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## Increase in productivity. Modern approach

Preseeding UV radiation of seeds (photostimulation) belongs to "green technologies" and provides increase in productivity of crops, and also increases their resistance to various diseases and adverse climatic factors (including by a drought).

**Essence of technology.** At ultraviolet (UV) radiation of seeds permeability of biological membranes of cages changes that leads to stimulation of initial growth processes. As a result of UV radiation in seeds the level of oxidation of lipids, pH and activity of ATP changes that leads to strengthening of biopower and biosynthetic processes which lead to increase in energy potential of seeds. Besides, radiation of seeds of UV radiation with their preliminary irrigation by small doses of peroxide of hydrogen leads to intensive destruction of phytopathogens, i.e. to disinfecting of seeds (ecologically safe and effective analog of a traditional chemical protravelivaniye). UV radiation will mobilize in seeds genetically put growth reserves which are caused by centuries-old adaptation of plants to sunlight that brings to strengthening of growth and development of plants.



*Sprouts grown from seeds irradiated with UV radiation (right) and from seeds not photostimulated (left).*

**Construction.** At the present time our company has developed and issued two UV types of activators: drum and tray types. UV activator of drum type (fig. 1) represents the cylindrical camera in which special a UV lamp is placed.

The processed seeds via the special hatch are filled up in a drum cavity. Then the drum is given to rotation and UV radiation of seeds is made. After holding a session of radiation which is made within several minutes a UV lamp are switched off, and unloading of the processed seeds is made. Then processing repeats.



Fig. 1. UV activator of the drum type  
OBP09.1T10 productivity to 500 kg/h.

Feature of the UV activator of drum type is recurrence of his work, i.e. processing of seeds is made by short cycles that complicates the organization of process of their continuous stimulation. However this UV type of activators has higher efficiency as in it along with UV the possibility at the same time of use of ecologically safe ozone or peroxide of hydrogen is available radiation. So for increase in efficiency of processing (stimulation and disinfecting) seeds before their loading in a drum can be subjected to preliminary spraying by peroxide of hydrogen or to ozonization. At preliminary irrigation of seeds of radiation saturation of seeds oxygen happens peroxide of hydrogen or processing by ozone

under the influence of UV – that leads to additional increase in viability of seeds and increase in energy of growth of plants. Also before processing (or after it) necessary minerals and biostimulators can be added to seeds.



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# Green technologies

Also our company has developed one more type of activators – UV activators of tray type (fig. 2) which provide a possibility of the organization of a continuity of processing. These installations have more high efficiency (1 – 2 tons/hour).



Fig. 2. The OBP10K.2430AS installation conveyor-based with a productivity up to 1000 kg of seeds in an hour.

They are also able to provide necessary extent of photoactivation of seeds and saturation of seeds with the activated oxygen (at their preliminary processing by hydrogen peroxide). Advantage of UV activators of tray type is their high efficiency and a possibility of automation of technological process.

**Results of application.** Preseeding UV processing of seeds positively influences increase in productivity of other grain, melon and vegetable crops. So processing photostimulation of seeds of wheat allows to provide increase in productivity on average by 10 - 30%, corn – for 10 - 40%, flax and barley – for 10 - 15%, sunflower, colza and other oil-bearing crops – for 15 – 50%, pepper – for 15 - 30%, eggplants – for 10 - 30%, cucumbers – for 15 - 20%, sugar beet – for 10 - 25%, water-melons and melons – for 20 - 30%, potatoes – for 20 – 25%. Positive results have been received at UV processing of the wetted cotton seeds that has led to increase in productivity for 10 – 25% .

## ***Influence of ultra-violet radiation on energy of germination and viability of seeds of some vegetable cultures.***

Cultura	Sort	Energy of germination, %			Viability, %		
		Control	Processing	Increase	Control	Processing	Increase
Carrots	Bright	26	46	20	30	49	19
Beet table	Delicious	56	69	13	66	79	13
Tomato	Soft	33	62	29	56	73	17
Cabbage white-headed late	Kharkov winter	19	26	7	25	39	14

## ***Results of UV processing of sunflower (droughty 2010)***

Grade	Gourmand		Netlet		Sur		Improvement of indicators, %
	Rough	UV-proc.	Rough	UV-proc.	Rough	UV-proc.	
Viability, %	72	93	71	90	72	92	26 - 29
Energy of germination, %	70	72	69	73	75	79	3 - 5
Productivity, c/hectare	22	37	23	35	25	39	52 - 68

Along with increase in productivity photostimulation of seeds of UV radiation positively influences increase in content of sugar, vitamin C, carotene, etc. Besides acceleration of maturing of plants for 3 – 10 days is observed. Also essential factor is the low price of the UV activator and the low cost of preseeding processing of seeds (0.3 – 0.5 USD/t). Specific expenses of the electric power on UV technology of activation of seeds don't exceed 1 kW / 1 t.



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## **Main advantages of a method of preseeded processing of seeds:**

- 1) low cost of disinfecting and stimulation of seeds;
- 2) essential increase in productivity of agricultures that allows to get the maximum profit with the minimum expenses or to reduce acreage;
- 3) increase in energy of viability and germination of seeds which have been subjected to photostimulation by UV radiation, and as a result decrease in losses of a harvest because of insufficient moisture content of the soil during sowing;
- 4) reduction of terms of maturing of a harvest;
- 5) transfer of production to the category of green technologies and organic agriculture that promotes increase in the export potential of the grown-up production caused by refusal of use of toxic chemical medicines.

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