

Biotechnical system of irradiating crop seeds

Andriy Smerdov, Alexander Petrovsky

Abstract – Biotechnical system of irradiating crop seeds with electro-magnetic field is described in the report. The results of laboratory and field testing different varieties of winter wheat are presented.

Key words – biotechnical system, electro-magnetic field, irradiation, seeds, germinating power, energy of growth.

I. INTRODUCTION

The analysis of economic activities in agro-industrial complex of Ukraine shows that enlarging expenditures on manufacturing crop growing produce leaves behind crop yields increase: 2.5 per cent of anthropogenic input is necessary to receive 1 per cent of yield increase [1]. One of the reasons of produce loses is the lack of germination after sowing seeds. The rate of it is 10-15 per cent. Pre-sowing seeds' treatment by electro-magnetic field is used to increase their germinating capacity and the energy of growth [2].

II. THE RESULTS OF RESEARCH

The report is devoted to the description of biotechnical system (BTS) of irradiating crop seeds by electro-magnetic field (EMF) and its results in experimental tests in field conditions.

Biotechnical system of irradiating seeds by EMF comprises master oscillator, functioning on frequency of 27.12 MHz, amplifiers' unit, controlling unit, connecting and coordinating, devices, electrodes with mechanical movement and power supply (source). The controlling unit ensures handling the system's work, smooth regulating exit power from zero to 60W, changing irradiation time from 1 to 25 minutes with the step of 1 minute. The coordinating device serves to correlate seed receiver contour and it consists of electrodes, a connecting device and a cable.

The developed BTS of seed irradiation has undergone laboratory and field tests with the aim of determining germinating power and energy of growth in different varieties of winter wheat - "Kolomak-5", "Poltavka", "Fora". The experiments have shown that when the irradiation capacity is 60 W, the germinating power varies from 70 to 97 per cent while the irradiation duration changed from 0 to 15 minutes.

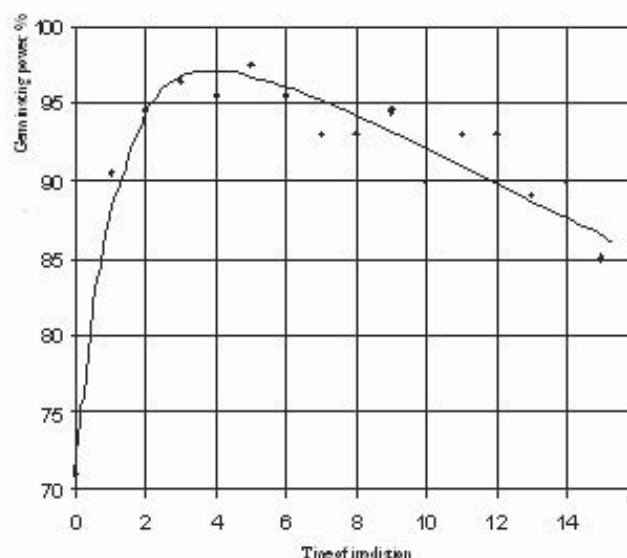


Fig. 1 The dependency between germinating power and time of irradiation for wheat "Kolomak-5"

The dependency shown on Fig. 1, demonstrates that germinating power, which is determined by the germinated seeds percentage to sown ones is extremely affected by the duration when the emitter's power is fixed. The maximum is observed when irradiation duration is 5 minutes. In this case the germinating capacity increases by 1.4 times in comparison with the seeds which are not irradiated before sowing.

III. CONCLUSION

The developed BTS of electro-magnetic seed irradiation ensured increasing germinating capacity of wheat variety "Kolomak-5" by 20-26 per cent having the exit power of 60 W and irradiation duration of 5 – 6 minutes.

LITERATURE

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^Andrey Smerdov, Alexander Petrovskiy the Poltava state agrarian academy, street Skovorody 1/3, Poltava, 36003, UKRAINE.
E-mail: smerdov@pdaa.com.ua