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YANGI O'ZBEKISTON: INNOVATSIYA, FAN VA TA'LIM

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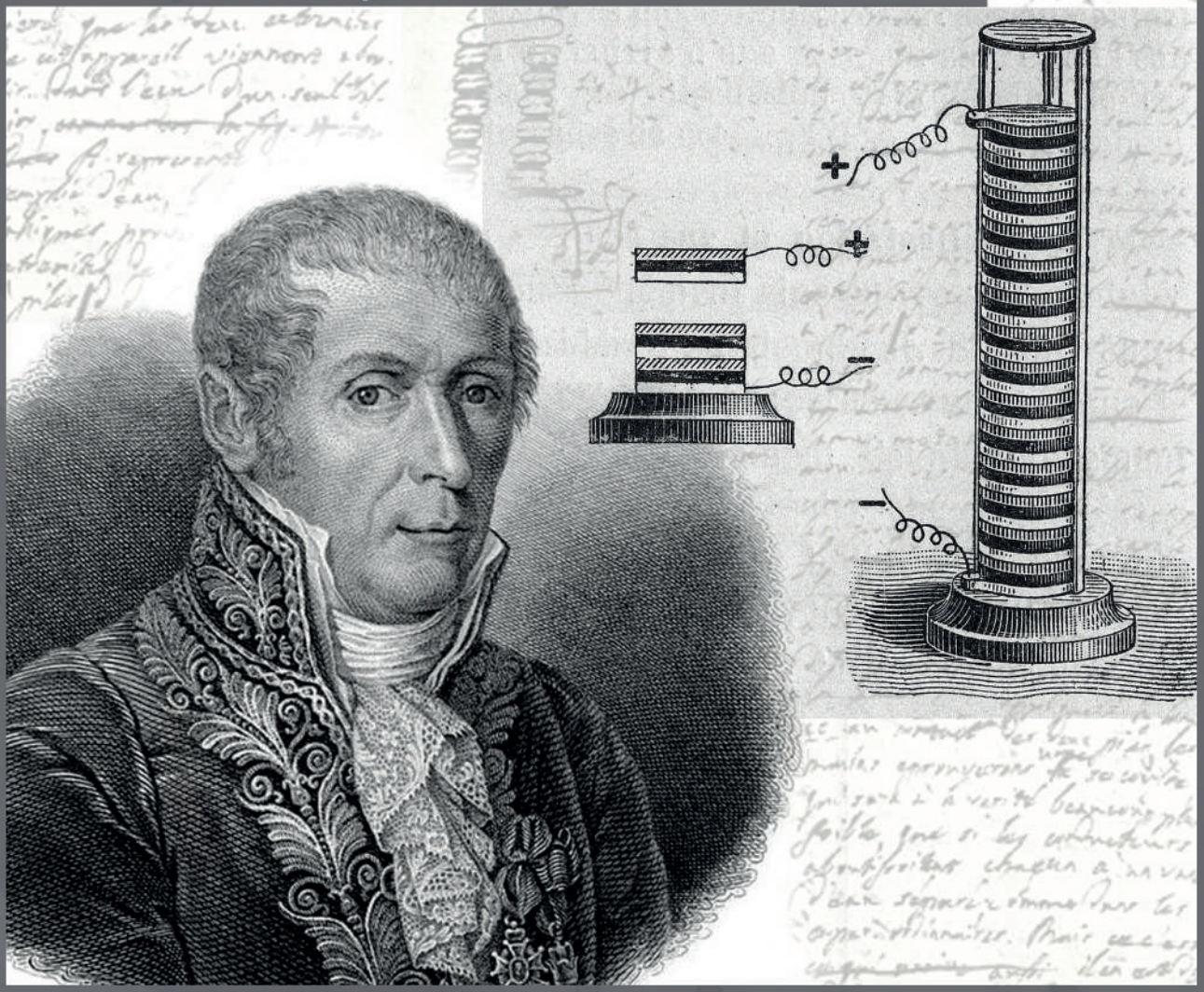

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ЯНГИ ЎЗБЕКИСТОН: ИННОВАЦИЯ, ФАН ВА ТАЪЛИМ 21-ҚИСМ

НОВЫЙ УЗБЕКИСТАН: ИННОВАЦИИ, НАУКА И ОБРАЗОВАНИЕ ЧАСТЬ-21

NEW UZBEKISTAN: INNOVATION, SCIENCE AND EDUCATION PART-21

ТОШКЕНТ-2023

УУК 001 (062)
КБК 72я43

“Янги Ўзбекистон: Инновация, фан ва таълим” [Тошкент; 2023]

“Янги Ўзбекистон: Инновация, фан ва таълим” мавзусидаги республика 52-кўп тармоқли илмий масофавий онлайн конференция материаллари тўплами, 31 май 2023 йил. - Тошкент: «Tadqiqot», 2023. - 16 б.

Ушбу Республика-илмий онлайн даврий анжуманлар «Ҳаракатлар стратегиясидан – Тараққиёт стратегияси сари» тамойилига асосан ишлаб чиқилган еттита устувор йўналишдан иборат 2022 – 2026 йилларга мўлжалланган Янги Ўзбекистоннинг тараққиёт стратегияси мувофиқ:– илмий изланиш ютуқларини амалиётга жорий этиш йўли билан фан соҳаларини ривожлантиришга бағишланган.

Ушбу Республика илмий анжуманлари таълим соҳасида меҳнат қилиб келаётган профессор - ўқитувчи ва талаба-ўқувчилар томонидан тайёрланган илмий тезислар киритилган бўлиб, унда таълим тизимида илғор замонавий ютуқлар, натижалар, муаммолар, ечимини кутаётган вазифалар ва илм-фан тараққиётининг истиқболдаги режалари таҳтил қилинган конференцияси.

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PageMaker\Верстка\Саҳифаловчи: Шахрам Файзиев

Контакт редакций научных журналов. tadqiqot.uz
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КИМЁ ФАНЛАРИ ЮТУҚЛАРИ

КИМЁ ФАНЛАРИ ЮТУҚЛАРИ

ZAMONAVIY PEDAGOGIK TEXNOLOGIYALAR ASOSIDA KIMYO TA’LIMINI AMALGA OSHIRILISHI O‘QUVCHILARNI RIVOJLANTIRUVCHI VOSITA EKANLIGI

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Annotatsiya: ushbu maqolada kimyo darslarida zamonaviy pedagogic texnologiyalar asosida kimyo ta’limini amalga oshirilishi o’quvchilarn9 rivojlantiruvchi vosita ekanligi haqida yoritilgan.
Kalit so’zlar: zamonaviy ta’lim, zamonaviy dars, axborot resurslari.

Axborot va innovatsion texnologiyalarni kimyo fanlarining muhim mavzulariga tadbiq etib, o‘qitishning dars samaradorligiga ta’sirini o‘rganishga oid keyingi o‘tkazilgan ilmiy pedagogik tadqiqotlar;

Nafaqat o‘quvchilar tomonidan bilimlarni egallashning muhim omili ekanligi, balki o‘quvchilarni rivojlantiruvchi ta’limda ham muhim vositaga aylanib borayotganligini ko‘rsatmoqda. O‘quvchilarni rivojlanishida kimyoviy tajribalarni ular tomonidan mustaqil bajarilishi, masalalar echish ko‘nikma va malakalarini hosil qilinishi, anorganik va organik moddalar sinflari orasidagi genetik bog‘lanishlar va umumlashtirishlarni talab darajada o‘qitilishi muhim ahamiyat kasb etadi.

Rivojlantiruvchi o‘qitishni amalga oshirish uchun o‘quvchilarni mustaqil ta’limini amalga oshirish muhim ahamiyatga egadir. Lekin an’anaviy o‘qitish metodlari bilan o‘quvchilarni mustaqil ta’limini amalga oshirish, televideniya va kompyuter orqali nihoyatda ko‘p o‘quv ilmiy axborotlarni o‘quvchilarning o‘rganishlari mumkin bo‘lgan hozirgi davrda qiyin muommoga aylanib qoldi.

Keyingi vaqtlarda innovatsion va axborot texnologiyasi asosida mustaqil ta’limni amalga oshirishga oid ilmiy metodik tadqiqotlar va ta’limni amalga oshirish tajribalari, bu muommoni hal qilish mumkinligini ko‘rsatmoqda. Masalan innovatsion texnologiyaning «Aqliy hujum», «Pinbord», «Klaster», «Loyihalash» texnologiyalari asosida, o‘quvchilarning mustaqil ta’limini amalga oshirishini qisqacha ko‘rib chiqamiz. Masalan «Aqliy hujum» metodida mustaqil ta’limni amalga oshirish uchun kimyo kursining biror mavzusini, masalan, «Fosfor va uning birikmalari» mavzusini o‘quvchilarga uyga vazifa qilib beriladi. Bu metodni amalga oshirish uchun, o‘quvchilarni vazifalarni mustaqil bajarishlari zarurdir. Mustaqil egallangan bilimlar asosida o‘quvchilar g‘oyalar tayyorlaydilar yoki g‘oyalarning o‘qituvchi tomonidan tuzib berilishi mumkin. Seminar va amaliy mashg‘ulotda dars rejasi bo‘yicha tuzilgan har bir g‘oya o‘quvchilarga o‘qib eshittiriladi. Masalan birinchi g‘oya «Fosforning kashf etilishi bo‘yicha. Bu g‘oyani guruh bo‘yicha hal qilishda, guruhdagi o‘quvchilar birin ketin adabiyotlardan mustaqil tayyorlanib kelgan bilimlari asosida javob beradilar. Javoblarni guruhdagi ikki o‘quvchi yozib boradi. Birinchi o‘quvchi XII asrda arab alkimyogari Alxid Bexil siydikni bug‘latib hosil bo‘lgan qoldiqqa ko‘mir va qum qo‘shib qizdirganda oq fosfor hosil bo‘lganligini, qorong‘uda nur sochish xossasiga ega bo‘lgani uchun olinish tavsilotini uzoq vaqt sir saqlagan deb tushuntiradi.

Ikkinchi, o‘quvchi javobida 1669 yilda nemis alkimyogari Savdogar Brand Bexil qo‘llagan usulda fosfor qayta olinganligi, uning xossasini namoyon qilish hisobiga boyib ketganligi va shuning uchun fosforni olinish tavsilotini sir saqlaganligi keltiriladi.

Uchinchi o‘quvchi javobida fosforning olinishiga bo‘lgan qiziqish hozirgi vaqtgacha davom etib, uning 11 ta allotropik shakl o‘zgarishi hosil qilinganligi qayd etiladi.

To‘rtinchi o‘quvchi javobida rus olimi akademik S.I.Volfkovich fosforning havorang nur sochuvchi allotropiyasini kashf etilganligini bayon etadi. Lekin javoblarda oq fosforning nur sochishida qanday jarayonlar natijasida sodir bo‘lishi g‘oyasi hal qilinmaganligi uchun o‘qituvchi

uni o‘zi asoslab beradi. Oq fosfor turgan idishdagi bosim oshirilsa, u shu’lalanmay qoladi. Bu hodisa fosfor nur sochishda uning bug‘lari ishtirok etishni ko‘rsatadi. Gap shundaki, fosfor bug‘idagi R_4 holidagi uning molekulalari havoda sekin oksidlanshiga ajraladigan energiya nur shaklida chiqadi. SHuning uchun qorong‘uda oq fosfor nur sochadi.

Mavzu rejasining 2-4 bandlari uchun tuzilgan g‘oyalarni ham guruhdagi o‘quvchilarning faol ishtirokida hal qilib chiqiladi. Rejaning 2,4 bandi uchun tuzilgan. Ђoyalarni «Fosfor (V) oksidi, pirofosfat kislota, organizmdagi ATF, ADF tuzilishlaridagi o‘xshashliklar nimalardan iborat. Ulardagi qaysi bog‘lar yuqori energetik holatlarga ega ekanligini qanday asoslaysiz». (2) «Fosfor organik birikmalar insonning hayotiy va genetik jarayonlarida qatnashishi to‘g‘risida nimalarni bilasiz». (3) va «Fosforli o‘g‘itlarni olish, undagi fosfor elementini organizmdagi faoliyatini» (4) asoslab bering. Bu ђoyalarni hal qilinishi ham ishtirokchilarning juda katta qiziqishlariga va qizg‘in shu muxokamalarga olib kelganligi talablarni mavzuga oid bilimlarni yaxshi o‘zlashtirganliklaridan dalolat beradi. Mustaqil o‘qib kelish uchun berilgan mavzu bilimlarini o‘kuvchilar tomonidan qanday o‘zlashtirganliklarini nazorat qilish talablarning g‘oyani hal qilishlaridagi javoblariga ball qo‘yish orqali aniqlanadi.

Innovatsion texnologiyalar joriy qilib, kimyo ta’limini amalga oshirishga oid dars jarayonlari kimyo fanlari chuqurlashtirib o‘qitiladigan akademik litseylarda aprobatsiyadan o‘tkazilish natijalari dars samaradorligini yuqori bo‘lganligini ko‘rsatadi. Bunda dars samaradorligini oshirishga birinchi navbatda, o‘quvchilarning mavzuga oid mustaqil ta’limini talab darajasida amalga oshirilgandagina yuzaga chiqishi aniqlanadi, aks holda vaqtni ko‘p sarflanishi hisobiga dars rejasidagi ta’limni to‘liq amalga oshirib bo‘lmasligi kuzatiladi.

Ko‘rib chiqilgan mavzuni o‘qitishda o‘quvchilarni rivojlantirish vositasiga mazmunning qiziqarli holda bayon qilinishi, o‘quv jarayonini o‘zaro muloqotlar asosida faol olib borilishi va natijada o‘quvchilarning faolligini oshishini kiritish mumkin.

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STUDIES ON THE EXTRACTION OF PROTEIN FROM POULTRY FEATHERS AND THEIR ANALYSIS RESULTS.

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Abstract: Poultry farming is one of the most developed industries, and it is very important to operate the industry completely without waste. More than 20,000 chickens are slaughtered in poultry factories per month. Taking into account that on average 100 grams of feathers are extracted from one chicken, the main goal is to extract keratin protein by processing more than 2 tons of chicken feathers per month. During the research, my method of extracting protein from feathers will be discussed. In addition, determination of the amount of nitrogen in the protein isolated by a special method, determination of the total protein and amino acids are discussed. In the results section, it was found that 25% dry mass was extracted, it contained 17 different amino acids. It was concluded that chicken feather protein can be used for cosmetics based on theoretical comparisons with keratin protein. Hair is composed mainly of keratin protein and a small amount of lipid.

Keywords: Keratin, Protein, Feathers, Amino acids, Chicken feather, Feather protein.

Introduction

We know that feather pillows are made from bird feathers. But the feather pillow is a favorable environment for the development of fungi. Due to the fact that it is the cause of various allergic diseases, it is not in demand among the population today.

Poultry farming is one of the main areas of agriculture. Today, poultry meat is popular among the population. By using poultry products and their feathers in the national economy, it is possible to reduce the amount of harmful waste emitted into the atmosphere and environment. The main function of a bird's feather is, of course, the ability to fly. The chemical composition, properties and research results of all birds and poultry feathers are presented in the article. By working without waste, it is possible to bring up ecological culture, to fundamentally change the relationship between man and the environment. On average, 100 grams of dry chicken feathers are extracted from one chicken, and insufficient processing system is considered one of the urgent problems. Keratin protein is isolated as a solution to the problem. The advantages of processing poultry feathers and applying cosmetics have been proven in the world experience.

Literature review

Approximately 5 million tons of feather biomass is being generated annually from poultry farms [1,2] which leads to serious solid waste hazards [3]. It is important to establish a feather processing system. Considering the high protein content (90%) [4], it could provide an excellent source of amino acids for animal feed [5], bio composites [6] and for numerous other industrial applications [7,8]. The sodium sulfide-based extraction of keratin by dissolving chicken feather is an efficient and economically favorable method which provide sufficient yield and also retained the secondary structure of protein [9]. The feather protein also has potent antioxidant and anticancer properties. Recently the anti-cancerous activity of hair protein had been reported by [24].

$$Na_2S + H_2O \rightarrow 2Na^+ + HS^- + OH^-$$

Hair is composed mainly of keratin protein (90%) and a small amount of lipid (1–9%). The diameter of hair fibers varies between 40 and 150 μm and its major structure consists of a cuticle, cortex and medulla [10]. Keratin protein is present in the body of reptiles and birds. For example, found in mammals' feathers, claws, horns and horns [11].

According to the literature analysis, it shows keratin hydrolysis peptides with molecular mass

are obtained by enzymatic method 800 to 1079 Daltons. Keratin is widely used in the cosmetic, medical, pharmaceutical and biotechnological industry.

Considering that keratin protein obtained from feathers is an environmentally friendly product, based on stability and biotransformation he claims that it is protein rich biomass. Keratin is a complex biopolymer, composed of 19 amino acids linked together in ladder-like polypeptide chains by peptide bonds [12].

Based on the sources of this article, [13] the chemically extracted particles of keratin proteins can be used pharmacologically to formulate the medically important products like anti-ageing cream, shampoo and wound healing creams. This study also provided a sustainable method to remove the huge chicken feather waste biomass moderately generated by poultry industry and production of value aided materials. The feather biomass is easily available and can be used produce the keratin microparticles with effective bio-functional properties of pharmaceutical use. Feather keratin has an average molecular mass of about 60500 g/mol, ranging from 59000 up to 65000 Daltons [14]. Melting point – 230 °C.

Experimental parts of articles published in international journals were studied. Fresh white chicken feathers (about 3cm-20cm long) slaughtered adult Leghorn chickens were supplied by Baiada Poultry Pty Ltd (Melbourne VIC, Australia). All feathers are cleaned of oils, stains, dirt, etc. by ethanol extraction method. Cleaned feathers were conditioned using an incubator at 34 ± 1°C for 3 days and conditioned at 20 ± 2°C and 60 ± 2%. It was dried for 72 hours until the relative humidity disappeared. Ground chicken feathers in a ratio of 1:20 to 100 ml of aqueous solutions 0.5 mol/L sodium sulfide (Na_2S) solution (Solution A) and immersed in 8 mol/L urea (NH_2CONH_2) and 0.165 mol/L L-cysteine (Solution B), then adjusted to pH 10.5 using NaOH (2 mol/L). Then the solutions are heated and stored at 40°C and required continuous stirring for 6 h at 10 g using a magnetic stirrer, then centrifuged at 11,648 g for 20 min at 10°C. The supernatant was collected and the particles contained were discarded. Hydrochloric acid (7 mol/L) was added to the solution until pH 4 [38,39] and the isoelectric-keratin point was taken and left for 2 h without heating or stirring. The aqueous phase was tested after sedimentation and the Biuret test confirmed the presence of protein. The precipitated keratin was washed three times with deionized water, filtered and dried at 40°C. Keratin powders were taken and stored in closed light-sensitive glass containers. When the concentration of keratin solutions was analyzed by ultraviolet radiation, the spectrophotometer was determined to be 280 nm using the BioFotometer plus [16].

Research Methodolog

The chicken feathers were collected from a chicken process-ing plant at Jaya Gading, Kuantan, Malaysia. Sodium sulfide, NaOH, HCl, petroleum ether and Cetrimonium bromide (CTAB)were purchased from Sigma Aldrich (Selangore, Malaysia). Wet feathers are cleaned and dried in a ventilated oven at 40°C for 72 hours. Chicken feathers are degreased using petroleum ether, then washed twice with distilled water. Washed feathers are dried for 24 hours at a temperature of 20°C and a relative humidity of 65%. After the first cleaning, the feathers are cleaned with Cetrimonium bromide for 3 hours to remove impurities and microbial contamination. These feathers were then cut into small pieces (2–25 cm), dried under sunlight for 48 h, and stored at 4◦C for further use. For keratin extraction, 25 g of ground feathers were immersed in sodium sulfide (0.5 M) at 50°C for 6 h using a mechanical stirrer. The hydrolyzate solution was filtered twice and centrifuged to separate the supernatant. The pH of the hydrolyzate solution is neutralized with 2N HCl to pH 3.5 and 5.5, and a thick precipitate is deposited after 24 hours. The precipitates were collected and designated as Keratin microparticles (KM1 and KM2, respectively). To remove salts and other impurities, KM1 and KM2 were dispersed in water and centrifuged 3 times at 12,000 rpm for 10 minutes each. Finally, the keratin precipitate was collected and lyophilized to obtain keratin powders. The total yield of extracted keratin powder was 79.6% and 70.23% for KM1 and KM2, respectively [13].

10 g of chicken feathers in warm soapy water and a few washed once with distilled water. Washed feathers are placed in a flask and 100 ml of 10% NaOH solution is added and the process of alkaline hydrolysis occurs. It is also hydrolyzed with reducing agents. In this way 10 g of feathers are washed with warm soapy water, put into a distilled flask, shaken several times, and 200 ml of 0.1 N NaOH solution, 200 ml 10% solution of H_2O_2, Na_2S, Na_2SO_3 is added. The amount of isolated protein is determined by the protein photocolorimetric method and the biuret reaction method. As a result, up to 43 g/l of protein was extracted within 48 hours [17].

Effects of reagents

According to preliminary studies, feathers are not affected by hot and cold water when they are carried over them in a laboratory room with 87% humidity.

When heated under the influence of sulfuric acid H_2SO_4, a black solution is formed and the feather dissolves in 15 minutes.

When heated with phosphoric acid H_3PO_4, a purple solution was formed and the feather was insoluble.

Liquid ammonia solution and ammonium hydroxide NH_4OH do not cause any change in the solution when exposed to poultry feathers.

When exposed to nitric acid HNO_3, the feather completely dissolves and a pale-yellow solution is formed.

When caustic soda NaOH is applied to a bird's feather for 10 minutes, the feather dissolves and a light-yellow solution is formed. Based on preliminary studies, it was decided to hydrolyze the feathers in an alkaline medium.

The method of extracting proteins from discarded feathers

The feathers were collected from the poultry factory located in the Fergana region of the Republic of Uzbekistan. According to the conducted research, poultry feathers are washed, dried and ground to a size of 0.25 cm. To separate proteins from biomaterials, their solubility property is used. But the isolation of proteins causes more difficulties. The main difficulty in this separation is their instability. They lose their natural "native" properties under the influence of high temperature, strong acids and alkalis, and a lot of reagents. These processes are called denaturation. The second difficulty encountered in the isolation of proteins is to get rid of protein molecules, other organic compounds that mix with them and form complexes with them, lipids, carbohydrates, and nucleic acids in complex mixtures obtained from biological material. In order to get rid of the residual oils contained in the feather, it is cleaned using extracted gasoline. Then, feather dried with a dryer was hydrolyzed with NaOH solution with 0.2 N pH value of 12 in a 95□ water bath (1:20 ratio) for 2 hours. When measured on an analytical balance, it was found that 20 g of protein (25% compared to the initial product) precipitated. When the solubility of the isolated protein was studied, it did not dissolve under the influence of water, alcohol, acetic acid, acetonitrile, hydrochloric acid and salts containing phosphate anion. When it was exposed to sodium alkali, it was observed that the melting process took place. All chemicals were of analytical grade and used as received.

3. Results and Discussion

The amino acid content of the resulting protein hydrolyzate was determined by chromatographic method. Chromatographic analysis results are shown in Table 2. It was analyzed according to the method of amino acid analysis using phenyl isothiocyanate derivatives. Isolation of free amino acids. The sedimentation of proteins and peptides from the aqueous extract of the samples was carried out in centrifuge beakers. To do this, 1 ml (exact volume) of 20% TCA was added to 1 ml of the test sample. After 10 minutes the precipitate was separated by centrifugation at 8000 rpm for 15 minutes. After separating 0.1 ml of the supernatant, freeze-dried. The hydrolyzate was evaporated, the dry residue was dissolved in a mixture of triethylamine-acetonitrile-water (1:7:1) and dried. This operation was repeated twice to neutralize the acid. Reaction with phenylthioisocyanate gave phenylthiocarbamyl derivatives (FTC) of amino acids according to the method of Steven A., Cohen Daviel. Identification of amino acid derivatives was carried out by HPLC. HPLC conditions: Agilent Technologies 1200 chromatograph with DAD detector, 75x4.6 mm Discovery HS C18 column. Solution A: 0.14 M CH_3COONa + 0.05% TEA pH 6.4, B: CH_3CN. Flow rate 1.2 ml/min, absorbance 269nm. Gradient %B/min: 1-6%/0-2.5min; 6-30%/2.51-40min; 30-60%/40.1-45min; 60-60%/45.1-50min; 60-0%/50.1-55min [18].

Table 1. The amount of amino acids in 1 gram of substance according to the chromatogram of protein hydrolyzate obtained from chicken feathers.

№	Name of amino acids	Protein hydrolysis isolated from chicken feathers
		Concentration mg/g
1	Asparaginic acid	56,78975
2	Glutamic acid	78,86349
3	Tserin	56,99378

4	Glycine	65,98891
5	Asparagine	0
6	Glutamine	0
7	Cysteine	46,2541
8	Threonine	37,11877
9	Arginine	44,37028
10	Alanine	37,92451
11	Proline	74,15931
12	Tyrosine	52,13104
13	Valin	79,67239
14	Methionine	13,73588
15	Histidine	55,13941
16	Isolate	43,56399
17	Leucine	97,88839
18	Tryptophan	0
19	Phenylalanine	26,67172
20	Lysine	22,80812
Total		**890,0738**

In this article, the main goal is to reduce the amount of environmental waste by promoting the technology of processing chicken feathers, which is considered as a waste of poultry farms. The problem exists in all poultry factories, and by reducing the amount of environmental waste, creating an additional income by creating a zero-waste technology, and trying to solve the problem in a new way, causes the interest of entrepreneurs to increase. If more than 25,000 broiler chickens are slaughtered per month in one poultry factory, 625 kg of protein can be obtained by processing the feathers separated from them with a yield of 25% in our research.

$$625\ kg \cdot 12\ month = 7500\ kg = 7{,}5\ tons$$

According to the account books, an entrepreneur who processed waste by selling 7.5 tons of protein per year will have a large investment by introducing the finished product to the market. The product mainly occupies the market of cosmetic products intended for hair, there is a significant consumer demand, and it will stimulate the creation of additional vacancies in the labor market.

Discussion

According to our research results, 250-300 kg of protein can be extracted from 1 kg of chicken feathers. Further research is being done to increase the yield. Unlike the method of other scientists mentioned in the analysis of the literature, in the article, only sodium hydroxide and acetic acid can be seen in the process of alkaline hydrolysis and precipitation of proteins. In this way, the necessary raw materials can be reduced. We are conducting research on the introduction of feather processing technology in the conditions of Uzbekistan.

The main goal is to use cosmetics for hair that preserves keratin protein by introducing the technology of protein extraction from chicken feathers, and includes the following tasks:

- extraction of dry mass for the preparation of protein from chicken feather, which is considered a local raw material;
- study of the chemical composition of dry mass obtained from chicken feathers;
- to determine the composition of the main amino acids in the dry mass obtained from chicken feathers;
- is to develop a recipe for the preparation of special washing agents for hair based on the obtained keratin protein.

Conclusion

One of the disadvantages of our method is the smell of acetic acid and alkaline solutions. In addition, it is necessary to bleach the color of the obtained protein. In addition, it is necessary to study the toxicological and allergic aspects of the isolated protein. The reason is that feathers collect fungi in themselves, and feathers are no longer used as pillows today. Also, in the future, it was aimed to study the content of the extracted protein more deeply, to determine the content of

heavy metals.

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KIMYO FANINI O’QITISHDA VERTUAL LABORATORIYALARDAN FOYDALANISHNING AHAMIYATI

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Annotatsiya : ushbu maqolada kimyo darslarini vertual tashkil etish, organik kimyo va noorganik kimyoda qo’llash haqida yoritilgan.

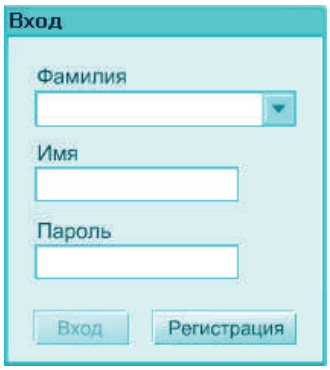
Kalit so’zlar: vertuakl, organik va anorganik, dastur.

Organik kimyo o’qitish noorganik kimyo o’qitishdan tubdan farq qilmasa ham, uning o’ziga xos tomonlari bor. Bulardan birinchisi barcha mavzularning juda uzviy bog’langanligidir. Agar biror mavzu o’quvchilarga yaxshi tushuntirilmay qolsa, keyingi mavzularning barchasining o’zlashtirilishi qoniqarli bo’lmay qoladi. Organik moddalarning ko’pchiligi bilan o’quvchilar kundalik turmushda uchrashib turadilar. Shu sababli darslarda turmushda ahamiyati katta moddalardan ko’proq misollar keltirib, ularning qo’llanilishi bilan o’quvchilarni chuqurroq tanishtirib borish lozim.

Dasturni ishga tushirish

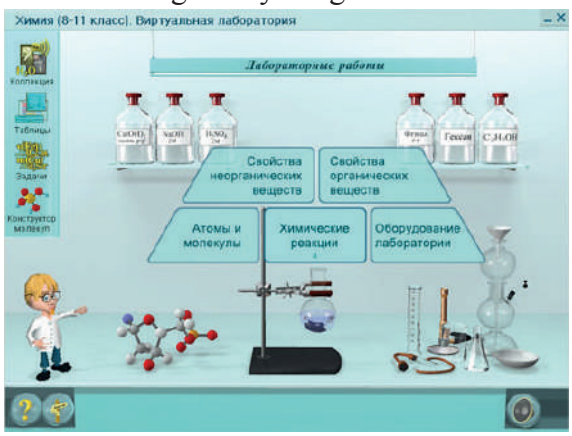
Dasturni ishga tushirishdan oldin shaxsiy kompyuterga o’rnatish uchun tavsiya bilan tanishib chiqiladi. Dasturni ishga tushirgandan so’ng ekranda asosiy ko’zgusi paydo bo’ladi.

Dasturga kirish tartibi:



Agar siz elektron dasturga birinchi bor kirmoqchi bo’lsangiz kaydnomaga o’zingiz to’gringgizdagi malumotlarni kiritasiz. Agar oldin bu dastur bilan ishlagan bo’lsangiz unda ismingizni va shaxsiy parolingizni kiritasiz va kirish «vxod» tugmasini bosasiz. Endi Sizning dasturda ishlagan bacha ishlaringiz maxsus faylda saqlanadi.

Dasturning asosiy kuzgusi



Dasturni birinchi bor ishga tushirganingizda «Kimyogar» Sizga elektron dasturning maksadi va tarkibi to’g’risida malumot beradi

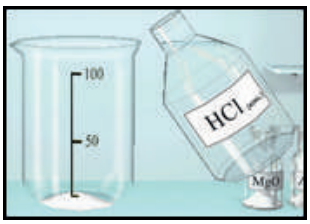
Laboratoriya ishlari va ularda bajariladigan amallar

Laboratoriya ishlari bo’limi jami beshta qismdan iborat. Siz tomondan istalgan qism tanlansa kimyogar tomonidan tanlangan qism to’g’risida malumot beriladi.

Laboratoriya ishlarini bajarish uchun quyidagi xarakatlarni bajarishga to’g’ri keladi:

-Suyukliklarni quyish
-Quruq moddalarni quyish
-Tomchilatib quyish
-Kimyoviy idishlarni qizdirish
-Laboratoriya jurnalini to’ldirish
- Asboblarni yig’ish.

Suyukliklarni quyish uchun (probirkaga, farfor idishga, kimyoviy stakanga) quyidagi amallar bajariladi:



1) Probirka sichkoncha yordamida tanlanadi;
2) Reaktiv solingan idish tanlanadi;
3) Reaktivni quyish uchun tanlangan reaktiv idishi sichqonchaning chap tugmasi bilan bosilib turiladi to eritma idishga zarur mikdorda tushguncha. Agar reaktivning zarur mikdoridan kam olinsa, 3 punkt yana takrorlanadi.

Quruq moddalardan reaktsiya uchun olish tartibi

Quruq moddalardan (probirkaga chinni kosachaga, kimyoviy stakanga olish shpatel yordamida amalga oshiriladi. Moddani olish uchun:

1) Probirka yoki idish tanlanadi;
2) Reaktiv solingan idish tanlanadi;
3) Sichqoncha yordamida shpatel tanlanadi

Eritmani tomchilatib quyish uchun pipetkadan foydalaniladi. Undan foydalanish tartibi:

1) Probirka tanlanadi
2) Reaktiv solingan idish tanlanadi
3) Sichqoncha bilan pipetka tanlanadi

Foydalanilgan adabiyotlar:

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Эълон қилиш муддати: 31.05.2023

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