crops: corn and sunflower.

Methodology: Seeds sown 24.06.2022. Plants in the phase of 3 leaves were treated (foliarly) with solutions: 1) Control (clean); 2) Liposam, 1 l/ha; 3) *Bacillus subtilis*, 1 l/ha; 4) Liposam, 1 l/ha + *Bacillus subtilis*, 1 l/ha; 5) Liposam, 0.1 l/ha + *Bacillus subtilis*, 1 l/ha.

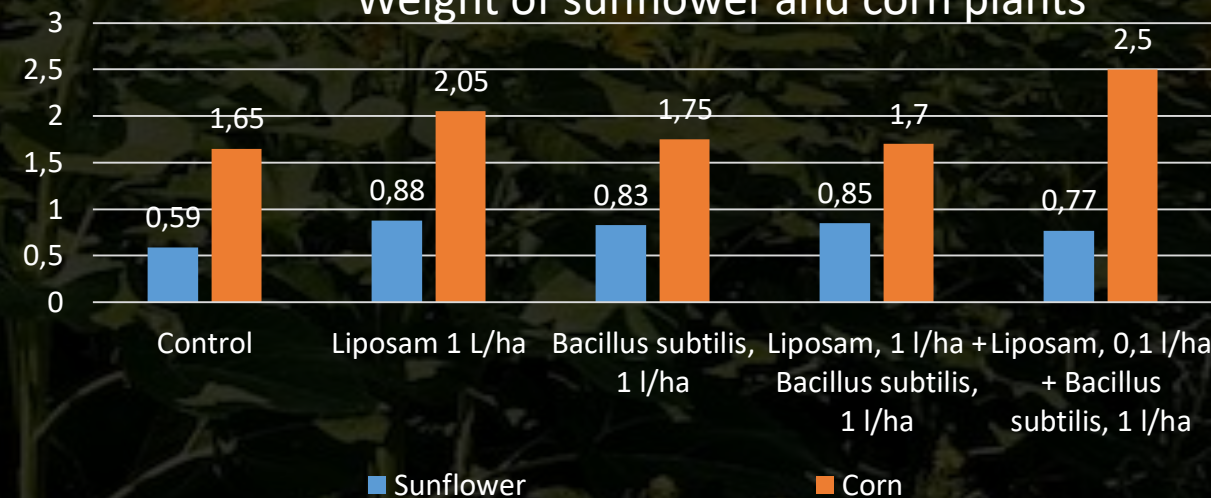
After 90 minutes, the rain was simulated. Then 20 hours after the "rain" the plants were infected with *Fusarium*. Repeat 2 times.



Height of sunflower and corn plants



Weight of sunflower and corn plants





TO IMPROVE UPTAKE OF BIOCONTROL (BS), 2

Objective: To investigate the possibility of increasing the effectiveness of *Bacillus subtilis* when applied together with Liposam (foliar).

Study crops: corn.

Methodology: Seeds sown 24.06.2022. Plants in the phase of 3 leaves were treated (foliarly) with solutions: **1) Control (water); 2) *Bacillus subtilis*, 1 l/ha; 3) Liposam, 0,3 l/ha + *Bacillus subtilis*, 1 l/ha.** After 90 minutes, the rain was simulated. Then 20 hours after the "rain" the plants were infected with *Fusarium*. Repeat 2 times.

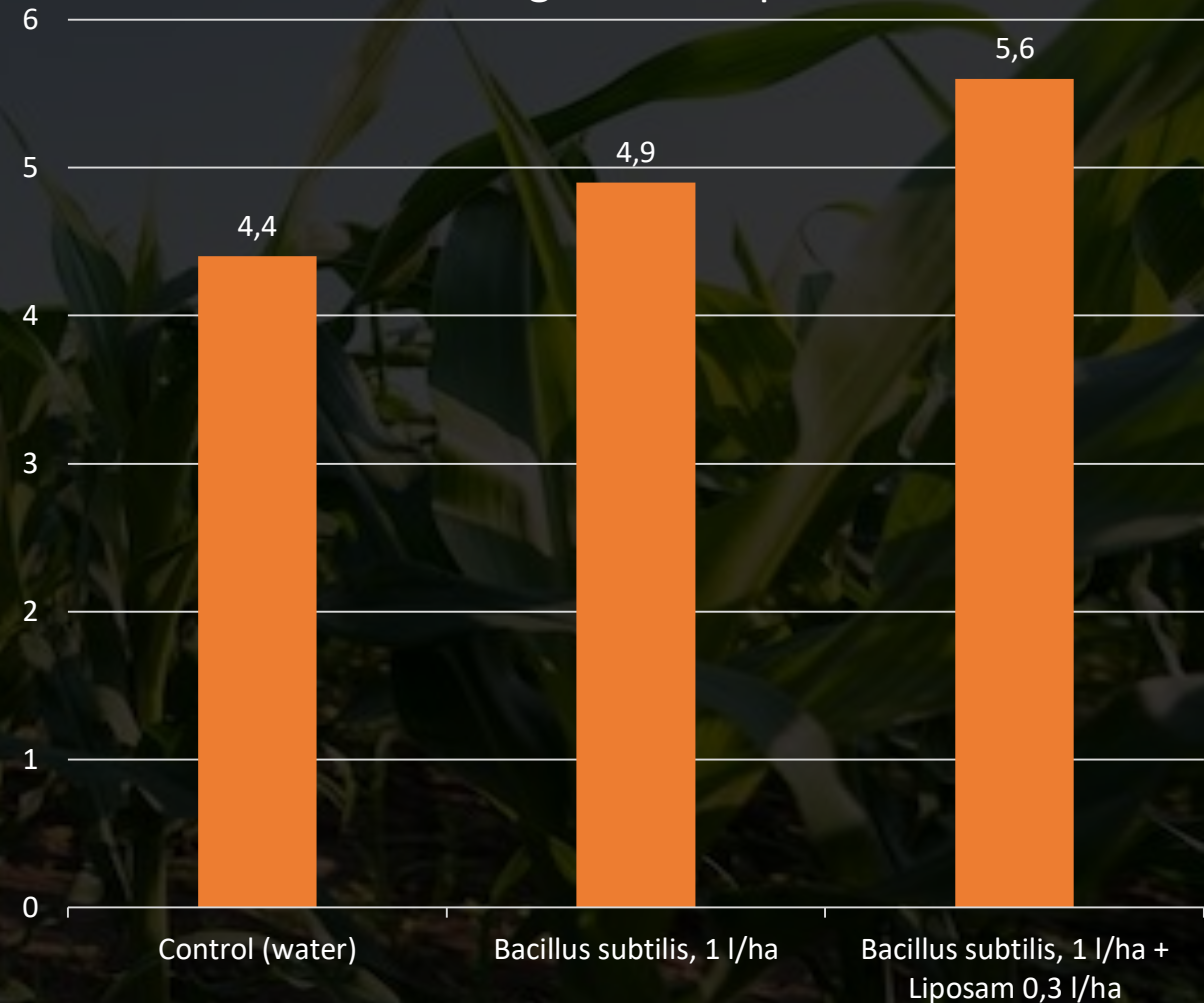


Bs, 1 l/ha



Bs, 1 l/ha + Liposam 0,3 l/ha

Weight of corn plants



*Height of plants had no significant difference among variants

SEE YOU ON BOOTH #16

Dmytro Yakovenko,
Head of International Department

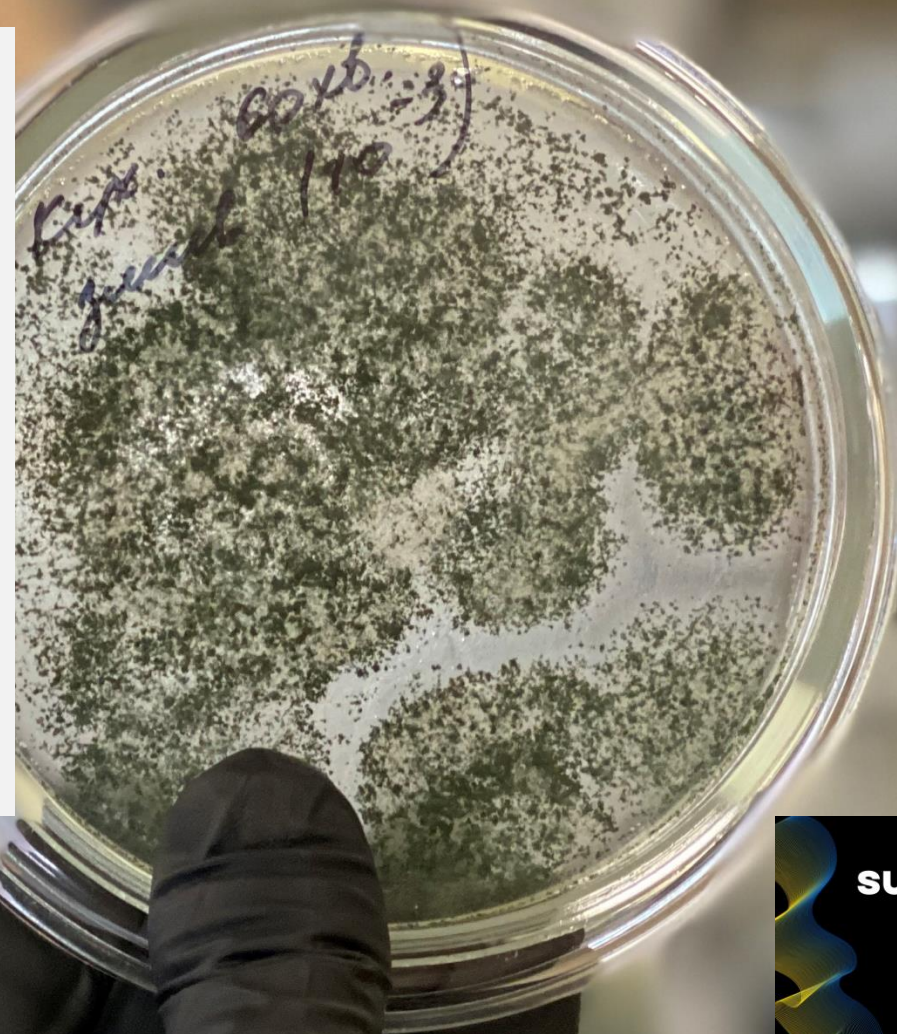


+ 38 097 941 11 23



d.yakovenko@btu-center.com

btu-center.com



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