

ISSN 2181-8622

Manufacturing technology problems



Scientific and Technical Journal Namangan Institute of Engineering and Technology

INDEX  COPERNICUS
INTERNATIONAL

**Volume 9
Issue 1
2024**



DESCRIPTION OF PROTEINS AND POISONS CONTAINED IN FLOUR PRODUCED FROM WHEAT GRAIN PRODUCED IN OUR REPUBLIC

VOQQOSOV ZUHRIDDIN

PhD of Namangan Namangan Institute of Engineering and Technology, Namangan, Uzbekistan
Phone: (0899) 973-9430, E-mail: zukhriddinvoqqosov@gmail.com

KHODZHIEV MA'RUF

Doctoral student of Namangan Institute of Engineering and Technology, Namangan, Uzbekistan
Phone: (0893) 499-9909, E-mail: maruf_mr88@mail.ru

*Corresponding author.

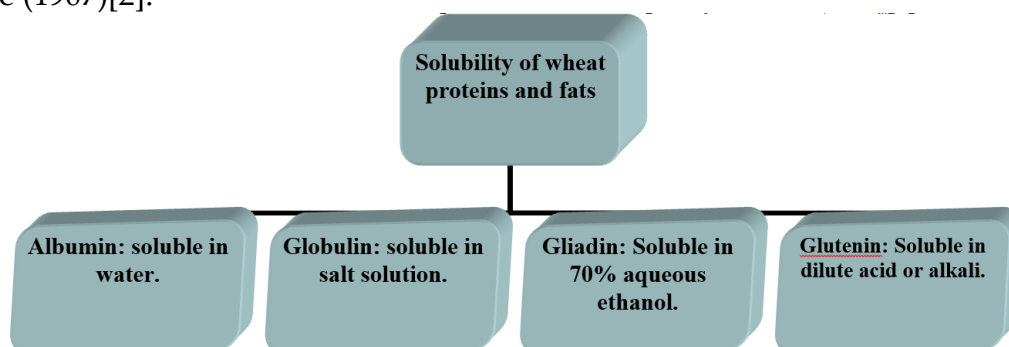
Abstract: This article describes the proteins and starches contained in flour produced from wheat grains grown in our republic. Nowadays, it is important to have information about the amount and structure of wheat flour proteins in the production and processing process. In our experiments, attention is focused on these factors, i.e. methods of determining proteins in flour and information about proteins in flour products available in our republic.

Keywords: Gliadin, glutenin, Kjeldahl procedure, CAN, albumin, globulin, wheat, macro and micro nutrients.

Introduction. 7.3 million tons of wheat are grown in our republic in 1 year. Cultivated wheat is being produced in existing large and small enterprises, and the composition of the developed flour products is considered to be a constantly consumed product due to its rich composition of macro and micro nutrients. A number of works have been carried out to study their composition and enrichment, especially experiments are being conducted to determine the structure of proteins in flour.

Wheat protein and the resulting flour protein are directly related to the size of the bread. Finney and Barmore (1948) showed a correlation between protein content and bread content[1].

Wheat proteins are traditionally classified according to their solubility properties. The first comprehensive fractionation scheme for wheat proteins was developed by Osborne (1907)[2].



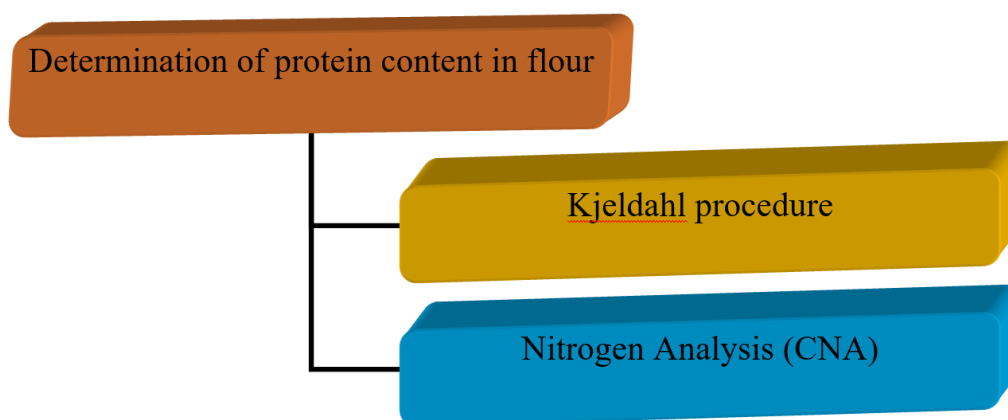
Gliadin and glutenin together account for approximately 80% of the total proteins in wheat and are present in approximately equal amounts (Tatham and Shewry, 1985;

Shewry et al., 2009; Békés, 2012; Békés and Wrigley, 2016). Gliadin and glutenin are the most important determinants of the functional properties of wheat flour [3].

Wheat proteins are divided into monomeric and polymeric proteins depending on whether they have single or multi-chain polypeptides (MacRitchie & Lafiandra, 1997). Monomeric proteins include gliadins and albumins and globulins. Gliadins are generally divided into α -, β -, γ -, and ω -gliadins, with molecular weights (MW) ranging from 30 to 80 kDa. Glutenins are polymeric proteins composed of low molecular weight (LMW) and HMW glutenin subunits. SDS-PAGE of wheat gluten showed five bands corresponding to HMW-glutenins along with some bands corresponding to LMW-B-glutenins and gliadins (Kaur et al., 2010a). Incubation of wheat gluten in the presence of pepsin and KE has been reported to result in digestion of all glutenin and gliadin proteins and subunits less than 250 kDa (Kaur et al., 2010a) [4-10].

It is known from the available researched literature that wheat flour proteins are considered very important for the human body and life activities. Today, it is important to have information about the quantity and structure of wheat flour proteins produced in our republic in the process of production and processing. In our experiments, attention is focused on these factors, that is, the methods of determining the proteins in flour and the information about the proteins in the flour products available in our republic are given.

Methods. There are a number of methods for determining the amount of proteins in flour that have been developed in the grain processing industry. They include:



Nowadays, CNA is used more than the Kjeldahl method in advanced laboratories because CNA provides higher accuracy while being free from a number of corrosive chemicals required for Kjeldahl analysis. In addition, the CNA method is faster and more efficient in nitrogen recovery, resulting in proteins being detected consistently above Kjeldahl values.

The CNA method is carried out at high temperature in a fully automated protein analyzer. It assumes that protein is the main nitrogen-containing flour compound. Thus, the amount of nitrogen released during combustion at high temperature is converted into protein.

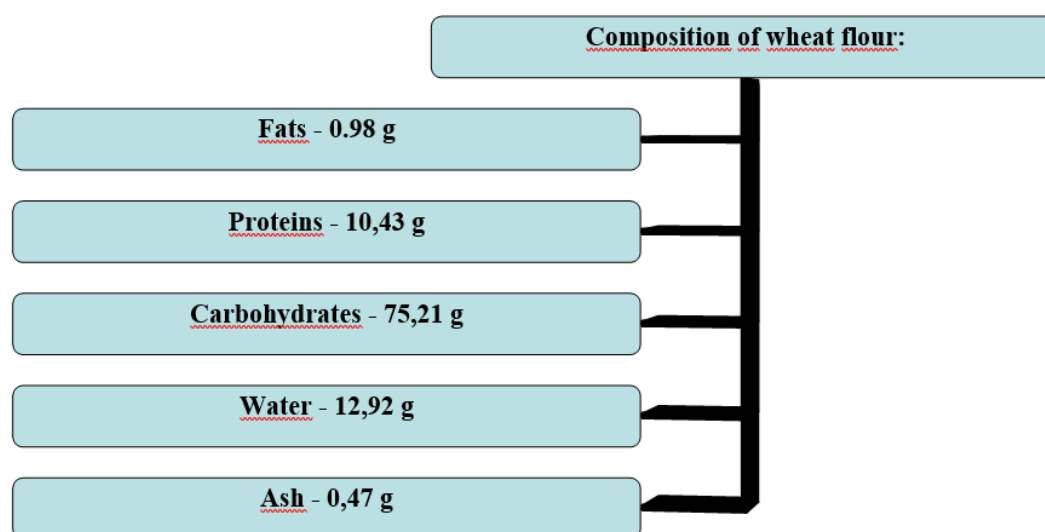
Protein content results are expressed as % of total sample weight after factoring for moisture. The latter may differ from one to another.

Weigh a sample of flour or ground wheat to 0.2 g and place it in the CNA protein analyzer.

The sample is automatically placed in a hot furnace that burns at 952°C (1,746°F).

The amount of protein in the sample is determined based on the amount of nitrogen gas released during combustion. This measurement is used to convert to protein content.

Results. Are high molecular biopolymer substances consisting of proteins and amino acids. In the protein molecule, the amino and carboxyl groups of amino acids are connected to each other by peptide bonds. Proteins of wheat and rye flour consist only of amino acid residues. The technological role of flour proteins in the production of moldy bread is considered high. The structure of protein molecules in flour and the physico-chemical properties of flour determine the properties of the dough and negatively affect the shape and quality of the bread.



Wheat flour grown in our country contains albumin and globulin, gliadin and glutenin proteins. Proteins containing wheat flour make up an average of 9-12% of the total weight of wheat mass and mainly have enzymatic and structural functions: enzymatic proteins accelerate chemical reactions in the dough, structural proteins, liquid gives hardness to biological components.

Proteins are divided into water- and salt-soluble proteins, albumin and globulin, which make up 18% of the total amount of wheat proteins, and water-insoluble gliadin and glutenin make up the remaining 78%. All types of wheat proteins do not have the same proportions. This type of wheat does not have less protein - as is believed - but the quality of the gluten is slightly better than that of wheat grown today. It is a type of gluten that absorbs less liquid with a different stiffness and a less resistant gluten mesh. This factor is unattractive to industries that prefer more structured grain products to obtain

bulky, alveolated bread products. Due to the chemical structure of proteins and the diversity of their bonds, food made from ancient grains is more digestible.

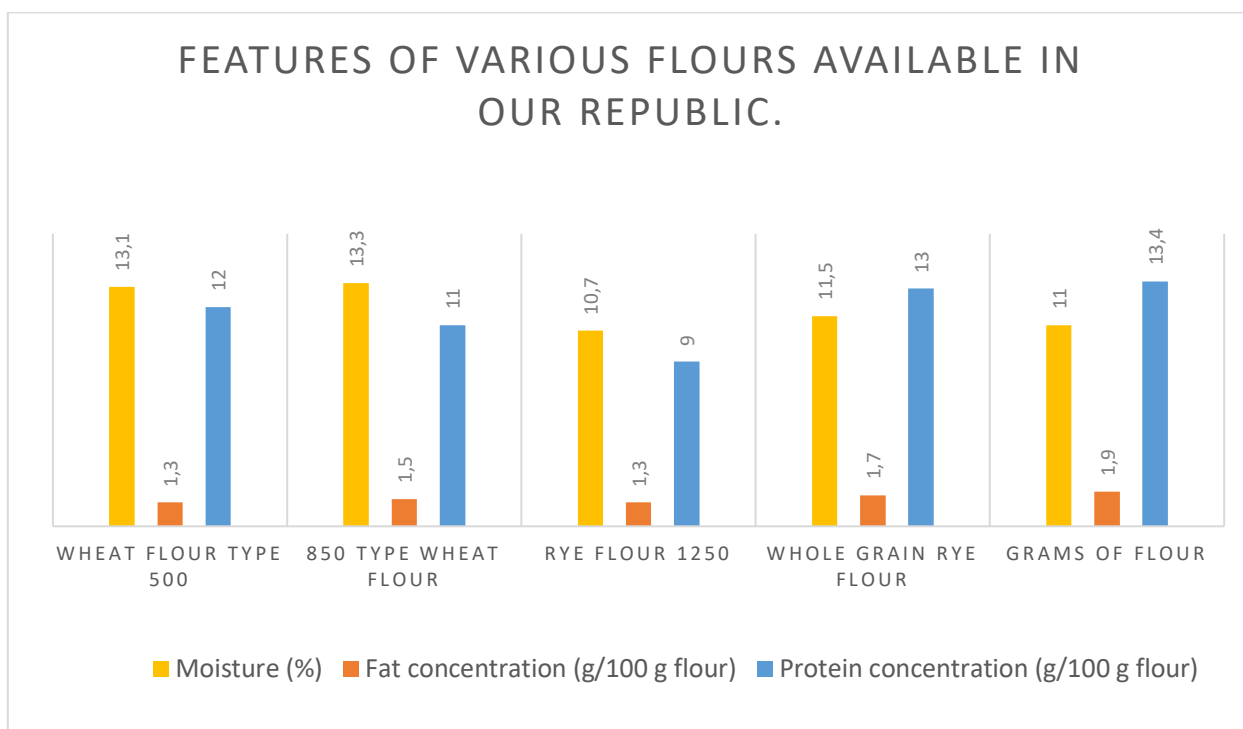


Figure 1. Moisture, fat concentration, protein concentration of various grain products in our republic.

Gliadins and glutenins are hydrophobic proteins. Gliadins are responsible for the dough's stretchability, while glutenins are responsible for its firmness. During the movement during mechanical processing, due to water, these proteins bind together and form a three-dimensional network called gluten. Gluten has a sticky, compact and elastic structure that absorbs water during dough processing and retains carbon dioxide during fermentation. Getting a well-developed gluten depends on the quality of the proteins in it and the correct processing.

Proteins have a number of properties that are particularly important for bread making. The amount of protein in wheat flour grown in our republic ranges from 9.5 to 24%, depending on the type of grain and the conditions of its cultivation. They are distinguished by many physical and chemical properties, the most important in proteins are the ability to swell, dissolve, hydrolyze and denaturate.

The more proteins in the flour and the stronger their ability to rise, the more raw gluten we get, and it is important to have gluten, which determines the strength of flour in our republic. A significant part of flour proteins does not dissolve in water, but swells well in it. Proteins rise especially well at a temperature of about 30-35 ° C, and at the same time absorb water 2-3 times more than their weight. As the starch fulfills its function

during the preparation of bread, it rises as much as possible, and then the formation of the bread is finished.

Discussion. The value of gluten depends on the quality of gluten proteins. This feature is very important in dough processing. Dough processing time, soaking time, yeast time and volume of the finished product are important in determining the strength of the flour.

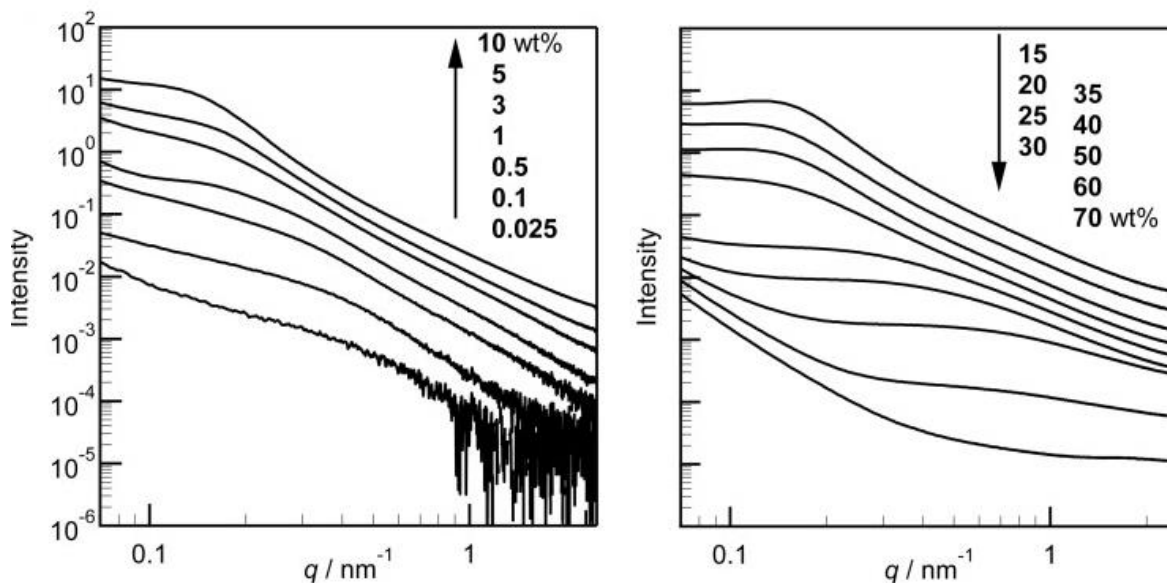


Figure 1. SAXS profiles of gliadins in distilled water. a) Solution components at low concentrations; b) gellike solid samples at high concentrations.

A flour with a higher gluten content produces a firmer gluten with a higher capacity to hold fermentation gases, which requires a longer leavening time. In addition, strong flour may require a large amount of water, resulting in products with highly developed alveolation. Weak flour, on the other hand, does not have the ability to absorb water, and several problems can be seen in a sticky dough if the dough is kneaded for several minutes, it is difficult to form, and there is little chance of retaining the carbon dioxide formed occurs by yeast, as a result, undeveloped and low-quality products are produced.

Conclusion. Currently, flour factories or combines in Uzbekistan are state mills, each of them has the capacity to produce 250-500 tons of flour per day. Year by year, as a result of the development of science and technology, the production capacity is increasing, it is important to determine the proteins, which are one of the most important components of flour products, and to know what processes are involved in the composition of flour. Wheat grain proteins grown in our republic are divided into water- and salt-soluble proteins, albumin and globulin, which make up 18% of the total amount of wheat proteins, and water-insoluble gliadin and glutenin make up the remaining 78%. They are determined by two methods, namely the Kjeldahl procedure method and the CNA method. Nowadays, the CNA method is more widely used because CNA provides high accuracy while being free from a number of corrosive chemicals required for Kjeldahl analysis. is determined using

REFERENCES

1. Amendola J, Rees N. (2003) *The Art and Science of Baking*, 3rd edition. John Wiley & Sons Inc. Hoboken, New Jersey, USA. ISBN 13-978-0-471-40546-7.
2. McGee H. (2004) *On Food and Cooking: The Science and Lore of the Kitchen*. Scribner. New York, New York, USA. ISBN 13-978-0-684-80001-1.
3. Stevens, D. (2009) *River Cottage Handbook No.3: Bread*. Bloomsbury Publishing Plc. London, England, UK. ISBN 978-0-7475-9533-5.
4. <https://pizzastories.le5stagioni.it/en/technique/the-proteins-of-flour-the-gluten>
5. Voqqosov Z., Ikramova M., Olimjanova M. Production of organomineral fertilizers based on local raw materials and nitrogen-fixing microorganisms //E3S Web of Conferences. – EDP Sciences, 2024. – Т. 486. – С. 05009.
6. Voqqosov Z., Khudaiberdieva L., Xodzhanazarova M. Studying the process of phenological monitoring of late varieties of plums grown in the climatic conditions of Namangan region //E3S Web of Conferences. – EDP Sciences, 2024. – Т. 486. – С. 02012.
7. Zuhridin V., Maftuna I. Determination of acceptable dimensions of biofertilizer production //Universum: технические науки. – 2024. – Т. 4. – №. 1 (118). – С. 59-62.
8. Худайбердиева Л. А. и др. Исследование промышленных сортов слив и совершенствование технологий хранения и сушки //Universum: технические науки. – 2023. – №. 11-4 (116). – С. 57-60.
9. Zukhriddin, Vokkosov, Kanoatov Khairullo Murodillaevich, and Sultonov Boxodir Elbekovich. "Obtaing Organomineral Fertilizers on Base of Local Raw Materials and Nitrogen-fixing Microorganisms." *Chemical Science International Journal* 31.4 (2022): 44-53.
10. Sharipov S. Y., Azizov A. S., Vakkasov Z. K. Storage of apples in different methods in the valley region of Uzbekistan //IOP Conference Series: Earth and Environmental Science. – IOP Publishing, 2022. – Т. 1068. – №. 1. – С. 012029.

C O N T E N T S

PRIMARY PROCESSING OF COTTON, TEXTILE AND LIGHT INDUSTRY

Nabidjanova N., Azimova S.	
Study of physical-mechanical properties of fabrics used for men's outer knit assortment	3
Nabidjanova N., Azimova S.	
Development of model lines of men's top knitting assortment	7
Noorullah S., Juraeva G., Inamova M., Ortiqova K., Mirzaakbarov A.	
Enhancing cotton ginning processing method for better fibre quality	12
Kamalova I., Inoyatova M., Rustamova S., Madaliyeva M.	
Creating a patterned decorative landscape using knitted shear waste on the surface of the paint product	16
Inoyatova M., Ergasheva Sh., Kamalova I., Toshpo'latov M.	
State of development of fiber products – cleaning, combing techniques and technologies	21
Vakhobova N., Nigmatova F., Kozhabergenova K.	
Study of clothing requirements for children with cerebral palsy	30
Mukhametshina E., Muradov M.	
Analysis of the improvement of pneumatic outlets in the pneumatic transport system	37
Otamirzayev A.	
Innovative solutions for dust control in cotton gining enterprises	45
Muradov M., Khuramova Kh.	
Studying the types and their composition of pollutant mixtures containing cotton seeds	50
Mukhamedjanova S.	
Modernized sewing machine bobbin cap hook thread tension regulator	53
Ruzmetov R., Kuliyeu T., Tuychiev T.	
Study of effect of drying agent component on cleaning efficiency.	57
Kuldashov G., Nabiev D.	
Optoelectronic devices for information transmission over short distances	65
Kuliev T., Abbasov I., F.Egamberdiev.	
Improving the elastic mass of fiber on the surface of the saw cylinder in fiber cleaning equipment using an additional device	73
Yusupov A., Muminov M., Iskandarova N., Shin I.	

On the influence of the wear resistance of grate bars on the technological gap between them in fiber separating machines **80**

Kuliev T., Jumabaev G., Jumaniyazov Q.

Theoretical study of fiber behavior in a new structured elongation pair **86**

GROWING, STORAGE, PROCESSING AND AGRICULTURAL PRODUCTS AND FOOD TECHNOLOGIES

Meliboyev M., Ergashev O., Qurbonov U.

Technology of freeze-drying of raw meat **96**

Davlyatov A., Khudaiberdiev A., Khamdamov A.

Physical-chemical indicators of plum oil obtained by the pressing method **102**

Tojibaev M., Khudaiberdiev A.

Development of an energy-saving technological system to improve the heat treatment stage of milk **109**

Turg'unov Sh., Mallabayev O.

Development of technology for the production of functional-oriented bread products **115**

Voqqosov Z., Khodzhiev M.

Description of proteins and poisons contained in flour produced from wheat grain produced in our republic **120**

CHEMICAL TECHNOLOGIES

Choriev I., Turaev Kh., Normurodov B.

Determination of the inhibitory efficiency of the inhibitor synthesized based on maleic anhydride by the electrochemical method **126**

Muqumova G., Turayev X., Mo'minova Sh., Kasimov Sh., Karimova N.

Spectroscopic analysis of a sorbent based on urea, formalin, and succinic acid and its complexes with ions of Cu(II), Zn(II), Ni(II) **131**

Babakhanova Kh., Abdukhalilova M.

Analysis of the composition of the fountain solution for offset printing **138**

Babakhanova Kh., Ravshanov S., Saodatov A., Saidova D.

Development of the polygraphic industry in the conditions of independence **144**

Tursunqulov J., Kutlimurotova N., Jalilov F., Rahimov S.

Determination zirconium with the solution of 1-(2-hydroxy-1-naphthoyazo)-2-naphthol-4-sulfate **151**

Allamurtova A., Tanatarov O., Sharipova A., Abdikamalova A., Kuldasheva Sh.

Synthesis of acrylamide copolymers with improved viscosity characteristics **156**

Amanova N., Turaev Kh., Alikulov R., Khaitov B., Eshdavlatov E., Makhmudova Y.	
Research physical and mechanical properties and durability of sulfur concrete	165

MECHANICS AND ENGINEERING

Abdullaev E., Zakirov V.	
Using parallel service techniques to control system load	170
Djuraev R., Kayumov U., Pardaeva Sh.	
Improving the design of water spray nozzles in cooling towers	178
Anvarjanov A., Kozokov S., Muradov R.	
Analysis of research on changing the surface of the grid in a device for cleaning cotton from fine impurities	185
Mahmudjonov M.	
Mathematical algorithm for predicting the calibration interval and metrological accuracy of gas analyzers based on international recommendations ILAC-G24:2022/OIML D 10:2022 (E)	192
Kulmuradov D.	
Evaluation of the technical condition of the engine using the analysis of the composition of gases used in internal combustion engines	197
Kiryigitov Kh., Taylakov A.	
Production wastewater treatment technologies (On the example of Ultramarine pigment production enterprise).	203
Abdullayev R.	
Improving the quality of gining on products.	208
Abdullayev R.	
Problems and solutions to the quality of the gining process in Uzbekistan.	212
Yusupov D., Avazov B.	
Influence of various mechanical impurities in transformer oils on electric and magnetic fields	216
Kharamonov M.	
Prospects for improving product quality in textile industry enterprises based on quality policy systems	223
Kharamonov M., Kosimov A.	
Problems and solutions to the quality of the gining process in Uzbekistan.	230
Mamahonov A., Abdusattarov B.	
Development of simple experimental methods for determining the coefficient of sliding and rolling friction.	237

Aliyev E., Mamahonov A.	
Development of a new rotary feeder design and based flow parameters for a seed feeder device	249
Ibrokhimova D., Akhmedov K., Mirzaumidov A.	
Theoretical analysis of the separation of fine dirt from cotton.	260
Razikov R., Abdazimov Sh., Saidov D., Amirov M.	
Causes of floods and floods and their railway and economy influence on construction.	266
Djurayev A., Nizomov T.	
Analysis of dependence on the parameters of the angles and loadings of the conveyor shaft and the drum set with a curved pile after cleaning cotton from small impurities	272
ADVANCED PEDAGOGICAL TECHNOLOGIES IN EDUCATION	
Jabbarov S.	
Introduction interdisciplinary nature to higher education institutions.	276
Tuychibaev H.	
Analysis of use of sorting algorithms in data processing.	280
Kuziev A.	
Methodology for the development of a low cargo network.	289
Niyozova O., Turayev Kh., Jumayeva Z.	
Analysis of atmospheric air of Surkhondaryo region using physico-chemical methods.	298
Isokova A.	
Analysis of methods and algorithms of creation of multimedia electronic textbooks.	307
ECONOMICAL SCIENCES	
Rashidov R., Mirjalolova M.	
Regulations of the regional development of small business.	315
Israilov R.	
Mechanism for assessment of factors affecting the development of small business subjects.	325
Yuldasheva N.	
Prospects of transition to green economy.	334
Malikova G.	
Analysis of defects and solutions in investment activity in commercial banks.	346