WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 8, Aug., 2022

EFFICIENCY OF ELECTROTECHNOLOGICAL SELECTION OF MUNG BEAN SEED

A. Mukhammadiev
Institute of Energy Problems under the Academy of Sciences of the Republic of Uzbekistan

N. M. Makhmudov
Scientific Research Institute of Agricultural Mechanization

Summary
The article presents the results of experimental studies conducted on the theoretical justification of the possibility of sorting mung bean seeds in an electric field.

Keywords: Mung bean, electric sorting device, sorting, working body, two different electrodes, voltage, electric field, uneven electric field, electric field strength, mass, geometric size, density, electrical resistance, dielectric absorption, seed fraction, technical fraction.

Таянч сўзлар: Мош уруғи, электр саралагич қурилмаси, саралаш, иш органи, икки хил электрод, кучланиш, электр майдони, нотекис электр майдони, электр майдон кучи, массаси, геометрик ўлчами, зичлиги, электр қаршилиги, диэлектрик сингдирувчанлиги, уруғлик фракция, техник фракция.

Аннотация: Мақолада мош уруғини электр майдонида саралаш мумкинлигини назарий асослаш бўйича ўтказилган экспериментал тадқиқотларнинг натижалари келтирилган.

Introduction

It is known that in order to obtain high-quality seeds of agricultural crops, biological properties close to each other, with high fertility and potential yield in laboratory and field conditions, it is necessary to select them according to all important physical and mechanical properties, including electrotechnological influence [1,2]. This requirement is fully met by the sorting of agricultural crop seeds in the electric field. Because the electric field affects the seeds with the power of the electric field directed to them, taking into account all their important physical and mechanical properties [3]. As a result, the seeds are sorted in the electric field according to their mass, geometric dimensions, density, electrical resistance, dielectric absorption and other properties.

Table-1 shows the result of sorting mung bean seeds in an electric sorting device. Experimental studies were conducted when the diameter of the working body of the electric sorter device was 300 mm, the number of revolutions was 40 min-1, the diameter of the potential electrode was 7.0 mm, the diameter of the grounded electrode was 3.0 mm, and voltages of 3000, 4000 and 5000 V were applied to electrodes of two different diameters [4].

Table-1 The result of sorting mung bean seeds

Number	The value of voltage applied to the electrodes and the name of the fractions	Fractionation, %	Mass of 1000 seeds, g	Difference compared to control	
				g	%
1	*U*=3000 V Control After Sorting: -seed fraction - technical faction	 100,0 92,8 7,2	 63,20 65,06 39,23	 – +1,86 −23.97	 – +2,94 −37,92
2	*U*=4000 V Control After Sorting: -seed fraction - technical faction	 100,0 84,4 15,6	 63,20 66,06 47,73	 – + 2,86 −15,47	 – + 4,52 −24,48
3	*U*=5000 V Control After Sorting: -seed fraction - technical faction	 100,0 76,6 23,4	 63,20 67,65 48,63	 – +4,45 −14,57	 – +7,04 −23,05

As can be seen from the results presented in the table, with the change of the structural dimensions of the working body and the working mode, as well as the value of the voltage applied to the electrodes with two different diameters, the amount of mung bean seed separation into fractions and the change in the mass of 1000 seeds were observed. For example, if a voltage of around 3000 V was applied to the electrodes of two different diameters, 92.8% of mung bean seeds were separated into the seed fraction, and the mass of 1000 grains was 65.06 grams, which increased by 1.86 grams compared to the control. 76.6 percent of mung bean seeds were separated into the fraction, and the mass of 1000 pieces was 67.65 grams, which increased by 4.45 grams compared to the control. In other words, increasing the value of the voltage applied to electrodes of two different diameters led to a decrease in the amount of seeds separated into the seed fraction and an increase in the mass of 1000 seeds.

In mung bean seeds separated into the technical fraction, a different law was observed [5], that is, with the increase in the value of the voltage applied to the electrodes of two different diameters, the amount of seeds separated into the technical fraction increased and the mass of 1000 seeds increased.

WEB OF SCIENTIST: INTERNATIONAL SCIENTIFIC RESEARCH JOURNAL
ISSN: 2776-0979, Volume 3, Issue 8, Aug., 2022

The analysis of the results presented in Table-1 showed that from the point of view of technological efficiency of sorting, it is sufficient to apply a voltage of about 4000 V to electrodes of two different diameters to sort mung bean seeds in an electric sorting device. At this value of tension, 84.4 percent of mung bean seeds are separated into the seed fraction, and the mass of 1000 seeds is 66.06 grams, an increase of 2.86 grams or 4.52 percent compared to the control.

Some of their physico-mechanical properties were studied and compared to each other after sorting the mung bean seeds in an electric sorting device.

To study the mass of 1000 seeds, mung bean seeds sorted by electric sorter were separated from their composition according to [6], in four replicates of 100 seeds. Separated mung bean seeds were placed in previously prepared bags and their mass was measured separately. Seed mass was measured using a Ming Heng 6S electronic scale.

Figure-1. Overview of the Ming Heng 6S electronic scale

Processing of the obtained results using the method of mathematical statistics based on the programs available on computers given [7; 8].

Table 2 presents the results of studying the mass of 1000 pieces of "Turon" and "Durdona" mung bean seeds sorted in the initial and electric sorting device.

Number	Name of seeds and fractions	Mass of 1000 seeds, g	Mean squared deviation, g	Coefficient of variation, %
1	Mung bean seed: Turon initial seed Seed fraction	 61,07 64,02	 1,82 0,67	 2,97 1,04
2	Mung bean seed: Durdona initial seed Seed fraction	 63,20 66,06	 1,54 0,59	 2,52 0,89

As can be seen from the results presented in Table-2, when the average square deviation s = 1.82 grams and the coefficient of variation V = 2.97 percent of the original "Turon" mung bean seeds, the mass of 1000 mung bean seeds was 61.07 grams on average. After sorting in the electric sorting device we proposed, when s=0.67 grams and V=1.04%, the mass of 1000 mung bean seeds divided into seed fraction was 64.02 grams, which increased by 2.95 grams compared to the mass of the original mung bean seeds. .

As can be seen from the results presented in the table, when the average square deviation s = 1.54 grams and the coefficient of variation V = 2.52 percent of the original "Durdona" mung bean seeds, the mass of 1000 mung bean seeds was 63.20 grams on average, we suggest after sorting in the electric sorting device, when s=0.59 grams and V=0.89%, the mass of 1000 mung bean seeds divided into seed fractions was 66.06 grams, which increased by 2.86 grams compared to the initial mass of mung bean seeds.

The analysis of the obtained results shows that the mass of 1,000 seeds in the fractionated option, when sorting mung bean seeds in an electric sorting device, increases, and seeds close to each other in terms of mass are also obtained. The value of the coefficient of variation in the variant divided into the seed fraction compared to the original

Decreased from 2.85 times to 2.83 times. So, when mung bean seeds are sorted in an electric sorter device, with an increase in mass of 1000 seeds, seeds close to each other in terms of mass are obtained.

REFERENCES

1. Rosaboev, A. T., & Maxmudov, N. M. (2019). Modernized device for seed sorting of legumes. Innovatsionnoe razvitie.–Tashkent, 77-82.
2. A. Mukhammadiev, R. D. Matchanov, I. Turopov and others. Electrical technology in agriculture in Uzbekistan (monograph) - Tashkent, 2020-171 p.
3. Rosaboev, A., & Maxmudov, N. (2020). Ways to improve the quality of legume seeds. Agro Ilm.–Tashkent, (2), 32-33.
4. Uz.R. Patent No. IAP 06673. Device for sorting seeds of agricultural crops / Rosaboev A.T., Imomkulov U.B., Makhmudov N.M., Vakhobova S.K // Official bulletin, 2022. –№1.– B. 50-51.
5. Umarov, Q. B., & Makhmudov, N. (2021). BASIS OF THE STRENGTH OF THE MUNG BEAN SEED ON THE EARTH OF THE WORKING BODY. МЕХАНИКА ВА ТЕХНОЛОГИЯ ИЛМИЙ ЖУРНАЛИ, (4), 52.

6. Seeds of agricultural crops. Methods for determining the mass of 1000 seeds. GOST 12042-80 // Official publication. - Moscow,
7. 2011. - 4 p.
8. Rosaboev A.T. Technique for studying the deformation and elasticity of fibers in an electric field // Bulletin of Tash State Technical University. - Tashkent, 2015. - No. 3 - S. 89-54.
9. Vedinyapin G. General methodology of experimental research and processing of experimental data. – M.: Kolos, 1973. – 199 p.