

**VOKĖ BRANCH OF THE LITHUANIAN RESEARCH CENTRE FOR
AGRICULTURE AND FOREST**

REPORT

**THE BIOLOGICAL EFFICACY OF THE ORGANIC MATTER
BLACKJAK SC ON THE YIELD OF POTATO**

Required by: LANCES LINK S.A., 34 Quai de Cologny 1223 GENEVE-SUISSE

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Title page

The Biological Efficacy of the Organic Matter Blackjak SC on the Yield of Potato

Trial number: 023

Executing testing unit: Vokė Branch of the Lithuanian Research Centre for Agriculture and Forest

Trial leader: Almantas Ražukas
Eugenija Bakšienė

Start: May 2010

End: November 2010

Test product: Yield and quality of potato

Locality: Trial Department of Vokė Branch of the Lithuanian Research Centre for Agriculture and Forest, field No. 5
Žalioji a. Trakų Vokė, Vilnius

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SUMMARY

The feasibility of using humic matter Blackjak SC on potato yield and quality of tubers has been studied at the Voke Branch of the Lithuanian Research Centre for Agriculture and Forest in 2010. Experiments were carried out on a sandy loamy Haplic Luvisol with the application of Blackjak SC single and normal application program (mineral NPK fertilizer)+ Blackjak SC. Dosage for Blackjak SC: 0,5 t ha⁻¹. When plants were 20-25 cm high + repeated same dosage 2 weeks later.

According to the results, we found that the application of Blackjak SC had a positive impact on the yield of potato plants and quality of tubers. The best results were got where Blackjak SC used together with mineral NPK fertilizers with microelements. The yield increased by 3,6 t ha⁻¹, starch by 0,7-1,4 % and proteins by 0,36-0,65 %.

AIM

The aim of experiment was to study the influence of humic matter Blackjak SC on potato yield and quality of tubers.

MATERIALS, METHODS AND CONDITIONS

1. Experimental conditions

1.1. Trial conditions

<i>Type of the trial</i>	Field trial
<i>Crop</i>	Potatoes
<i>Variety</i>	VB Goda
<i>Previous crop</i>	Winter rye
<i>Fertilizers</i>	Before potato planting where use local fertilization N ₆₀ P ₆₀ K ₁₂₀ + all microelements complex for potato
<i>Usage of pesticides</i>	Acrobat plus – 2,0 kg ha ⁻¹ Proteus – 0,5 l ha ⁻¹
<i>Soil type and characteristics</i>	Sandy loamy <i>Haplic Luvisol</i> P ₂ O ₅ – 140; K ₂ O – 140 mg kg ⁻¹ ; humus – 1,9-2,0 %.
<i>pH value</i>	6.0
<i>Tillage</i>	Conventional
<i>Planting date</i>	7 May, 2010
<i>Seed rate</i>	48 thousand units of tubers per ha (3,5 t ha ⁻¹)
<i>Row-spacing</i>	0,70 m.

1.2. Design and layout of the trial

Randomized block with 4 replicates. Plot size 50,4 m², harvested plot 28 m²

1.3. Trial plan

01 1	01 2	01 3	01 4	02 1	02 2	02 3	02 4	03 1	03 2	03 3	03 4
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2. Application of treatments

2.1. Application of treatments

:

- 1) Control (using normal application program, but without Blackjak SC);
- 2) Blackjak SC single;
- 3) Normal application program + Blackjak SC.

Dosage for Blackjak SC: 0,5 l ha⁻¹. When plants are 20-25 cm high + repeat same dosage 2 weeks later.

2.2. Mode of application

<i>Type of application</i>	Spraying
<i>Type of equipment</i>	The products were applied with a trial sprayer, nozzle 4110-12, pressure 1.5 bar per nozzle
<i>Time and frequency of application</i>	When potato were 20-25 cm high, BBCH 32-35, 18-06-2010 Repeated same dosage after 2 weeks, BBCH 55, 02-07-2010
<i>Doses and volumes used</i>	The application was carried out according to the trial design.
<i>Meteorological conditions at the time of application</i>	<ul style="list-style-type: none">- Temperature - 15,9 – 19,3 °C- wetness of soil surface – 25-30 %- wind speed - 13 m/s W- rain - 2 days after treatment

Mode of assessments, recording and measurements

3.1. Meteorological data

Table 1. Meteorological conditions

Voke station of meteorological data, 2010 m.

Month	Ten- day period			Average and sum of month	Mean 1924-2010
	I	II	III		
Air temperature °C					
May	11,5	16,7	13,8	14,0	12,5
June	17,5	15,9	16,8	16,7	15,8
July	19,3	23,5	22,4	21,8	17,0
August	22,0	22,2	15,5	19,8	16,3
September	11,1	12,3	11,0	11,5	11,7
Precipitation mm					
May	54	27	32	113	62
June	52	42	48	142	77
July	90	104	14	208	78
August	16	24	77	117	72
September	46	21	13	80	65

Spring was early warm and dry. Summer was hot and humid. In 2010 during the whole growing season of potatoes the temperature was noticeably higher than usual. The mean temperature of May was $-1,5^{\circ}\text{C}$, June $-0,9^{\circ}\text{C}$, July $-4,8^{\circ}\text{C}$ and August $-3,5^{\circ}\text{C}$ higher than the mean air temperature of 1924-2010 (Table 1).

3.2. Yield

Harvest manually on

16 September, 2010

3.3. Statistical analysis of results

The data of potato yield were processed using the computer programme ANOVA for EXCEL₂₀₀₀ version 2.2. All data were evaluated according to Fisher criteria (F) and LSD₀₅

RESULTS

Table 2. The Influence of Blackjak SC on the Yield of Potato

Treatments	Yield of potato t ha ⁻¹				
	replications				average
	I	II	III	IV	
1. Control (using normal application program, without Blackjak SC)	24,21	27,98	26,54	25,20	26,0
2. Blackjak SC single	23,49	24,11	24,41	24,90	24,2
3. Normal application program + Blackjak SC	27,11	28,84	31,31	30,50	29,4
LSD ₀₅					2,10
Sx%					2,28

Table 3. The Influence of Blackjak SC on the Starch of Potato

Treatments	Starch of potato %				
	replications				average
	I	II	III	IV	
1. Control (using normal application program, without Blackjak SC)	15,8	15,7	15,5	15,7	15,7
2. Blackjak SC single	15,2	14,7	14,9	15,0	15,0
3. Normal application program + Blackjak SC	16,4	16,2	16,5	16,3	16,4
LSD ₀₅					0,24
Sx%					0,45

Table 4. The Influence of Blackjak SC on the Proteins of Potato

Treatments	Proteins of potato %				
	replications				average
	I	II	III	IV	
1. Control (using normal application program, without Blackjak SC)	7,12	7,31	7,50	7,40	7,33
2. Blackjak SC single	7,31	6,81	6,81	7,25	7,04
3. Normal application program + Blackjak SC	7,75	7,62	7,62	7,77	7,69
LSD ₀₅					0,34
Sx%					1,34

DISCUSSION AND CONCLUSIONS

The experiment revealed that the use of Blackjak SC for spraying on potato has positive influence on the yield of potato and quality of tubers (table 2 and fig. 1).

The treatment where was used single Blackjak SC gave lower results, because without mineral NPK fertilizers in the soil was less amount of the nutritent elements for the potato plants.

The best results were got where Blackjak SC was used together with mineral NPK fertilizers: yield of potato tubers increased by 3,6 t ha⁻¹ and this data is strongly statistical significant (LSD₀₅ - 2,10; Sx% - 2,28).

Application of Blackjak SC on potato stimulate not only growing of potato, but also and quality of tubers. Under their impact the amount of starch was higher in tubers where used Blackjak SC with mineral fertilizers NPK and increased up till 16,4 %. Also larger amount of proteins (7,69 %) was established in to potato tubers with Blackjak SC and mineral fertilizers. This data is statistical significant (LSD₀₅ - 0,24 and 0,34, Sx% - 0,45 and 1,34).



Figure 1. The influence of Blackjak SC on potato plants.

