



# INVOLTA INNOVATION SCIENTIFIC JOURNAL

**2023**



Google Scholar provides a simple way to broadly search for scholarly literature.



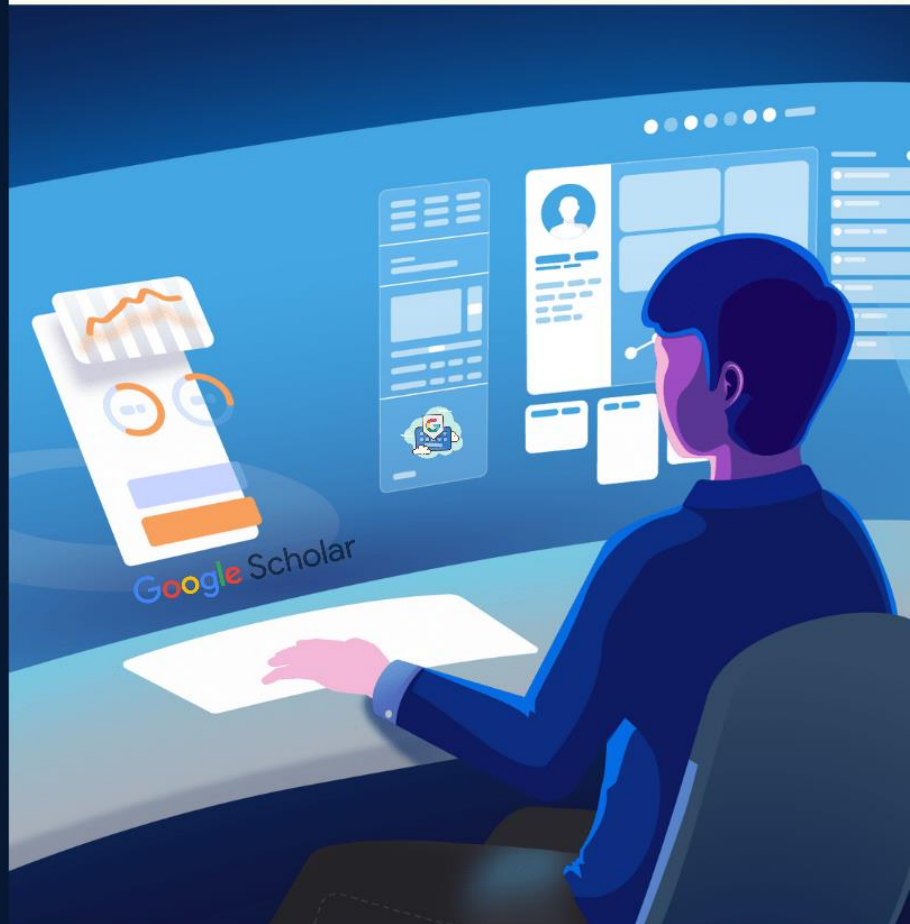
Any status is accepted, from any stage of the research lifecycle



Wikipedia is a free online encyclopedia created by volunteers around the world



Open Journal Systems (OJS) is an open source solution to managing and publishing scholarly journals online.



**JOURNAL OF THE  
COMMONWEALTH OF INDEPENDENT STATES**

**INVOLTA IS A SCIENTIFIC JOURNAL ESTABLISHED WITH  
SUPPORT OF THE KHOREZM MAMUN ACADEMY ( BASED ON  
THE AOKA CERTIFICATE NO: 1453 UNDER THE PRESIDENTIAL  
ADMINISTRATION OF THE REPUBLIC OF UZBEKISTAN)**





**INVOLTA**

**INNOVATION ILMİY  
JURNALI**

**ИННОВАЦИОННЫЙ  
НАУЧНЫЙ ЖУРНАЛ  
INNOVATION SCIENTIFIC  
JOURNAL**

**ISSN:2181-2632 BARCHA  
SOHALAR BO'YICHA  
VOL 2, ISSUE 1 (1),  
January 2023**

**PART – 1**

**[www.involta.uz](http://www.involta.uz)**

TAHRIRIYAT

<p><b>Editor in chief</b> Mavlonov Khudargan <u>Doctor of Biological Sciences, Professor.</u> <u>Jizzakh State Pedagogical Institute</u></p> <p><b>Editor-in-Chief (Executive Secretary Deputy)</b> Kholikova Nodira <u>Kholikova Nodira Candidate of Philological</u> <u>Sciences.</u> <u>Associate Professor, Chirchik State Pedagogical</u> <u>Institute</u></p> <p><b>Preparing for publishing</b> Umaraliyev Humoyun <u>Chirchik State Pedagogical Institute</u></p>	<p><b>Bosh muharrir</b> Mavlonov Xudargan <u>Biologiya fanlari doktori, Professor.</u> <u>Jizzax davlat pedagogika instituti</u></p> <p><b>Bosh muharrir o‘rinbosari (Mas‘ul kotib)</b> Xolikova Nodira <u>Filologiya Fanlari Nomzodi, Dotsent.</u> <u>Chirchiq Davlat Pedagogika Instituti</u></p> <p><b>Nashrga tayyorlovchi</b> Umaraliyev Humoyun <u>Chirchiq Davlat Pedagogika Instituti</u></p>
<b>TAHRIR KENGASHI A‘ZOLARI</b>	

*Tojiboyev Komiljon O‘zR FAsi Botanika Ilmiy Tekshirish Instituti Direktori, Biologiya FanlariDoktori,Akademik*  
*Abdullayev Ikram Biologiya Fanlari Doktori, Professor. Ma‘mun Akademiyasi Raisi*  
*Mustafakulov Sherzod Iqtisod Fanlari Doktori, Professor Qo‘qon Universiteti Rektori*  
*Prof. Dr. Tanju Seyhan Mimar Sinan Güzel Sanatlar Üniversitesi Fen Edebiyat Fakültesi Öğretim ÜyesiProf.Dr.*  
*İbrahim İştan Selçuk Üniversitesi İslami İlimler Fakültesi Öğretim Üyesi*  
*Dr. Necdet Tosun Marmara Üniversitesi, İlahiyat Profesörü*  
*PROF. Dr. Önal Kaya Ankara Üniversitesi Dil, Tarih Ve Coğrafya Fakültesi Emekli Öğretim Üyesi*  
*Almaz Ulviy Binnatova Ozarbayjon Ilmlar Akademiyasi Nizomiy Nomidagi Adabiyot Instituti Professori*  
*Haqqulov O‘zRes FAi O‘zbek Tili, Adabiyoti Va Folklor Instituti, Filologiya Fanlari Doktori,*  
*Professor*  
*Doschanov Tangribergan Iqtisod Fanlari Doktori. Professor, Urganch Davlat universiteti*  
*Sirojiddinov Shuhrat Filologiya Fanlari Doktori, Professor O‘zbek Tili va Adabiyoti Universiteti Rektori*  
*Baltayeva Umida Fizika-Matematika Fanlari Doktori, Ma‘mun Akademiyasi Katta Ilmiy*  
*Xodimi Farmonov Rahmon Jahon Iqtisodiyoti Va Diplomatiya Universiteti Ijtimoiy-Gumanitar*  
*Fanlar Kafedrasiprofessori*  
*Sherimbetov Sanjar O‘ZRFA Bioorganik Kimyo Instituti Professori*  
*Jabborov Nurboy Filologiya Fanlari Doktori, Professor Alisher Navoiy Nomidagi Toshkent Davlat*  
*O‘zbek Tiliva Adabiyoti Universiteti*  
*Mambetullayeva Svetlana Biologiya Fanlari Doktori, Prof. Qoraqalpoq Tabiiy Fanlar Ilmiy-Tadqiqot Instituti*  
*DirektoriO‘rinbosari*  
*Erkinov Aftondil Filologiya Fanlari Doktori, Professor. O‘zR FA Temuriylar Tarixi Davlat Muzeyi (O‘rindosh)*  
*Kattallmiy Xodimi*  
*Saparov Qalandar Biologiya Fanlari Doktori. Nizomiy Nomidagi Toshkent Davlat Pedagogika Universiteti*  
*Jo‘raqulov Uzoq Alisher Navoiy Nomidagi O‘zbek Tili Va Adabiyoti Universiteti, Filologiya Fanlari Doktori,*  
*Professor*  
*Yusupova Dilnavoz Filologiya Fanlari Doktori, Dotsent Alisher Navoiy Nomidagi O‘zbek Tili va*  
*AdabiyotiUniversiteti*  
*Xasanov Nodirxon O‘zRes FAsi O‘zbek Tili, Adabiyoti va Folklori Instituti, Filologiya Fanlari*  
*Doktori Sultonov Marat Kimyo Fanlari Doktori, Dotsent JDPI Kimyo O‘qitish Metodikasi Kafedrası*  
*Mudiri Asadov Maqsud Filologiya O‘zRes FAsi O‘zbek Tili, Adabiyoti va Folklori Instituti Yetakchi*  
*Ilmiy Xodimi*  
*Pardayev Qo‘ldosh Filologiya Fanlari doktori Alisher Navoiy Nomidagi Toshkent Davlat O‘zbek Tili va AdabiyotiUnivesiteti*  
*Qodirov G‘ayrat Biologiya Fanlari Nomzodi, Dotsent. JDPI Ilmiy Ishlar va Innovatsiyalar Bo‘yicha*  
*ProrektoriO‘tanova Sirdaryo O‘zR FAsi O‘zbek Tili, Adabiyoti va Folklor Instituti Katta Ilmiy*

**INVOLTA INNOVATSION ILMIY JURNALI TAHRIRIYATINING MANZILI:**  
**111707.TOSHKENT VILOYATI, CHIRCHIQ SHAHRI,M.YUSUPOV KO‘CHASI 1-**  
**UY**

[www.involta.uz](http://www.involta.uz)

17.	Ibragimov Salim, & Fuzailov Farhad. (2023). EXPERIMENTAL ESTABLISHMENT OF THE PHYSICAL MECHANISM OF THE DRYING PROCESS.	90-99
18.	Ibragimov Salim, & Xusenov Chinorbek. (2023). EXPERIMENTAL DRYING PLANT OF DIRECT TYPE FOR DRYING GRAPES.	100-106
19.	Дилдора Султонова. (2023). МИЛЛИЙ ҲУНАРМАНДЧИЛИК МАҲСУЛОТЛАРИ РАҚОБАТБАРДОШЛИГИНИ ОШИРИШ АҲАМИЯТИ.	107-110
20.	Hakimova Xonbuvi. (2023). «JAMOAT SALOMATLIGI VA SOG'LIQNI SAQLASH IQTISODIYOTI» FANIDAN MASHGULOTLARNI INTERFAOL O'YINIDAN FOYDALANIB O'TISHNING AFZALLIKLARI.	111-115
21.	Pirmatova Ozoda, & Tilavova Minavar. (2023). RICE FARMING TERMS IN WORKS OF ALISHER NAVOI.	116-118
22.	Abdullayeva Z.G'. (2023). VAQTNi O'LCHASH. KALENDARLAR-OY VA QUYOSH KALENDARLARI.	119-123
23.	Yuldashova Saida. (2023). THE DIFFERENCE BETWEEN PEDAGOGICAL TECHNOLOGY AND METHODOLOGY.	124-128
24.	Matniyozov Sarvarbek. (2023). XORAZMDA ZARGARLIK VA KANDAKORLIK SAN'ATI TARIXI.	129-134
25.	Kodirova Fotima. (2023). PHRASEOLOGICAL UNITS AND PROBLEMS OF TRANSLATION.	135-137
26.	Obidova Aziza, & Shermamatova Sevara. (2023). INGLIZ TILI ME'YORIY TALAFFUZ STANDARTLARINI O'QITISH MEZONLARI.	138-141
27.	Гайбуллаев Шерзод, Усаров Мухриддин, & Далерова Мадина. (2023). НОРМАЛЬНЫЕ УЛЬТРАЗВУКОВЫЕ РАЗМЕРЫ ЖЕЛЧНОГО ПУЗЫРЯ И ОБЩЕГО ЖЕЛЧНОГО ПРОТОКА У НОВОРОЖДЕННЫХ.	142-148
28.	Namidullayev Faxriddin, & Abdulxaqov Nodirbek. (2023). O'SMIRLIK DAVRIDA SUITSID MUAMMOSINI IJTIMOIIY PSIXOLOGIK XUSUSIYATLAR.	149-152
29.	Туйчибаева Мафтуна, & Ахмедова Матлуба. (2023). СЎЗЛАР ВА ФРАЗЕОЛОГИК БИРЛИКЛАР СЕМАНТИКАСИ.	153-157
30.	Dilbar Negmatovna Alimdjanova, Umida Muxammadjonovna Burgutova, & Gulirano Vahobjonovna Berdieva. (2023). PSYCHOLOGICAL AND PEDAGOGICAL PROBLEMS OF ACTIVATING THE LEARNING PROCESS.	158-160
31.	Нилуфар Вайитовна, & Нигора Нурмухаммедовна Файзиёва. (2023). КОМПЬЮТЕРНЫЕ СРЕДСТВА ОБУЧЕНИЯ В ПРЕПОДАВАНИИ ВЫСШЕЙ МАТЕМАТИКИ В ТЕХНИЧЕСКИХ ВУЗАХ.	161-168

## EXPERIMENTAL DRYING PLANT OF DIRECT TYPE FOR DRYING GRAPES

Ibragimov Salim Safarovich

Lecturer at Bukhara State University. [salim.ibragimov.89@mail.ru](mailto:salim.ibragimov.89@mail.ru)

Xusenov Chinorbek Iskandar o'g'li

Bukhara State University magistranti.

**Annotation:** The dryer was built in Uzbekistan, the city of Bukhara. It twice dried grapes of 800 kg. The grapes were initially dried for 3 days at a humidity of 82%, then for 5 days in the sun. Thus dried grapes are completely protected from insects, pests, dust and rain. In addition, the dried grapes turned out to be clean and of high quality.

**Keywords:** type greenhouse, insulation, range hood, advanced, solar dryer.

Nowadays, in Central Asia, including Uzbekistan, dried fruits are mainly cooked outdoors. This method of drying fruits has its positive and negative sides. The disadvantages of this method are the following: a long drying process, an increase in atmospheric humidity, a partial loss of product on rainy days, adverse weather conditions, air pollution, dust, insects, etc. As a result, the amount of product is reduced and its cost is increased.

To dry the grapes at the places of their ripening, a mobile sun-drying device was created. Such a device has passed the test on the heliopolygon Buch GU and the results are presented in this document.

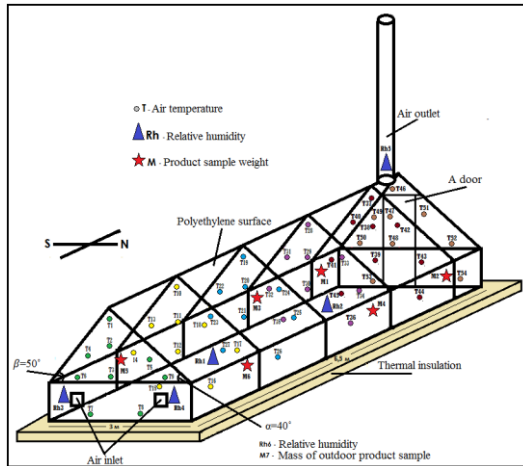


*1-figure. Image of an advanced greenhouse dryer.*

A greenhouse type dryer has been installed in the city of Bukhara, Uzbekistan. The width of the device is 3 m, the length is 6,5 m and the height is 2,2 m. In the dryer there are two openings with an area of 20x20 sm<sup>2</sup> that serve as the occurrence of air flow (natural convection), in the gaps between the opposite walls, a chimney is installed in the upper part 9 m long. The drying device consists of sides, one of which is 400 from the horizon, and the other 500. The dryer is shown in Figure 1.

The sun's rays penetrate through the polyethylene with which the device is coated and warm the air inside the dryer, the products, as well as the insulated surface. Atmospheric air enters the inside of the dryer through openings that are located below on the side. Under the influence of sunlight, the air inside the dryer warms up and dries the products. On top of the opposite side of

the air penetration holes, a chimney is installed through which warm, humid air comes out, and as a result, a process of natural convection occurs inside the dryer. In the present work, it was experimentally shown that in a greenhouse-type solar drying device, 800 kg of grapes can be dried (primary humidity 82%). In the September - October months of 2018, two experiments were conducted. The amount of energy from scorching sunlight was measured with a pyranometer (Kipp & Zone modeli CM 11, accuracy level 0,5%) mounted on the outside of the drying device.



2-figure. Schematic illustration of a grape dryer. The location of the measurement points inside the dryer: temperature (T), relative humidity inside the dryer (Rh) and product humidity (M).

In each experiment, 800 kg of grapes were placed inside the dryer. To place grapes on shelves inside the dryer, there is a special passage. The time for obtaining the results of the experiment lasted from 08:00 to 17:00. The drying process continued until the desired moisture level was obtained. Prototypes of products were placed in different places of the dryer and periodically, every two hours, weighed on an electronic balance (FEJ-1000B). The humidity of product samples located in the open air and inside the dryer was controlled and compared. During the drying process, the humidity of the product samples was measured for 24 hours and the following data were obtained: the evaporation of product moisture within 24 hours is: inside the dryer - 21%, and in the open air 12% (duration 24 hours, accuracy 0.5%).

The experiment process for a greenhouse-type solar dryer was held in September-October 2018. During drying, solar radiation entering the dryer rises sharply from 8:00 to 13:00 (October 18 rises: from 1.1 MJ / m<sup>2</sup> to 3.47 MJ / m<sup>2</sup>, October 19 from 1.05 MJ / m<sup>2</sup> to 3.36 MJ / m<sup>2</sup>, on October 20 from 0.94 MJ / m<sup>2</sup> to 3.3 MJ / m<sup>2</sup>), but after 13:00 it decreases significantly (on October 18 from 3.47 MJ / m<sup>2</sup> to 0.44 MJ / m<sup>2</sup>, October 19 from 3.36 MJ / m<sup>2</sup> to 0.28 MJ / m<sup>2</sup>, October 20 from 3.3 MJ / m<sup>2</sup> to 0.55 MJ / m<sup>2</sup>) and changes under the influence of clouds. Figure 3- (a, b, c) shows the daily changes in solar radiation. Figure 4- (a, b, c), during the experiments, compares the air temperature readings (T2, T12, T21, T30, T39) in five places of the solar dryer with the ambient air temperature (during the day).

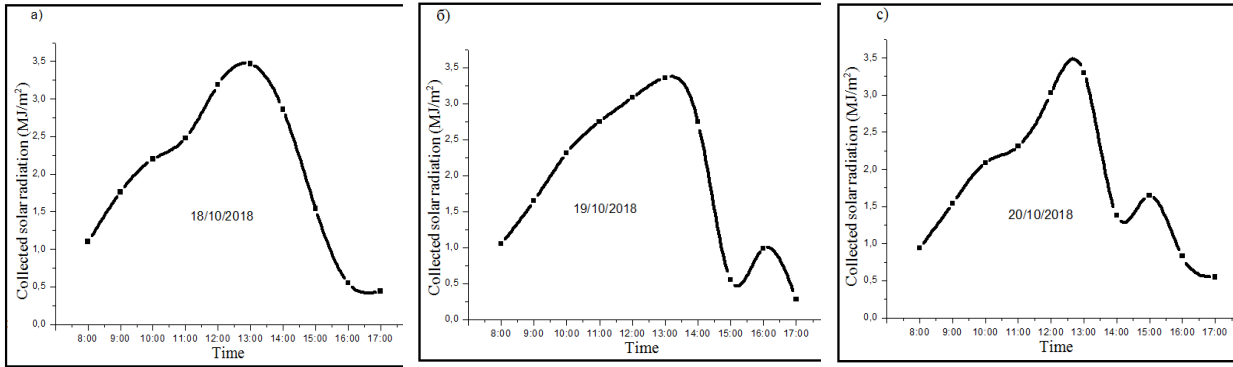
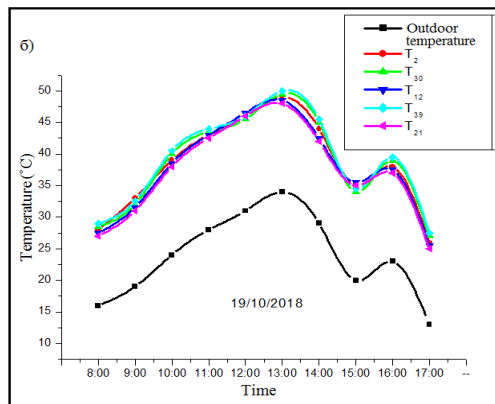


Figure 3- (a, b, c). The change in solar radiation over time during the drying of grapes.

It was possible to compare temperature changes at different points at different heights of the dryer. Compared in five places, the temperature does not differ much from the temperature at different heights. In addition, the air temperature at each point of the dryer is significantly different from the air temperature of the atmosphere (the air temperature at each point inside the dryer is higher than the atmospheric air temperature by an average of 15, 16°C). Figure 5- (a, b, c) compares the relative humidity of the ambient air and the air inside the dryer during the drying of grapes.

In the first half of the day, after a certain time, due to the temperature at different points of the dryer, the relative humidity decreases (October 18 from 48% to 13%, October 19 from 35% to 12%, October 20 from 41% to 15% decreases), and in the afternoon it is the other way around (October 18 from 13% to 38.6%, October 19 from 12% to 36%, October 20 from 15% to 39% rises). At different heights inside the dryer, relative humidity is not particularly different, but at the same time there is a significant difference between the relative humidity of the atmosphere and relative humidity at all points inside the dryer. Relative humidity below ambient temperature.



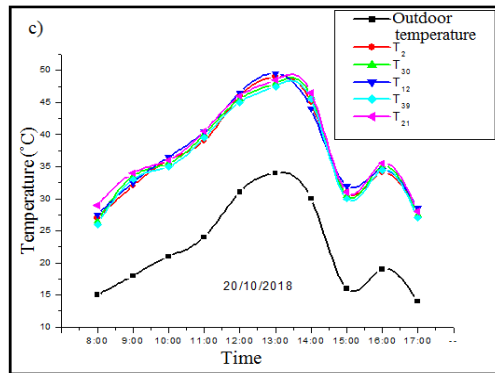


Figure 4- (a, b, c). Changes in temperature inside the dryer and the environment over time during the drying of grapes

To assess the quality of the finished product, testing was carried out in an accredited experimental laboratory of the center of the Bukhara State Organization for Certification and Testing. Products tested in the Central Accredited Experimental Laboratory meet the requirements of 1.2.4 points of normative document GOST 6882-88. The obtained experimental results show that grapes dried on a solar dryer are no different from a quality product sold on the local market. If you evaluate from a financial point of view, to build and install a greenhouse-type solar dryer, you need an initial capital of \$ 240 (1USD = 9,400 soum), the dryer capacity is 1,500 kg. According to the calculations, it was determined that the dryer can be used 20 times a year, after drying 1,500 kg of grapes. According to the same calculations, you can get 6000 kg of raisins per year. The calculations show that the sale of 3000 kg of dried raisins on a solar dryer, fully cover all costs made for the manufacture and installation of the device.

To study the operating mode of the advanced greenhouse-type solar dryer, grapes in the amount of 800 kg were twice dried in the heliopolygon of BukhSU. It was found that when drying grapes in a greenhouse-type solar dryer, the product wins in drying time (48 hours) than when drying in the open air. In addition, the products dried in our dryer are of the best quality and color. The duration of the greenhouse-type solar dryer is 2 years. More than ten pieces of such a device are currently used in small-scale farms. And already received products, high-quality raisins.

#### Used literature

1. С.С.Ибрагимов. [Выбор поверхностей, ускоряющих естественную конвекцию в фруктосушилках, путем проведения опытов.](#)// Молодой ученый, (2017) С 66-67.
2. С.С.Ибрагимов, Л.М.Бурхонов. [Изучить взаимосвязь между поверхностью конденсации и прозрачной поверхностью в опреснителях воды.](#)// Eurasian Journal of Academic Research 1 (9), 709-713.
3. С.С.Ибрагимов. [Определение геометрических размеров теплицы и способы подбора материалов.](#)// Молодой ученый, (2016) С 105-107.
4. С.С.Ибрагимов. [Проектирование двухскатной теплицы с эффективным использованием солнечного излучения.](#)// Молодой ученый, (2016) С 103-105.



5. С.С.Ибрагимов, А.А.Маликов. [Исследование теплового режима инсоляционных пассивных систем.](#)// Молодой ученый, (2017) С 27-29.
6. С.С.Ибрагимов. [Результаты лабораторной модели сушки фруктов.](#)// Молодой ученый, (2016) С 79-80.
7. С.С.Ибрагимов. [Результаты испытания водоопреснителя парникового типа.](#)// Молодой ученый, (2016) С 67-69.
8. Sh. Mirzaev, J. Kodirov, S.I. Khamraev. Method for determining the sizes of structural elements and semi-empirical formula of thermal characteristics of solar dryers. // APEC-V-2022 IOP Conf. Series: Earth and Environmental Science. 1070 (2022) 012021.
9. Кодиров Ж.Р., Маматрузиев М., Составление программного обеспечения, алгоритм и расчет математической модели применения свойств солнечного опреснителя к точкам заправки топливом. // Молодой ученый, (2018) С 50-53.
10. Кодиров Ж.Р., Маматрузиев М. Изучение принципа работы устройства насосного гелио-водоопреснителя. // Международный научный журнал «Молодой ученый», 26 (2018) С 48-49.
11. Кодиров Ж.Р., Хакимова С.Ш, Мирзаев Ш.М. Анализ характеристик параболического и параболоцилиндрического концентраторов, сравнение данных, полученные на них. // Вестник ТашИИТ №2 2019 С 193-197.
12. Кодиров Ж.Р., Мавлонов У.М., Хакимова С.Ш. Аналитический обзор характеристик параболического и параболоцилиндрического Концентраторов. // Наука, техника и образование 2021. № 2 (77). С 15-19.
13. Мирзаев Ш.М., Кодиров Ж.Р., Ибрагимов С.С. Способ и методы определения форм и размеров элементов солнечной сушилки. //Альтернативная энергетика и экология (ISJAEE). 2021;(25-27):30-39. <https://doi.org/10.15518/isjaee.2021.09.030-039>.
14. Mirzaev Sh.M., Kodirov J.R., Ibragimov S.S. (2021) "Method and methods for determining shapes and sizes of solar dryer elements," // Scientific-technical journal: Vol. 4: Iss. 4, Article 11.
15. Qodirov, J. (2022). Установление технологии процесса сушки абрикосов на гелиосушилках.// Центр научных публикаций. Том 8. № 8. (2021).
16. Mirzayev Sh.M., Qodirov J.R., Hakimov B. Quyosh qurilmalarida o'riklarni quritish uchun mo'ljallangan quyosh qurilmasini yaratish va uning ishlash rejimini tadqiq qilish. // Involta Scientific Journal, 1(5). 2022/4/29. 371–379.
17. Sh. Mirzaev., J. Kodirov., B Khakimov. Research of apricot drying process in solar dryers. // [Harvard Educational and Scientific Review](#). 11.10.2021. Vol. 1 No. 1. Pp 20-27.
18. Qodirov, J. Quyosh meva quritgichi qurilmasining eksperiment natijalari. // центр научных публикаций. Том 1 № 1 (2020).
19. Arabov J.O., Hakimova S.Sh., To'xtayeva I.Sh. Past haroratli qiya ho'llanadigan sirtli quyosh suv chuchutgichlarida bug'lanadigan sirt bilan kondensatsiyaladigan sirt orasidagi masofani optimallashtirish.// Eurasian journal of academic research Innovative Academy Research Support Center. Volume 1 Issue 01, (2021) .

20. Kodirov J, Saidova R, Khakimova S, Bakhshilloev M. Determination of the size and amount of energy incident on the reflective surface of a parabolic cylinder concentrator. // Asian Journal of Research (2020). No 1-3. Pp 252-260.
21. Qodirov J, Hakimova S. Suv nasos quyosh chuchitgichi takomillashgan qurilmasini loyihalash usuli. // Центр научных публикаций. Том 1 № 1 (2020).
22. Qodirov J, Hakimova S. Quyosh konsentratorlari boyicha jahonda olib borilayotgan ilmiy tadqiqotlar holati. // Центр научных публикаций. Том 1 № 1 (2020).
23. Qodirov J, Hakimova S. Noan’anaviy energiya manbalaridan foydalanishning kelajak istiqbollari. // Центр научных публикаций. Том 1 № 1 (2020).
24. J Kodirov, S Khakimova. Determination of the size and amount of energy incident on the reflective surface of a parabolic cylinder concentrator. // Asian Journal of Research (2020). № 1-3.
25. J.R. Kodirov., Sh. M. Mirzaev., S.Sh. Khakimova. Methodology for determining geometric parameters of advanced solar dryer elements. // Thematic Journal of Applied Sciences (ISSN 2277-3037). 2022/2/9. Volume 6 Issue 1. <https://doi.org/10.5281/zenodo.5993063>.
26. Кодиров Ж.Р., Мавлонов У.М., Хакимова С.Ш. Конструкция параболического и параболослиндрического концентраторов и анализ полученных результатов. // Thematic Journal of Applied Sciences (ISSN 2277-3037). 2022/2/9. Volume 6 Issue 1. <https://doi.org/10.5281/zenodo.5992991>.
27. Uzakov G.N., Khamraev S.I., Khuzhakulov S.M. Rural house heat supply system based on solar energy // IOP Conf. Series: Materials Science and Engineering 1030 (2021) 012167 IOP Publishing doi:10.1088/1757-899X/1030/1/012167
28. Khamraev S. I, Ibragimov U. Kh Kamolov B.I. Removal of hydrodynamic lesions of a heated floor with a solar collector // APEC-V-2022 IOP Conf. Series: Earth and Environmental Science 1070(2022) 012018 IOP Publishing doi:10.1088/1755-1315/1070/1/012018.
29. Khuzhakulov S.M., Khamraev S.I., Mamedova D.N., Kamolov B.I. Study the characteristics of heat energy in the autonomic solar system // PalArch’s Journal of Archaeology of Egypt / Egyptology (2020). PJAEE 17(6), ISSN 1567-214x pp 3240 – 3252 (Scopus,Q3)
30. Uzakov G. N., Charvinski V. L., Ibragimov U. Kh., Khamraev S. I., Kamolov B. I. (2022) Mathematical Modeling of the Combined Heat Supply System of a Solar House. Energetika. Proc. CIS Higher Educ. Inst. and Power Eng. Assoc. 65 (5), 412–421. <https://doi.org/10.21122/1029-7448-2022-65-5-412-421>
31. Узаков Г.Н., Червинский В.Л., Ибрагимов У.Х., Хамраев С.И., Камалов Б.И. Математическое моделирование комбинированной системы теплоснабжения солнечного дома). Энергетика. Известия высших учебных заведений и энергетических объединений СНГ. 2022;65(5):412-421. <https://doi.org/10.21122/1029-7448-2023-65-5-412-421>.
32. Хужакулов С.М., Хамраев С.И. Комбинациялашган муқобил энергия қурилмалари асосидаги автоном иссиқлик таъминоти тизими // Инновацион технологиялар. -Қарши, 2020. -№ 3(38). 40-44 бетлар. (05.00.00; № 38).

33. Хамраев С.И., Хужакулов С.М., Камолов Б.И. Намунавий кишлок уйларининг автоном иссиқлик ва электр таъминоти тизимлари таҳлили // Инновацион технологиялар. - Қарши, 2020. Махсус сон. 67-73 бетлар.
34. Узоқов Ғ.Н., Хамраев С.И., Хужакулов С.М., Камолов Б.И. Қашқадарё вилояти ҳудудида қуёш энергияси ресурсларининг потенциалини баҳолаш // Фарғона политехника институти илмий-техника журнали. -Фарғона, 2021. -№4(25). 69-75бетлар.
35. Хамраев С.И., Хужакулов С.М., Камолов Б.И. Қуёш иссиқлик таъминоти тизимли тажриба кишлок уйининг иссиқлик балансини тадқиқот қилиш // Энергия ва ресурс тежаш муаммолари. -Тошкент, 2021. № 3. 181-191 бетлар.
36. Khamraev S.I., Khuzhakulov S.M., Kamolov B.I., Djuraev R.T. Thermal-technical characteristics and thermal regime of energy-efficient solar house // Asian Journal of Multidimensional Research. ISSN: 2278-4853. Vol 10, Issue 5, May, 2021. pp 769-776. SJIF-2021-7.699. DOI: 10.5958/2278-4853.2021.00450.8
37. Khamraev S.I., Khuzhakulov S.M., Kamolov B.I., Khusunov Sh.Kh., Narzullaev B.A. Analysis Of Scientific Research On The Use Of Renewable Energy Sources In The Heat Supply System // The American Journal of Applied Sciences. ISSN- 2869-0992 Volume 03 Issue 04- 2021 | pp. 264-274. SJIF-5.634. DOI: <https://doi.org/10.37547/tajas/Volume03Issue04-37>
38. Uzakov G. N., Charvinski V. L., Ibragimov U. Kh., Khamraev S. I., Kamolov B. I. (2022) Mathematical Modeling of the Combined Heat Supply System of a Solar House. Energetika. Proc. CIS Higher Educ. Inst. and Power Eng. Assoc. 65 (5), 412–421.
39. Хамраев С.И., Ибрагимов У. Х, Камолов Б.И, Зувайтова. З. К. Қуёш коллекторли сувли иссиқ пол тизими қувурдан иссиқлик бериш жараёнини моделлаштириш. Инновацион технологиялар. -Қарши, 2022. Махсус сон. 68-74 бетлар. (05.00.00; № 38).
40. Uzakov G. N., Khamraev S. I, Zuvaytova Z.K, Charvinski V. L. Thermal-technical characteristics and thermal regime of energy-efficient solar house. // «Информационные технологии в политических, социально-экономических и технических системах» Материалы международной научно-практической конференции. –Минск: БНТУ, 22 апреля 2022. ст. 180-187.
41. Хамраев С.И. Перспективы использования солнечной энергии в ГВС на примере Республики Узбекистан.// “Молодой учёный” международный научный журнал №24 (158) 2017 213-214 б.
42. Хамраев С.И. “Разработка систем солнечного электро-и теплоснабжения в типовых жилых домах, построенных в сельской местности Кашкадарьинской области Узбекистана”.// “Молодой учёный” международный научный журнал №24 (158) 2017 215-216 б.