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MAIN DIRECTIONS OF DEVELOPMENT OF TECHNOLOGY AND IMPROVED TECHNOLOGY OF SHEEDING, SEPARATING, ROASTING, PRESSING, AND GRANULATED PRESS FROM SUNFLOWER SEEDS CULTIVATED IN UZBEKISTAN

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Annotation : Uzbekistan differs in hot climatic conditions from the Russian lands, where sunflower seeds are mainly grown. In connection with this, we studied the component compositions, the effect of moisture on the bulk density and other equally important indicators of sunflower seeds and products of its processing. It has been established that sunflower seeds cultivated in the hot climatic conditions of Uzbekistan have distinctive features in physical-mechanical and physical-chemical properties than in the Russian regions. The linear dimensions, component compositions, the effect of moisture on the bulk density of sunflower seeds have been determined. It has been established that in the hot climatic conditions of Uzbekistan, the cultivation of sunflower seeds is more efficient than in the Russian regions.

Key words: sunflower, oil content of seeds, processing, dehulling, kernel, protein products, tons thickness of seed *husks, major axis, oil , training, innovation, modern technologies*

1. INTRODUCTION:

In our republic were developed comprehensive Mary to fully meet the needs of new types of oil seeds, in etc. Sunflower seeds in order to expand the raw material base of the republic's fat and oil enterprises. Sunflower oil, unlike traditional cottonseed oil, contains polyunsaturated fatty acids, vitamins, carotenoids and other nutritionally valuable components. Sunflower oil, this ready-made salad oil, after its deodorization, can be used in the

manufacture of canned food, mayonnaise and salad dressings. Tumbled particular attention to their implementation, removal of special attention to research on planting new varieties of sunflower, reached theoretical and practical results to improve the quality and diversification of oil and fat products in particular for the processing of seeds of sunflower . The strategy of the movement for the further development of the Republic of Uzbekistan defines the task of accelerating the development of production based on high technologies and aimed at the production of highly liquid finished products of deep processing based on local cheese resources.

2. METHODS OF RESEARCH.

In the practical implementation of research, physiological biotechnological, biochemical , sanitary and hygienic statistical methods were used. The work also used modern methods of physical and chemical analysis, an upgraded device PMS-1.

3. RESULTS OF STUDIES

Based on the practical results of scientific research carried out on the physiological characteristics of sunflower varieties, the scientific substantiation of the biochemical composition of grain in moderately salted soils. The ontogeny of growth and development of local varieties of sunflower of the control Russian, Uzbek and selection of varieties Krasnodar, Ukrainian in moderately saline soils and the formation of tubers on the roots of sunflower have been determined, as well as recommendations for growing sunflower have been developed and introduced in the production of regions of the Republic of Uzbekistan.

Fat industrial and Uzbekistan about leads some work on new quality of raw materials oilseeds, [1] Decree of the President of the Republic of Uzbekistan, the Ministry of Agriculture to provide methodological assistance to farmers and entrepreneurs engaged in planting and processing of seeds of sunflower [2].

At present, the cultivation and processing of sunflower seeds as an oilseed crop and raw material for obtaining high-quality edible oil is intensively developing in Uzbekistan. The production of sunflower seeds is one of the most valuable types of agricultural raw materials, the production of which, especially in the regions of the republic, is constantly increasing. [3]. the sunflower seeds contain high-quality dietary fat to 50%,[4] the most valuable vegetable protein, phosphates[22], vitamins and other components. Indicators of the productivity of sunflower varieties in the Republic are provided in tab. one

Table 1

Indicators of productivity of sunflower varieties in the Republic of Uzbekistan (Bukhara, Kashkadarya, Surkhandarya and other regions).

The chemical composition of seeds, kernels and shells of sunflower

Sunflower Seed Components	Russian variety (control)			Uzbek variety		
	Seeds	Core	Shell	Seeds	Core	Shell
Fat	33-57	51-65	0.6-1.7	33-59	52-67	0.7-1.9
Total nitrogen	2.5-4.3	19-29	0.60-0.74	2.7-4.5	20-30	0.65-0.77
Crude protein	17.7-20.8	1.26-1.57	-	18.0-21.1	1.29-1.60	-
P_2O_5	1.4-1.7	0.065-0.075	0.05-0.07	1.5-1.8	0.067-0.080	0.06-0.08
P_2O_5 phosphides	0.046-0.061	1.8-5.8	52.00-54.75	0.048-0.063	1.9-6.0	52.1-54.8
cellulose	19.3-25.3	2.9-3.8	1.29-2.20	19.5-26.0	3.0-3.9	1.3-2.3
Ash	1.8-4.9	-	-	2.0-5.1	-	-
Nitrogen-free extractives	14.3-17.5	-	34.75-39.55	14.5-17.7	-	34.8-39.7

Seed components	Containing its components%	Lipid content% by . with uhoe substance	Acid value of lipids mg KOH	Lipid content in%		
				Wax - like substances (freezing method)	Non-saponifying substances	Waxes (calculated from non-saponifying agents)
Russian variety (control)						
Core	70.3	58.9	0.53	0.03	0.93	-
Seed coat (film)	2.4	5.6	8.1	-	9.6	18.0
Fruit shell (husk)	27.3	1.0	8.2	41.6	24.5	45.0
Uzbek variety						
Core	70.5	59.1	0.45	0.02	0.85	-
Seed coat (film)	2.5	5.7	7.4	-	9.1	17.4
Fruit shell (husk)	27.0	0.8	8.0	40.0	24.1	44.2

table 2

Physicochemical properties of lipids obtained from sunflower seeds

From table. 1 shows that the seeds of Uzbek sunflower varieties are of higher quality in terms of their structural and technological indicators than Russian ones[5].

For an objective assessment of the quality[6], it is also necessary to study the content of other components accompanying sunflower seeds. We in the table. 2 show the content of other equally important indicators of sunflower seeds cultivated in Russia (control) and Uzbekistan.

From table. 2 it can be seen that the lipid content is significantly higher in Uzbek sunflower seed varieties than Russian ones. At the same time , there are also less non-saponifiable substances and wax in the first samples of sunflower seeds[7].

It is known that sunflower is classified into low-oil and high-oil seeds and their oil content, the degree of unsaturation of fatty acids and the content of non-saponifiable substances differ from each other. Taking this into account, we studied the seeds of local varieties and their distinctive features according to the corresponding indicators from the control one. Table 3 presents these analysis results.

Table 3

Physicochemical properties of lipids obtained from low-oil and high-oil sunflower seeds

Varieties podsol-night seeds	Oil content,% on dry matter		Iodine number,% J_2	Fatty acid composition of oil,%			Didn't wash it . in eschestv crude oil,%
	seed	kernels		Noses - wenched	Oleinovaya	Linole-waya	
Russian variety (control)							
low oilseeds	31.9-36.1	56.9-59.7	108.0-118.0	8.2-9.2	45.2-47.0	44.4-45.6	1.01-1.20

high oily	50.5-55.0	65.6-67.2	119.1-129.6	8.6-16.9	28.3-35.2	55.6-60.7	1.03-1.25
Uzbek variety							
low oilseeds	32.2-36.4	57.0-60.1	107.0-116.0	8.3-9.4	45.5-47.3	44.5-45.7	1.02-1.21
high oily	51.0-55.3	66.0-67.3	119.4-130.0	8.8-17.1	29.3-35.6	55.4-59.8	1.0-1.16

From table. 3, it can be seen that the oil of seeds of high-oil varieties contains more biological active fatty acids of the linew type ($C_{18:2}$).

The main component of sunflower seeds[8], which determines their national economic significance, is a group of substances united by the general term - lipids. The bulk of the lipids of oil seeds are fats, the main component of which is a mixture of triglycerides. The composition of sunflower seeds also includes aliphatic and cyclic alcohols, nitrogen-containing substances, complex proteins[19], enzymes, carbohydrates[9], polysaccharides, organic acids, vitamins A, B, C, D , F , PP , H, pigments and other substances. When breeding high-oily sunflower seeds[10], not only the ratio of the compositions of the non-fatty and fatty parts has changed , but also the ratio between the individual components. So, if in low- oil sunflower seeds the ratio between oleic and linic acids was 1: 1, then in high-oil seeds this ratio changed to 1: 2. Oil from sunflower husk from local seeds has a higher melting and pouring point due to the presence in it of a significant amount of substances that are not triglycerides. One of the characteristic properties of seed coat oil is its ability to rapidly oxidize and burn out . Sunflower oil for food purposes is used immediately after a full refining cycle (including deodorization) for the production of margarine products, in canning and other industries. Sunflower oil, obtained from low-grade seeds[20], is used to make high-quality drying oils and soaps .

Table 4 shows the forest cover of Russian and local varieties of sunflower seeds and their acid number from their size.

Table 4

Dependence of the forest cover of sunflower seeds and acid number on the size of the seeds

Sieve exit with hole diameter, mm	Humidity,%	Forest cover ,%	Oil content,%	Weight 1000 , g	Acid number, mg KOH
Russian variety (control)					
6	6.92	29	39.8	71.5	2.10
5	6.88	28	41.5	65.2	1.46
4	6.76	27	43.4	50.4	1.25
3	6.65	25	44.7	40.3	1.02
Uzbek variety					
6	6 , 13	27.8	40.1	72.1	2.0
5	6.50	27.0	42.1	66.0	1.4
5	6.66	26.2	44.1	51.0	1.1
3	6.52	24.5	45.1	40.8	0.9

From the data table. 4 it can be seen that with decreasing size i.e. exit from a sieve with a hole diameter of 6 to 3 mm, moisture content[11], forest cover and weight 1000 pcs. Sunflower seeds decrease, and oil content increases, respectively, from 39.8 to 44.7%. But the acid number of the oil drops from 1.02 to 2.10 mg KOH. However, these Russian varieties are inferior to local varieties of sunflower seeds in terms of corresponding indicators.

Depending on the physical and mechanical properties of sunflower seeds, their properties and the composition of individual morphological parts of the seed[12], the method of crushing is selected.

We carried out in the pilot production conditions of the JSC " Koson yog- extraction", the improved technology of hulling and separation of sunflower seeds cultivated in Uzbekistan was tested . Sunflower seeds of Russian production were used as a control. After cleaning from various impurities, the seeds go to the scourge seed miner of the MPR, where the sunflower collapses. In the course of the work[18], the influence of the gap between the deck and the seed drum on the quality indicators of the towel was determined. The results are shown in table. five.

Table 5

Indicators of collapse of Russian and Uzbek varieties of sunflower seeds on a scourge seed plow of the MPR

Gap between deck and drum, mm	Russian variety of sunflower seeds (control)		Uzbek variety of sunflower seeds	
	Unbroken seeds,%	Cross section,%	Unbroken seeds,%	Cross section,%
15	20	13	19	15
20	17	11	17	12
25	19	14	16	10
30	23	17	21	12

From table. 5 shows that sunflower seeds of Uzbek varieties are more susceptible to dulling compared to Russian ones. In this case, the optimal gap between the deck and the drum for local sunflower seeds should be maintained at 25 mm[13], and for the Russian (control) - 20 mm. This can be explained by the fact that sunflower seeds cultivated in Uzbekistan are relatively large in size than Russian ones.

After the dulling, we investigated the effect of the hole size of the 1st, 2nd and 3rd tiers on the kernel and husk yields for both types of sunflower seeds. The results obtained are presented in table. 6.

Table 6

Indicators of separation of Russian and Uzbek varieties of hulled sunflower seeds into aspiration seeds of a wake M1C -50

Sizes of holes of sieves 1st: 2nd: 3rd tiers, mm	Russian variety of sunflower seeds (control)			Uzbek variety of sunflower seeds		
	Core, %	Core forest cover ,%	Husk,%	Core, %	Core forest cover ,%	Husk,%
6.0: 4.5: 2.5	82.0	2.6	15.4	84.8	2.1	13.1
6.5: 5.0: 3.0	83.6	2.2	14.2	83.5	1.8	14.7
7.0: 5.0: 2.5	85.3	1.7	13.0	85.7	1.4	12.9
7.0: 4.5: 3.0	84.8	2.0	13.2	85.0	1.7	13.3

From table. 6 shows that the local varieties of sunflower seeds have approximately 1.5-2.0% more kernel yield than the control. At the same time, the forest cover and husk content are practically close to each other with a certain percentage difference[15].

Thus, the conducted research of the separation process i.e. Aspiration separation on M1C-50 Uzbek sunflower seed varieties show that the kernel yield is higher than in the control. This can be explained by the maturity and size of the local sunflower seed varieties.

And also we have been prove in the development and production conditions of JSC " Koson Yog -extraction" has been tested advanced technology frying compacting pulp obtained from local varieties of sunflower seeds.

Sunflower seeds of Russian production were used as a control. During the test[16], the following results were obtained[17], which are reflected in table. 7.

Table 7

Changes in the indicators of crude pressed sunflower oil depending on the temperature in vats I and II of the brazier and the size of the grates of the G-24 press

Temperature in vats I and II of the brazier, ° C	Press grate dimensions, mm	Indicators of crude pressed sunflower oil			
		Color, mg J_2	K. mg KOH / g	Phase ,%	Exit, %
Russian variety (control)					
95/98	0.75: 0.45: 0.35: 0.25	33	3.7	4.6	64.3
91/94	0.75: 0.45: 0.35: 0.25	25	2,3	5.4	62.7
95/98	0.75: 0.35: 0.25: 0.25	30	2.9	5.0	65.4
91/94	0.75: 0.35: 0.25: 0.25	22	1.8	6.1	63.2
Uzbek variety					
95/98	0.75: 0.45: 0.35: 0.25	29	3.2	4,3	64.7
91/94	0.75: 0.45: 0.35: 0.25	21	1.7	5.2	61.2
95/98	0.75: 0.35: 0.25: 0.25	24	2.5	4.7	65.8
91/94	0.75: 0.35: 0.25: 0.25	14	1.4	5.8	63.5

From table. 7 shows that the local variety of sunflower seeds allows to increase the production of pressing oil by 0.5-1.0% and improve its quality, i.e. color, acid number and phase formation .

Thus, testing can be recommended roasting technology developed labels and pressing the pulp of sunflower seeds of local varieties in the replacement of import (from Russia, Ukraine, etc.). At the same time, the best technological conditions for frying the tag and pressing the pulp are the temperature in the first vat 91 and in the second vat 94 ° C , and the size of the grates of the G-24 press - 0.75: 0.35: 0.25: 0.25 mm.

Also, in the experimental production conditions of JSC " Koson yog- extraction", an improved technology for obtaining press oil and granulated cake from sunflower seeds cultivated in Uzbekistan was tested.

At the same time, sunflower seeds imported from Russia were used as a control. The experiments were carried out on a German G-24 pellet press at a pulp temperature of 70-75 ° C. Taking into account the previous tests of the influence of the size of the grates on the quality indicators of the obtained crude pressing oil from both types of sunflower seeds, in this test we selected the following optimal grate sizes 0.75: 0.35: 0.25: 0.25 mm. The results obtained are presented in table. 8.

Table 8

Changes in the main indicators of sunflower seed cake granules depending on different conditions for pressing the pulp on the G-24 press granulator

Pulp pressing conditions		Indicators of granules obtained from sunflower pulp			
Diameter of the hole in the matrix, mm	Cutting length, mm	Average diameter, mm	Average length, mm	Oil content,%	Porosity, cm^3/g
Russian variety (control)					
0.8	2.4	0.9	3.1	19.6	0.007
1.0	3.0	1.1	3.4	21.5	0.010
1,2	3.6	1.4	4.2	23.0	0.013
1.4	4.2	1.8	5.0	24.3	0.019
Uzbek variety					
0.8	2.4	1.1	2.6	18.5	0.010
1.0	3.0	1.3	3.1	20.4	0.016
1,2	3.6	1.5	3.8	22.3	0.020
1.4	4.2	1.7	4.4	23.0	0.025

From table. 8, it can be seen that the optimal size for obtaining highly porous granular cakes from local varieties of sunflower is expedient to maintain the diameter of the matrix holes within 1.0-1.2 mm, and the length within 3.0-3.6 mm. At the same time , a comparison of the parameters of granules obtained from local varieties of sunflower seeds show that Russian seeds after pressing have a relatively lower local porosity, which is not desirable for their further extraction.

Application of the above methods and technologies on farms and entrepreneurs in production requires training them with modern pedagogical and innovative technologies. This requires the use of the most innovative [22 , 23] and modern pedagogical learning technologies, such as online training for farmers and the use of telecommunication training projects [24]. With such training, lectures should not be in a simple traditional form, but should be presented in the form of problematic and modern lectures [25] . Training should be conducted in an interactive way that keeps the audience active. At the same time, of course, during training, it is important to ask the audience problematic questions, direct them to creative and scientific thinking, creating problem situations at the lectures. In addition, the creation of online training courses, including the use of technologies such as the project method [26,27], scientific and creative thinking, enriching the platform of the online course module with electronic resources [28], including video and audio lectures, gives excellent results .

CONCLUSIONS:

Scientific experiments on growing the development and obtaining of various varieties of sunflower on moderately salted soils of the Kashkadarya region gave positive results . In the first, on moderately saline soils, mid-season varieties of sunflower plants of the selections of Uzbekistan, Krasnodar and Russia were studied , as well as physiological processes occurring during the development period, the chemical composition of sunflower seeds were revealed .

To introduce research advanced technology to obtain granulates, and pressed oil cake from the local varieties of sunflower seed can recommend the optimal conditions for introduction in the press shop.

Before the introduction of this improved technology and other new technologies, it is recommended to train farmers and entrepreneurs on online training courses based on modern innovative educational technologies.

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