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DETERMINATION OF KEY PARAMETERS OF SEED SELECTOR IN PRACTICE.

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ABSTRACT. *The article presents the results of research on the process of sorting agricultural seeds in the electric field on such important properties as physical and mechanical and electrical properties, mass, geometric dimensions, dielectric constant.*

Keywords. Dielectric, dielectric drum, seed, silk thread, electronic scales, electrode, dielectric constant, electric field, rice weight, centrifugal force, dielectric sorting.

Based on the results of scientific research and theory, the selection of seeds of agricultural crops is one of the important agro-technical requirements for the seeds prepared for the sowing season in bifillary coils Dielectric sorters.

As a result of experiments conducted in this direction at the Scientific Research Institute of Agricultural Mechanization (ICMI) and Bukhara Engineering and Technology Institute (BuxMTI), by detecting and finding the rational parameters of the dielectric sorters, it is possible to substantiate the basic parameters of the above-mentioned device.

As a result, it is known from scientific research that by studying the physical-mechanical, biological, electrical properties of seeds of agricultural crops, it is possible to justify the design parameters of sorting devices and the optimal parameters of the working drum for each seed[1].

In order to implement this, scientific research and experiments were conducted at the Scientific Research Institute of Agricultural Mechanization (ICMI) and the Bukhara Institute of Engineering and Technology (BIU). As a result of the experiments, it was possible to study the physical and mechanical properties of the seeds by substantiating the rational parameters of the dielectric device for electrical sorting[2].

For experiments, according to the requirements of the state standard, we take 200 seeds from a sample, place them on a special numbered board and record the geometric dimensions of each seed using a micrometer MMN. we find the results obtained as a percentage by the following equation[3].

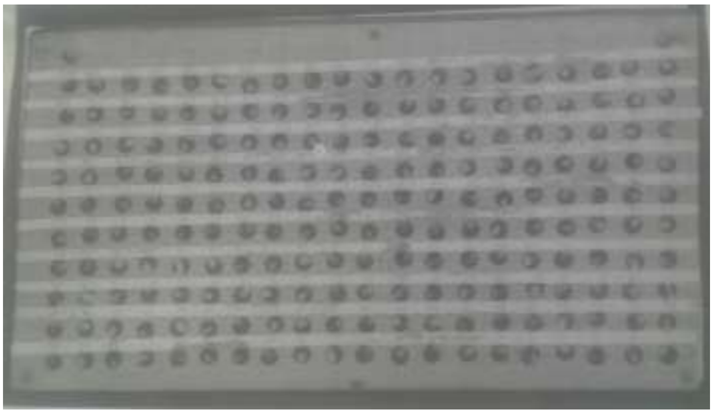


Figure 1. A board made to determine the geometric dimensions of the seeds.

$m_n\, m_ё = \frac{mn}{mё} \cdot 100\ \%$

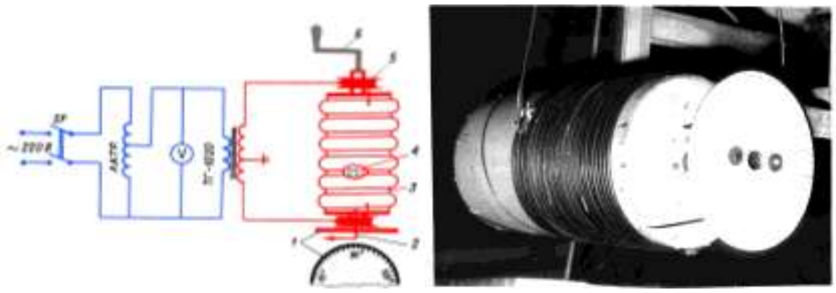
Here: $m_n = m_0 - m_ё$

m_0 = seed weight,

$m_ё$ = naked seed

Samples of seeds taken voluntarily and placed in a board cell are shown. Based on the values found in the experiment, we construct a graph of the relationship between the electrical resistance and the mass of the seed R = f (m).

For the next experiment, we created a device to determine whether the seed depends on the physical properties of the seed by determining the angle of separation of the seeds from the working drum surface and conduct the experiments (Figure 2).



a) b)

Figure 2.The wiring diagram (a) and (b) of the seed separation angle measuring device are shown.

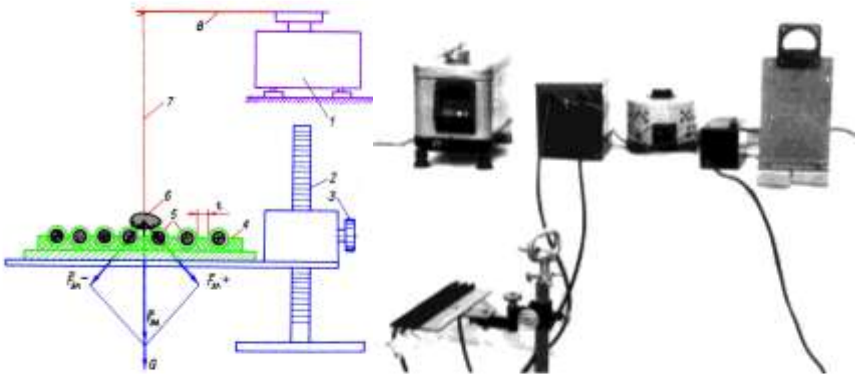
1 disc scale, 2 indicator, 3 dielectric drum, 4 seed, 5 connecting rod, 6 handle.

In order to conduct an experiment on a newly created device, i.e. the ability to determine the angle of separation of seeds, we conduct an experiment when the electrodes are energized and not energized[4]. To conduct experiments on this device, the working body of the dielectric seed sorter, i.e. some rational parameters of the drum must be constant, such as the distance between the electrodes, the frequency of rotation of the drum and the angle of interruption on the electrodes, we conduct experiments on the newly created device.

In determining the angle of separation of the seeds on the surface of the working organ drum, we take an arbitrary 15 seeds and repeat the experiment 5 times for seeds of different weights located in the cell. Using high-voltage transformer TG-1020 on the electrodes located on the surface of the working drum, we conduct experiments by giving a high voltage at values of U = 1800, 3200, 5250 and 6250 V.

According to a special method, the weight and other parameters of each seed, i.e. the angle of separation when high voltage is applied to the electrodes on the drum surface and when it is not applied, are recorded.

When the experimenter separates the seed from the working drum surface, the drum is stopped and an indicator is recorded from the scale of the disc. The working body is the drum rotation frequency (Fig. 3) in the newly created device[5]. whichFm-min, we conducted centrifugal force experiments for the heaviest seed. We created a device to measure the electric force that pulls the seeds of agricultural crops onto the surface of the working body electrodes, a newly created device shown in Figure 3.



a) b)

Figure 3.Shows a schematic of the electric force acting on the seed drawn on the surface of the electrode with a bifillary tube (a) and (b) an overview of the device.

The following tools are needed to conduct the experiment: 1 - electronic scales, 2 - gear rail, 3 - screw, 4 - dielectric base, 5 - different polar electrodes, 6 - seed, 7 - silk thread, 8 - rivet.

It is known from scientific studies that the seed is polarized when it falls on the surface of the rotating drum, and due to the high voltage applied to the electrodes, the seed between the electrodes is negatively charged and the electrodes are positively charged. under the influence of force.

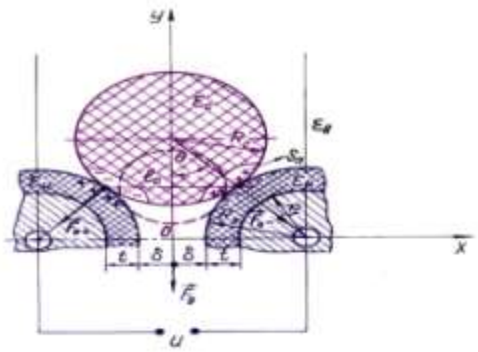
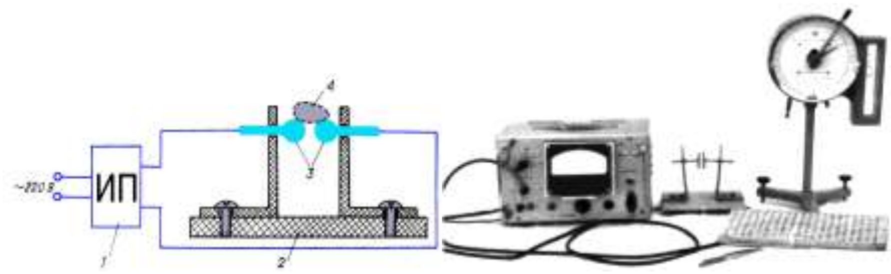


Figure 4.Forces acting on the seed between electrodes of different poles.

d is the distance between the electrodes; thickness of t-insulation; R 1-electrode radius; R c- seed radius; e_s- seed dielectric constant; this the electric force and the angle between the vertical; Constant voltage applied to U-electrodes; S nis the polarization surface of a single electrode and seed in an electric field; l_c-seed average electrical induction current.

As a result, the mechanical force affects the design parameters of the seed sorter, in which case we change the value of the high voltage applied to the bifilar coil electrodes to change the electrical power. This in turn creates a pulling and separating force[6].

Taking into account the above, we conduct experiments based on the parameters of dielectric devices, using the device shown in Figure 5.



a) b)

Figure 5.Electrical diagram of the seed electrical resistance measuring device (a) and general view of the experimental device (b).

The device consists of: 1 electronic scale, 2 gear rails, 3 screws, 4 dielectric bases, 5 different polar electrodes, 6 silk threads and 8 coils. A parallel electrode with a different pole diameter of 7.5 mm was placed in a dielectric base, spaced apart, in a shielded air gap (t = 1,2,3,4,5 and 6mm) and experimented using a top-down alternating screw 3.

The voltage value at the input of the high-voltage transformer TG-1020 supplied to the electrodes is changed by the laboratory autotransformer LATR-1[7]. To determine the electric force that pulls the seed to the surface of the various polar electrodes, a seed of unknown weight 6 is mounted on a silk thread 7, and the 8-pin difference is connected to an electronic scale VLTK-20. By lifting the electrode from the dielectric base 4 upwards, we change the screw 3 and continue until the seeds in the silk thread are pulled, giving a high voltage from the TG-1020 transformer to the different polar electrodes. Using a lever, slowly lower the base and repeat the experiment three times until the seed separates from the 6th surface[23].

We determine the relationship between the electric force acting on the electronic scale and the force of gravity on the electronic scale from the following equation.

F=F-G

Which: F-traction power, MG;

F-resultant force, MG;

G-gravity, MG;

Based on the newly developed experiments, we studied the possibility of studying the effect of electric force acting on the seeds of agricultural crops in a dielectric sorting device[9].

As a result, we found that it is possible to find the optimal value of the electrode spacing for dielectric sorters, the value of the voltage applied to the electrodes, and the value of the gravitational force[22].

In the next experiment, we conducted an experiment to determine the installation location of the separation plane to be installed under the working drum when the seeds of agricultural crops were sorted in a dielectric sorting device on a specially prepared stand (Figure 6).

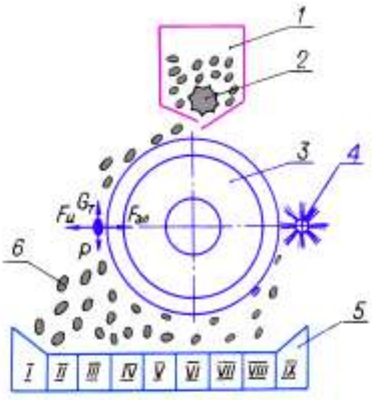


Figure 6.Determining the mounting location of the separation plane.

The stand consists of: 1-bunker, 2-supplier, 3-working body, 4-separation brush, 5-receiving bunker, 6-seed.

To determine the installation location of the separation plane, we perform the following experiment on the weight of the seeds, i.e., divide the receiving bunker into nine reactions and perform sorting on the laboratory stand (Fig. 6).

We measure the weight by taking 100 seeds from each fraction on a separate numbered board and measure the weight of the seeds using the following equation[21].

$$W_i=\frac{mi}{\Sigma mi}\cdot 100\%$$

Seeds separated by Wi-reaction,% ;-($i = 1,2,3,4, \ldots\ldots ..9$)

mi is the weight of the seed in each reaction, G;

We then take 100 seeds from each fraction in the experiment according to the requirements of the state standard and determine the weight and density, according to the requirements of the required methodology. By dividing the selected seed into fractions, as well as the weight and density of 1000 seeds, we determine the location of the separation plane and set the separation plane there[18].

As a result of experiments on newly developed devices, the value of the dielectric sorting device, drum diameter D = 350 mm, distance between electrodes t = 4mm, electrode diameter d = 7.5 mm, drum rotation frequency n = 60 m-1 and the voltage applied to the electrodes U = 5250 V. When the seeds of agricultural crops are sorted in a dielectric device, it is possible to obtain the expected positive results[19].

If we change the optimal parameters of the working drum, it is possible to sort the seeds of agricultural crops of different sizes by the dielectric method[20].

REFERENCES

1. Rosaboev A.T. Seed sorting in an improved device // AGRO ILM. - Tashkent, 2015. –№ 6. - B .74-76.
2. Rosaboev A.T. Scientific and technological bases of sorting of beams in triboelectric device. Monograph: - Tashkent: “Sparks of Literature”, 2015. –107 p.
3. PardaShoyimov, BekhruzMurodov, KhudoyorXafizov, and BarchinoyMurodova.Influence of electric power and other forces on the quality of cotton seeds on the surface of working body. Scopus, Conference Paper. E3S Web of Conferences 264, 04010 (2021)
4. Rosaboev A.T., Shaimova S.P. Theoretical studies of sorting rice seeds in the electric field.Scopus, Conference Paper. E3S Web of Conferences 216, 01144 (2020).
5. Khafizov I., Komil G., Muxammedov Sh., Jurakulov A. Energy saving when using a variable frequency drive in pump installations, Journal of Critical Reviews, ISSN- 2394-5125, **7** (12), pp.99-102, (2020)
6. Khafizov I.I., Khaitov B.B. The investigation of ions implantation processes into a single-crystal GaAs (001) in order to increase the efficiency of the solar cells, MODERN SCIENCE International scientific journal № 02, 2017, Founder and publisher: "Strategic Studies Institute" LLC., pp.43-46, Moscow, (2017)
7. Khafizov I.I., Gafforov K.K. Application and prospects of variable frequency means in electric drives of pumping units, International scientific-practical electronic journal «MOYA PROFESSIONALNAYA KARERA» (ISSN 2658-7998, dogorov s Elibrary №284-07 / 2019), (2020)

8. Khafizov I.I., Khafizov X.I. Modeling the introduction of ions into single-crystal gaas (001) to create p-n junctions in order to increase the efficiency of solar cells, MOLODEJNYY ISSLEDOVATELSKIY POTENTSIAL, Sbornikstatey II Mezhdunarodnogonauchno-issledovatelskogokonkursa, sostoyavshegosya January 11. v g. Petrozavodsk, pp. 105-111

9. Babanazarova N.K., Charyeva M.R. Voprosypreobrazovaniyabolshixperemennyxtokov. «UNIVERSUM», Scientific journal, **5** (75), Moscow, (2020)

10. Jo'raev M.Q, Muzaffarov F.F, RustamovS.Sh. "Transparent Surface Lens Of Low-Temperature Solar Devices" The American Journal of Applied Sciences, 2 (10), 145-149

11. Khafizov I.I., Komil Gafforov, Bakhodir Oblokulov, Aziz Azimov Elimination of energy losses in pumping installations by means variable frequency drive, International Engineering Journal For Research & Development, Vol.5, Issue 3, April 2020, E-ISSN NO:-2349-0721, Impact factor : 6.03.P.83-89, http://iejrd.com/index.php/%20/article/view/17/5

12. Khafizov I.I., Shaymatov B.,GafforovK.K., Orzikulov B.. Elimination of energy losses in pump units and increase of power efficiency by means of the tool of control of speed.Innovative technologica. (ISSN:2776-0987) Volume 2, Issue 5, May, 2021.

13. Khafizov I.I., GafforovK.K., Atoyev S. Jorakulova M..Economical mode by stabilizing the fluid supply pressure and eliminating energy losses in pumping units. ResearchJet Journal of Analysis and Invertions. (ISSN:2776-0960), Volume 2, Issue 4, April 2021.

14. IslomKhafizov, KomilGafforov, BahodirYormamatov."Mathematical Analysis of Electric Power Replacement Schemes of Weaving Machines", European journal of life safety and stability (EJLSS).ISSN 2660-9630. Volume 12, 2021 http://www.ejlss.indexedresearch.org/index.php/ejlss/article/view/283

15. Islom Khafizov, Komil Gafforov, BektoshMiyliyev. "Advantages of using a variable speed drive in pumping units" Journal of education discoveries and lifelong learning.ISSN: 2776-0995 Volume 2, Issue 5, May, 2021https://ejedl.academiascience.org/index.php/ejedl/article/view/67

16. Islom Khafizov, Komil Gafforov, ZilolaImomova. "Analysis of Pump Agrigarts Electric Power Control Elements in the Supply of Multi-Storey Houses Water Supply", International journal on economics, finance and sustainable development. Vol.3No.12(2020). https://journals.researchparks.org/index.php/IJEFSD/article/view/2520

17. Islom Khafizov, Komil Gafforov, ZilolaImomova. " Reduced capital costs when using a frequency-controlled electric drive in pumping units", International Journal on Integrated Education. Vol.4No.4(2021).https://journals.researchparks.org/index.php/IJIE/article/view/1607

18. Islom Khafizov, Komil Gafforov, Sharif Murtazoyev. "Technique of a feasibility study for the use of a variable frequency drive in pumping units", Web of scientist: International scientific research journal. Volume 2, Issue 4, April, 2021. https://wos.academiascience.org/index.php/wos/article/view/52

19. Islom Khafizov, Komil Gafforov, Sharif Murtazoyev. "Mathematical Analysis of Electric Motor Braking Modes of Weaving Machines", International Journal of Discoveries and Innovations in Applied Sciences. Volume: 1 Issue: 7, December, 2021.https://openaccessjournals.eu/index.php/ijdias/article/view/831

20. Islom Khafizov, Komil Gafforov, SukhrobAtoyev, MehrangizJòrakulova. "Economical mode by stabilizing the fluid supply pressure and eliminating energy losses in pumping units",International Journal of Discoveries and Innovations in Applied Sciences. Volume 2, Issue 4 April, 2021.https://reserchjet.academiascience.org/index.php/rjai/article/view/100/90

21. Jo'raev M.Q, Sattorov T.A, Muzaffarov F.F, RustamovS.Sh "Transparent Surface Lens Of Low-Temperature Solar Devices" The American Journal of Applied Sciences, 2(10), 145-149. https://usajournalshub.com/index.php/tajas/article/view/1297/1234

22. YusubalievA., SHoyimov P., SHoyimova S.P., Murodov B.B. Urug‘nidielektriksaralashustkunasi. – Buxoro, 2019 №5, 134 – 137 bet.

23. SHoyimov P., SHoyimova S.P., Murodov B.B. Izuchenieosnovnых fizicheskixsvoystvsemyan. // Fan vatexnologiyalartaraqqiyotiilmiiyvatexnikaviyjurnali. – Buxoro, 2020 №1, 5 – 8 bet.

24. SHoyimov P., Asraev Z., SHoyimova S.P., Murodov B.B. CHigitnidielektriksaralashustkunasi(CHDSU–2)ningvertualishrejimi. // Fan vatexnologiyalartaraqqiyotiilmiytexnikaviyjurnali. – Buxoro, 2020 №3, 21 – 26 bet

25. Barakaev N.R., SHoyimov P., Saidov S.F., Muzaffarov F.F., Murodov B.B. Elektrusuldasaralanibolinganpaxtachigitniekishorqalitolaningsifatko‘rsatgichlarinioshirishmu ammolari. // Fan vatexnologiyalartaraqiyoti. Ilmiy – texnikaviy jurnali. – Buxoro, 2020 №3, 35-39 bet.

26. SHoyimov P., SHoyimova S.P., Murodov B.B. Razrabotkaenergo i resursosberegayuщego dielektricheskogosortiruyuщego ustroystvasemyanxlopchatnika. //Fan vatexnologiyalartaraqiyoti. Ilmiy – texnikaviy jurnali. – Buxoro. 2020

27. SHoyimov P., SHoyimova S.P., Murodov B.B. Izmerenieelektricheskogosoprotivleniyasemyanxlopchatnika. O‘z.Ova O‘MTV. BuxMTI, “Zamonaviyishlabchiqarishningmuhandislikvatexnologikmuammolariniinnovatsionechimlari” xalqaroilmiyanjumanmateriallari. Buxoro,- 2019, - 400 – 401 s.