MODERN TECHNOLOGIES FOR AGRICULTURE

ECOTECH UKRAINE



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SEED PHOTOACTIVATION. PHOTOACTIVATORS

PHOTOZONE

CATALOG - 2027

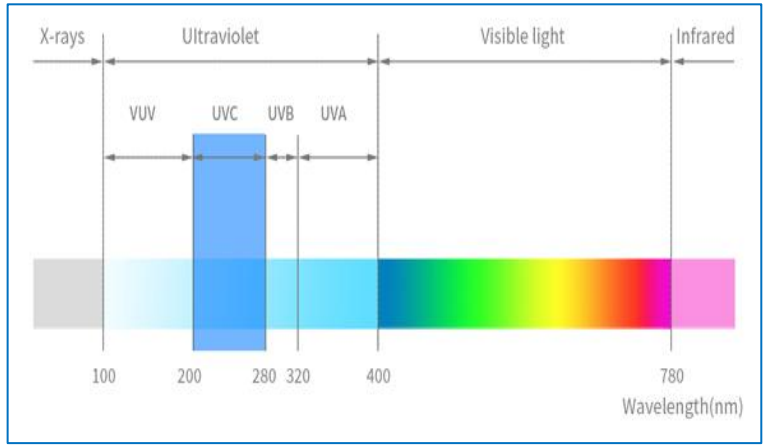
What Is Photoactivation?

- *PHOTOACTIVATION – a technological process involving the exposure of seeds to UV radiation in order to accelerate plant development, increase their drought tolerance, reduce fertilizer use, and increase crop yields.*
- *UV radiation is a component of natural sunlight with wavelengths in the range of λ = 205 … 365 nm.*









Basic Principles

- *UV radiation intensifies biological processes such as photosynthesis and phototropism.*
- *UV radiation effectively destroys microorganisms on the seed surface that cause plant diseases such as net blotch, powdery mildew, yellow and brown rust, root rot, fusarium wilt, and others.*
- *This method is fully compatible with traditional pre-sowing seed treatment with fungicides. At the same time, it allows for a significant reduction (by several times) in the use of pesticides.*



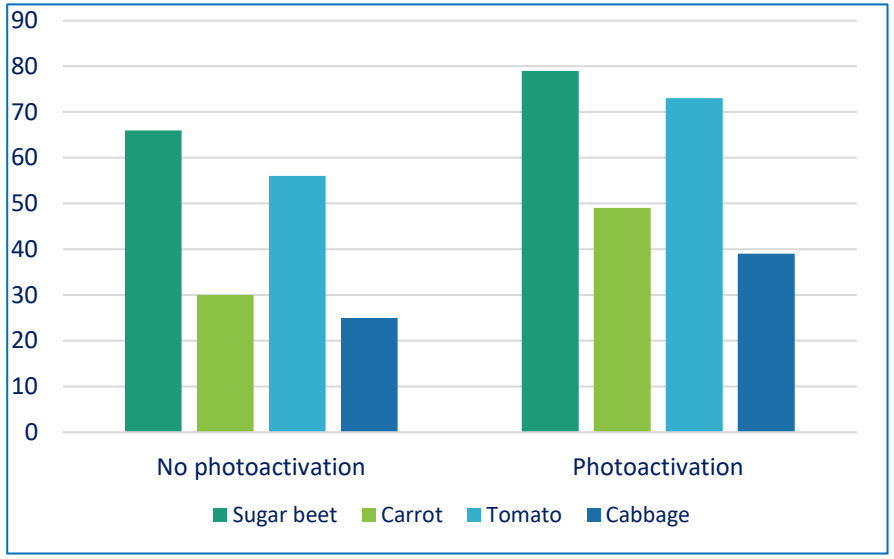
Technology Capabilities

- *Research conducted by the Institute of Bioenergy Crops and Sugar Beets of the National Academy of Agrarian Sciences (NAAS) of Ukraine has demonstrated the high effectiveness of this technology; specifically, photoactivation resulted in increased yields: cereal crops—by 10–11%, oilseeds and melons—by 20–35%, vegetables—by 12–35%; and sugar beets—by 20–22%.*
- *Studies conducted at the V. Ya. Yuryev Institute of Plant Growing of the NAAS of Ukraine showed that photoactivation of substandard seeds makes it possible to achieve high yields.*
- *Studies conducted at the V. F. Kuprevich Institute of Experimental Botany (Belarus) showed that photoactivation of potato seeds increases potato yields by 20–25%.*
- *At the Scientific Research Institute of Agriculture (Tajikistan), photoactivation was used to increase cotton yields by 44–48%.*



Plant Similarity

Photostimulation increases the germination rate of vegetable crops by 13–19%

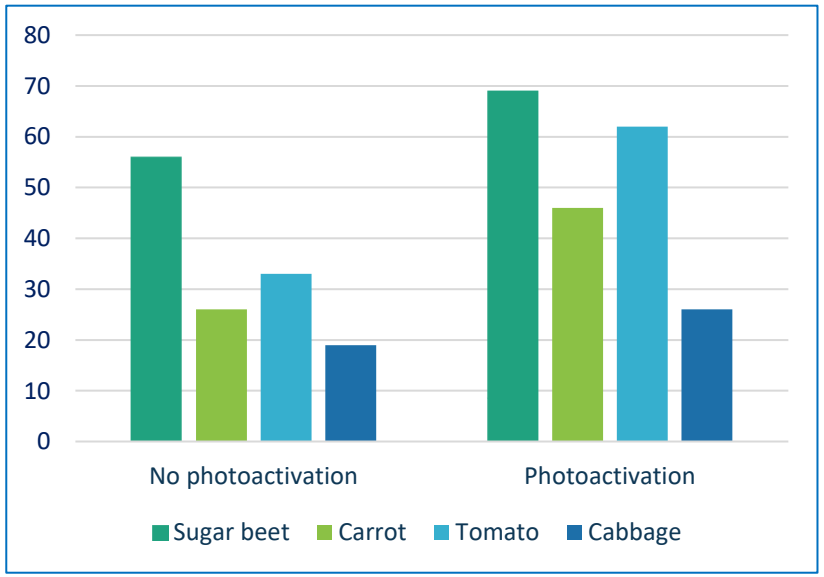




The results were obtained at the V. Ya. Yuryev Institute of Plant Growing of the National Academy of Agrarian Sciences of Ukraine

Energy of Germination

Photostimulation increases the germination energy of vegetable crops by 7–29%.





PHOTOZONE Photoactivators

FOTOZON rotary-type photoactivators are designed to activate seeds using UV radiation.





Photoactivation stimulates biological processes that occur at the cellular level and also ensures seed disinfection.

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Photoactivation of seeds



Seed treatment takes place in a special chamber that rotates around its axis. This ensures high seed treatment efficiency.

Video: https://www.youtube.com/watch?v=A221xBya1EU

Basic technical specifications

PHOTOZON Photoactivator Model

Parameter	Unit	M50	M100	M250	M750	M1250	M2500
Volume capacity	dm^3	10	25	65	175	300	625
Capacity	kg/h	15	35	100	250	450	950
Power	kW	0,2	0,25	0,5	0,75	1,35	2,0
Duration of the photoactivation cycle	min	15	15	15	15	15	15
Dimensions	m	2,0x0,6x1,7	2,5x1,0x1,7	2,5x1,4x2,1	3,0x1,4x2,1	3,5x1,4X2,4	3,5x1,4X2,4

Advantages

- *PHOTOZONE photoactivators provide an environmentally safe way to stimulate biological processes in seeds by treating them with UV rays and ozone generated by the photoactivator.*
- *Photoactivation is carried out without the use of pesticides.*
- *Seeds are loaded into the photoactivation chamber using a screw conveyor.*
- *The cost of photoactivating 1 metric ton of seeds is 0.5–0.75 USD.*
- *PHOTOZONE photoactivators can be used to disinfect dry feed, nuts, dried fruit, and other products.*



Effectiveness

PHOTOZONE photoactivators ensure effective activation and disinfection of seeds, which leads to increased plant resistance to adverse weather conditions and increased yields of grain and vegetable crops.

The effectiveness of seed photoactivation has been confirmed by research conducted at the Veselopodilsk Experimental and Selection Station of the Institute of Bioenergy Crops and Sugar Beets of the National Academy of Agrarian Sciences of Ukraine.

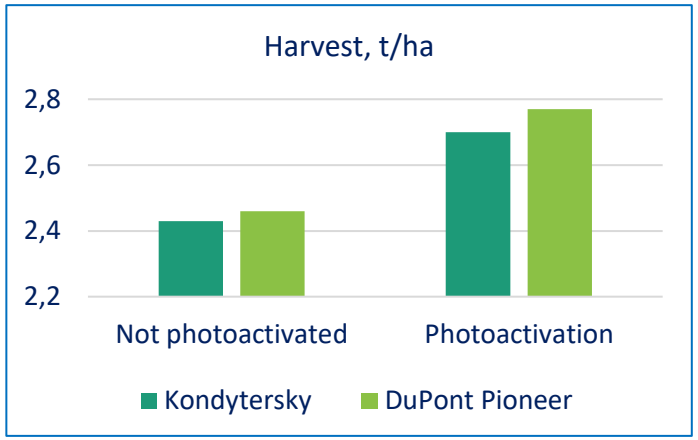


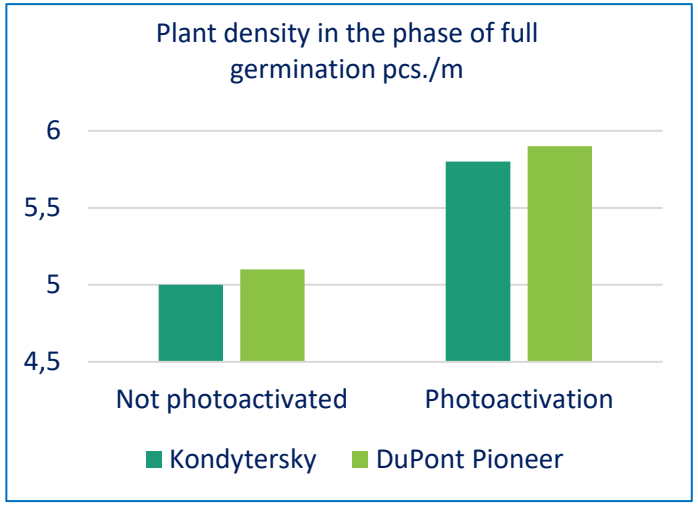
More details about the effectiveness of photoactivation on our website:
https://www.waterlight.pro/agriculture/photoactivation-of-seeds/

Sunflower

- *Seeds of the "Konditersky" and Pioneer hybrids were selected for a comparative analysis. No fertilizers were applied.*
- *Photoactivation of the seeds resulted in an increase in sunflower yield of more than 10%, from 2.7 to 2.77 t/ha, which is an increase of 0.27 and 0.31 t/ha.*
- *Photoactivation reduced the incidence of gray and white rot by 2.37 to 2.53 times and that of phomosis by 1.79 to 1.88 times.*







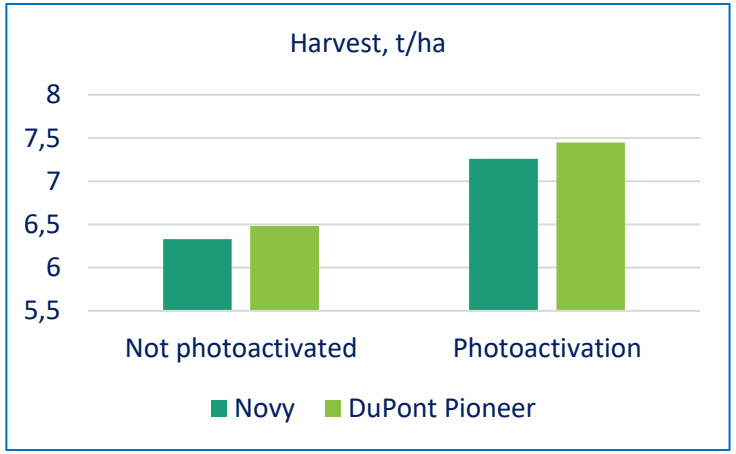
Corn

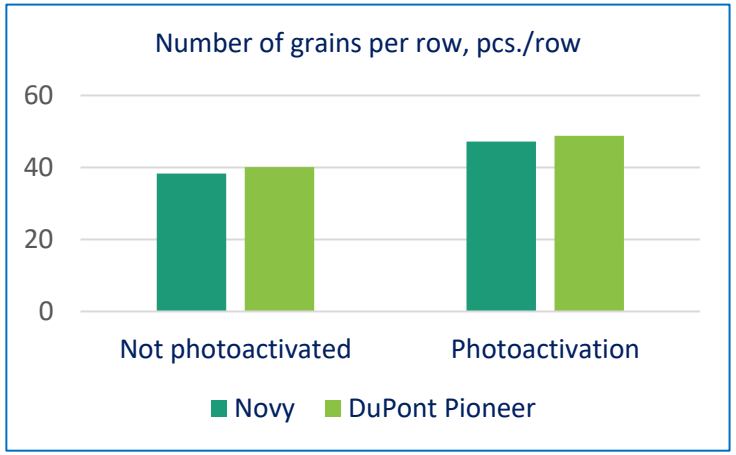
Seeds of the Novy and Pioneer hybrids from DuPont were selected for comparative analysis. No fertilizers were applied.

Photoactivation ensured:

- *a 13% increase in corn yield—from 6.33 to 7.26 t/ha and from 6.48 to 7.45 t/ha, respectively;*
- *a 1.52 to 1.57-fold reduction in helminthosporiosis, a 1.52 to 1.54-fold reduction in rust, and a 1.6 to 1.57-fold reduction in smut.*





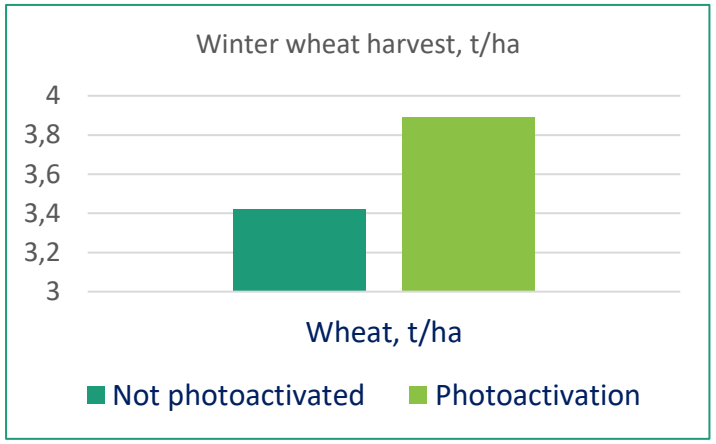


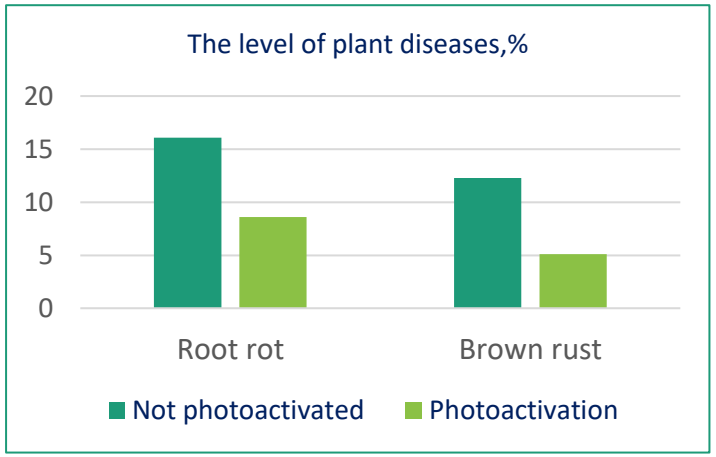
Wheat

Photoactivation of winter wheat seeds resulted in:

- *a 13.7% increase in yield (from 3.42 to 3.89 t/ha);*
- *a 5% increase in the weight of 1,000 seeds (from 40.2 to 41.6 g);*
- *a 7.5% reduction in root rot diseases (from 16.1 to 8.6%) and a 7.2% reduction in brown rust (from 12.3 to 5.1%).*





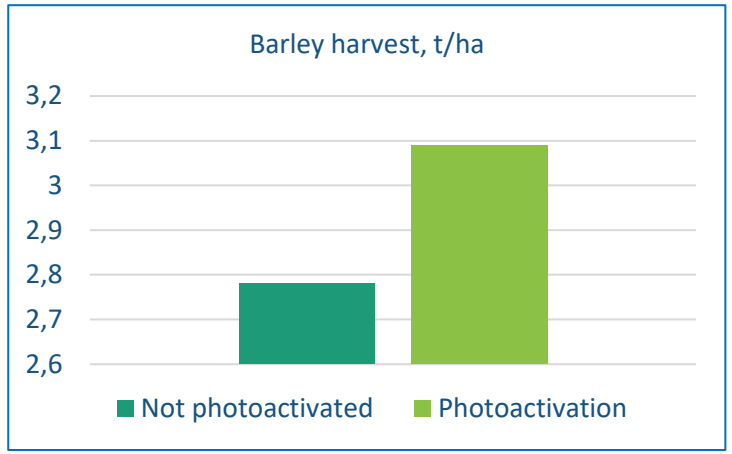


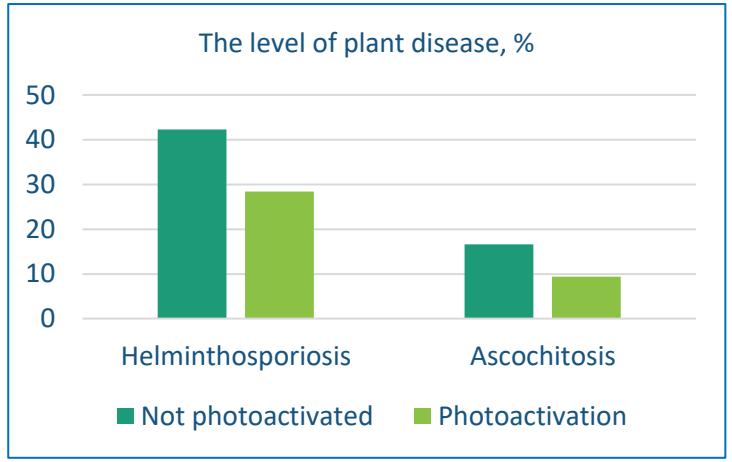
Barley

Photoactivation of barley seeds resulted in:

- *an 11% increase in yield (from 2.78 to 3.09 t/ha);*
- *a 13.9% reduction in barley diseases caused by helminthosporiosis (from 42.3 to 28.4%) and ascochytosis (from 16.6 to 9.4%);*
- *an increase in the weight of 1,000 seeds by 5% (from 41.7 to 43.8 g).*

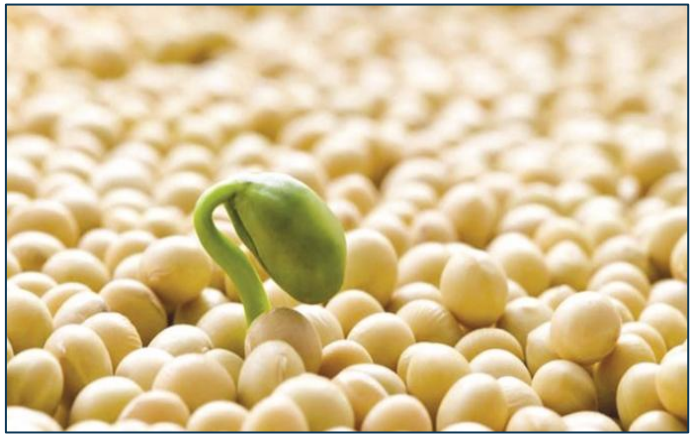


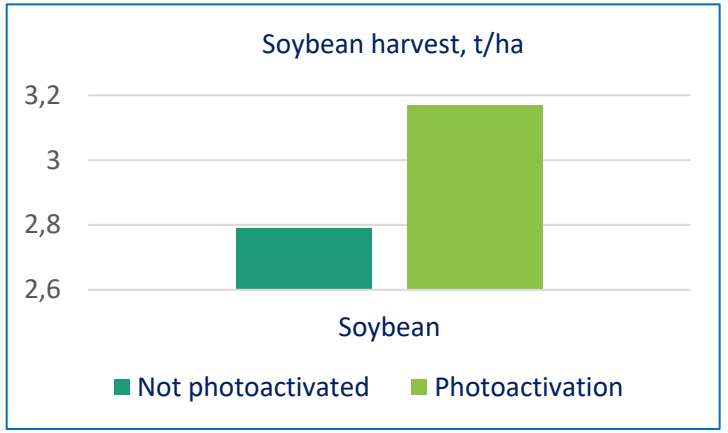


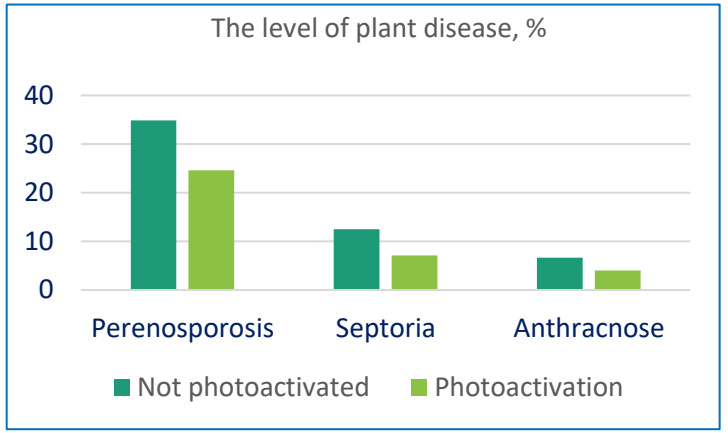


Soybean

- *Photoactivation of soybean seeds resulted in:*
  - *a 12% increase in soybean yield from 2.83 to 3.17 t/ha;*
  - *a 1.42-fold reduction in peronosporosis, a 1.76-fold reduction in septoria, and a 1.65-fold reduction in anthracnose.*





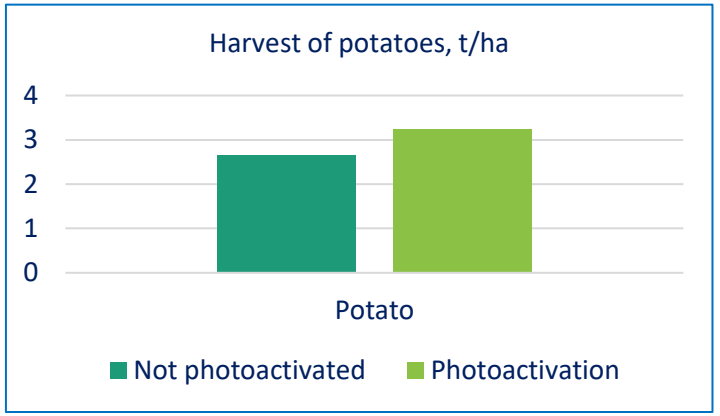


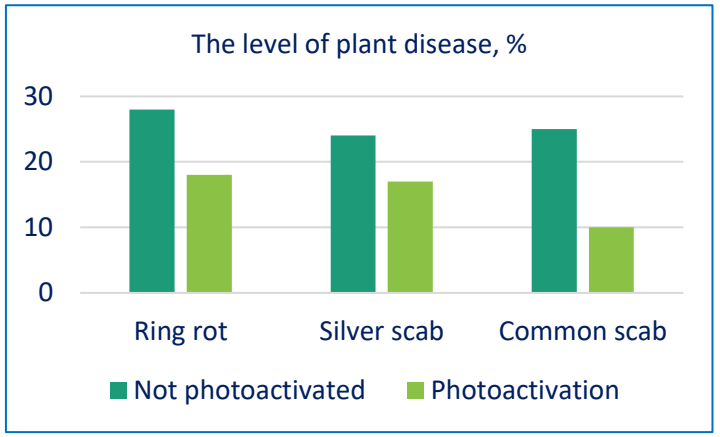
Potatoes

Photoactivation provided (Kuprevich Institute of Experimental Botany of the National Academy of Sciences of Belarus):

- *a 23% increase in potato yield—from 20.5 t/ha to 25.3 t/ha;*
- *a 2 to 2.5-fold reduction in mineral fertilizer consumption;*
- *a 30 to 35% reduction in potato tuber damage from ring rot, a 25 to 28% reduction from silver scurf, and a 56 to 62% reduction from common scurf.*



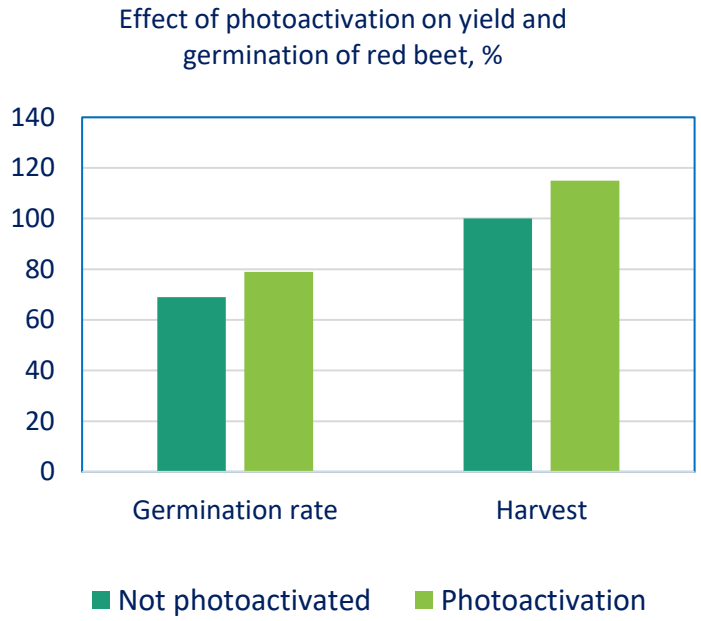




Red beetroot

- *Photoactivation of table beet seeds (Delikatesny variety) with reduced initial germination of 69% (instead of 75% according to DSTU 2240) ensured:*
  - *a 10% increase in plant germination, exceeding the standard requirements;*
  - *an increase in yield by 14–15%.*



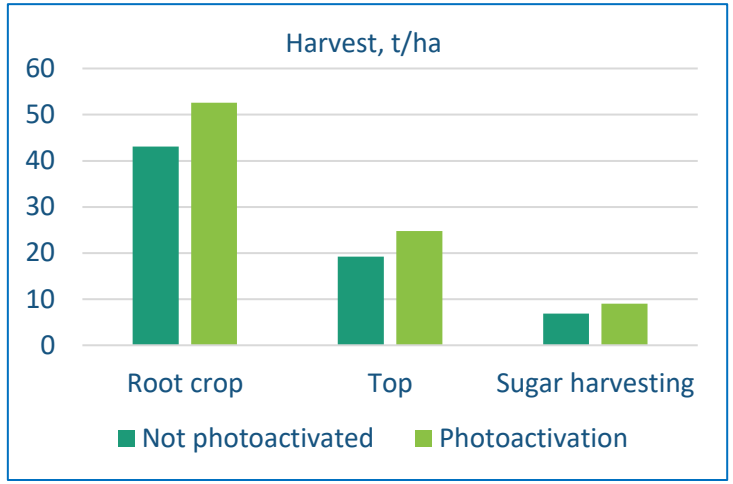


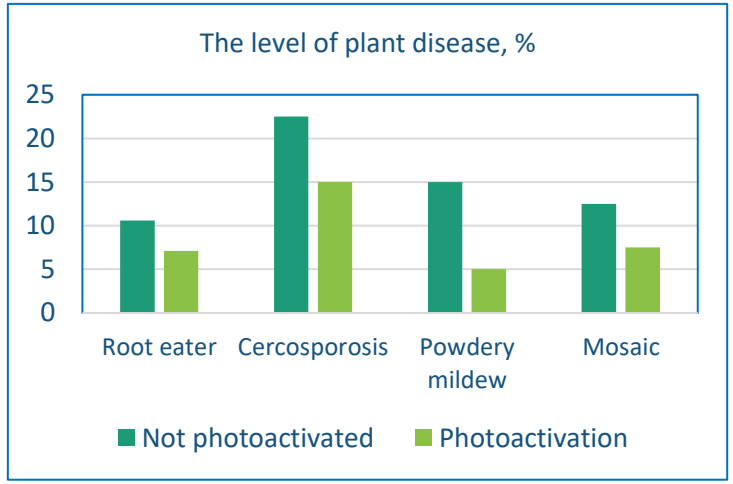
Sugar beet

Photoactivation of sugar beet seeds (Bulava hybrid) ensured (no fertilizers were applied):

- *a 22% increase in root crop yield—from 43.1 to 52.6 t/ha;*
- *a 67% reduction in the number of sugar beet seedlings affected by rootworm;*
- *a 31% increase in sugar yield, from 6.9 t/ha to 9.05 t/ha.*



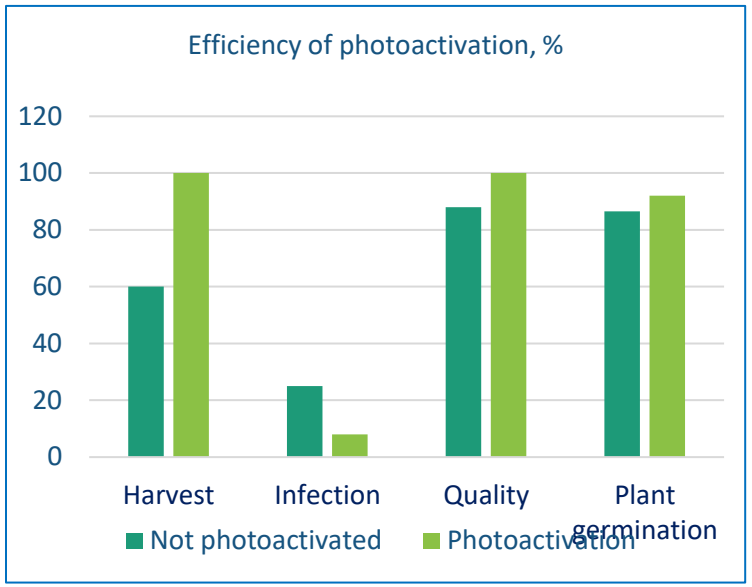




Cotton

- *The positive effect of photoactivation on the yield and quality of cotton and fiber was experimentally established.*
- *Photoactivation of cotton seeds provided:*
  - *increased seed germination from 86.5 to 92%;*
  - *reduction of seed infection by 30...32%;*
  - *increase in yield by 1.68...1.81 t/ha (i.e. by 44...48.1%);*
  - *improvement of technological quality of cotton fiber: increase in breaking load by 4.4...6.7% and breaking length by 10.5...11.3%.*





Advantages

- *The quality of plants grown from photoactivated seeds exceeds the quality of plants grown from non-activated seeds in all respects;*
- *Photoactivation significantly reduces the use of mineral fertilizers and chemical plant protection products, which is the basis of organic farming;*
- *Photoactivation protects the environment from pesticide pollution;*
- *PHOTOZONE increases seed germination and energy, which accelerates plant development and helps reduce crop losses due to insufficient soil moisture during sowing.*
- *Photoactivation of seeds increases plant resistance to drought, early frosts, and various diseases.*



PHOTOZONE photoactivators are:

Guaranteed ADDITIONAL yield.

ADDITIONAL profit of 100–200 EUR per hectare for open-field crops, or 250–500 EUR per 100 m² of greenhouse space.

- *Versatile application: photoactivation + disinfection.*
- *Cost-effectiveness: specific energy consumption does not exceed 5 kWh/t. The cost of pre-sowing seed treatment does not exceed 0.5–0.75 USD/t.*
- *Simple and reliable design. To perform photoactivation, simply connect the photoactivator to the electrical grid.*

The cost of the photoactivator is fully offset by the ADDITIONAL yield:

- ***for open-field cultivation—from a planted area of 100–200 hectares;***
- ***for greenhouses—from an area of 500–750 m².***



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WHAT WE DO TODAY DETERMINES OUR FUTURE



Seed photoactivators
PHOTOZONE
Ukrainian patent No. 73663
dated October 10, 2012

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