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ОРИПОВ А. (Ўзбекистон)

Муҳаррирлар: Ташматова Т.
Жўрабоева Г.
Шералиева Ж.

Таҳририят манзили:

150100, Фарғона шаҳри, Мураббийлар кўчаси, 19-уй.
Тел.: (0373) 244-44-57. Мобил тел.: (+99891) 670-74-60
Сайт: www.fdu.uz

Босишга рухсат этилди:

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МАТЕМАТИКА

А.Ўринов, Д.Усмонов Гиперболик типдаги бузиладиган иккинчи тур тенглама учун Коши-Гурса масаласи	6
А.Ғойипов Бир номаълумли модулли тенгламаларни ечишнинг бир усули ҳақида	18

КИМЁ

Х.Юлдашев, Ю.Мансуров Автомобиль чиқинди газларини каталитик тозалаш	25
Ғ.Мадраҳимов, М.Ҳожиматов, И.Асқаров 1-(2-карбокисфенил)-1'-п-метил оксиферроценил тизоамид синтези ва унинг биостимуляторлик хоссалари	31
Ш.Каримов, Н.Хабибуллаева, А.Хаитбаев <i>Leptinotarsa decemlineata</i> (Say) таркибидан хитозан ажратиш олиш	36
И.Асқаров, Ф.Абдугаппаров, М.Хожиматов Амигдалиннинг кимёвий хоссалари ва инсон саломатлигига таъсири	42
А.Йўлчиев, К.Джамолов, И.Асқаров, М.Мўминов Мувозанатлаштирилган гранулаланган омихта ем таркибини бойитиш	49
Х.Исмоилов, О.Саримсоқов, С.Хайдаров Пахта пневмотранспорти учун материал ўтказгич конструкциясини ишлаб чиқиш	53
У.Мараимова, И.Жалолов, Г.Бегматова, С.Арипова Ўзбекистонда ўсадиган <i>goetmeria hybrida</i> даги кимёвий элементларнинг микдорий таркибини аниқлаш	57

Ижтимоий-гуманитар фанлар

Г.Халматжанова, А.Ғофуров Кластер тизими ривожда сув ресурслари салоҳиятини ошириш	62
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ФАЛСАФА, СИЁСАТ

И.Сиддиқов Ўрта асрлар ислом ғоносеологияси ва теологиясининг ўзаро синтезлашуви	68
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ТАРИХ

М.Исамиддинов Қадимги Марғиёна ва Бақтрия ҳудудидаги яз-ii археологик комплексларини даврлаштириш масалалари	75
И.Мамадалиев, Тим Брэгер Ўрта Осиё Россия империяси таркибида	79
Р.Арслонзода Ўзбекистонда мактаб тарих таълими тизимининг шаклланиши	85
А.Йўлдашев XX асрнинг 20-йилларида европада таълим олган ўзбек қизи	90
Д.Абдуллаев XX асрда Ўзбекистон аҳолиси тақдирланишининг архив манбаларида акс эттирилиши	95
Н.Рахматова Мустақил Ўзбекистонда тадбиркорликни ривожлантиришда каштачилик ва касаначиликнинг ўрни	102

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АМИГДАЛИННИНГ КИМЁВИЙ ХОССАЛАРИ ВА ИНСОН САЛОМАТЛИГИГА
ТАЪСИРИХИМИЧЕСКИЕ СВОЙСТВА АМИГДАЛИНА И ЕГО ВЛИЯНИЕ НА ЗДОРОВЬЕ
ЧЕЛОВЕКА

CHEMICAL PROPERTIES OF AMYGDALIN AND ITS EFFECT ON HUMAN HEALTH

Иброхим Рахмонович Асқаров¹, Фарход Султонахмадович Абдугаппаров²,
Махсадбек Муйдинович Хожиматов³¹Иброхим Рахмонович Асқаров

– АнДУ, кимё фанлари доктори, профессор.

²Фарход Султонахмадович Абдугаппаров

– АнДУ, кимё фанлари бўйича фалсафа доктори (PhD)

³Махсадбек Муйдинович Хожиматов

– АнДУ, кимё фанлари бўйича фалсафа доктори (PhD)

Аннотация

Мақолада табиий цианогликозидлар синфига кирувчи амигдалин ва унинг кимёвий хоссалари тўғрисида маълумотлар келтирилган. Мақолада амигдалиннинг астма, бронхит, эмфизема, ўпка фибрози, ошқозон-ичак касалликлари, саратон, буйрак касалликлари каби турли хил касалликларни даволашдаги аҳамияти ҳақида ҳам сўз юритилган.

Аннотация

В статье представлена информация об амигдалине и его химических свойствах, который относится к классу природных цианогликозидов. В статье также упоминается важность амигдалина в лечении различных заболеваний, таких как астма, бронхит, эмфизема легких, фиброз легких, заболевания желудочно-кишечного тракта, онкологические заболевания, заболевания почек и других.

Annotation

The article presents information about amygdalin and its chemical properties, which belongs to the class of natural cyanoglycosides. The article also mentions the importance of amygdalin in the treatment of various diseases, such as asthma, bronchitis, emphysema of the lungs, pulmonary fibrosis, diseases of the gastrointestinal tract, oncological diseases, kidney diseases.

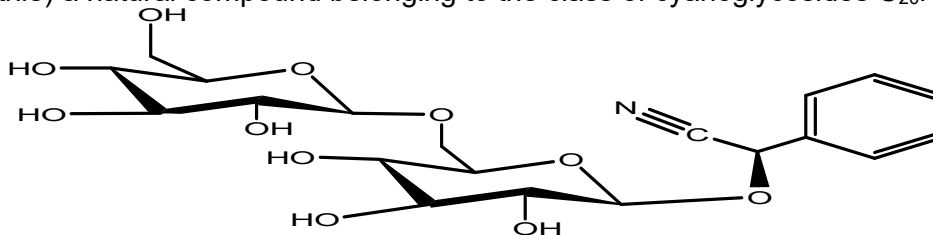
Таянч сўз ва иборалар: цианогликозидлар, амигдалин, мураккаб эфир, сирка ангидрид, бромгексамид, альгинат-хитозан, гаптенлар.

Ключевые слова и выражения: цианогликозиды, амигдалин, сложный эфир, уксусный ангидрид, бромгексамид, альгинат-хитозан, гаптены.

Key words of the expression: cyanoglycosides, amygdalin, ester, acetic anhydride, bromhexamide, alginate-chitosan, haptens.

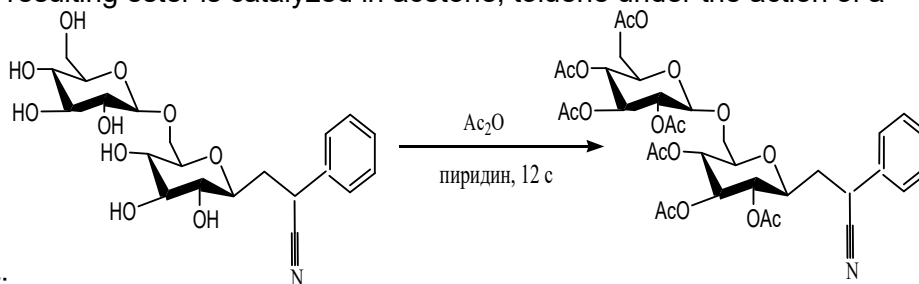
Today, cyanogenic glycosides are phytotoxins found in more than 2,000 plant species, a number of which are used as food in some parts of the world. The determining factor in the toxicity of cyanoglycosides is explained by the formation of cyanic acid when they are hydrolyzed.

One such compound is amygdalin - ([[(6-O-β-D-glucopyranosyl-β-D-glucopyranosyl) oxy]] (phenyl) acetonitrile) a natural compound belonging to the class of cyanoglycosides C₂₀H₂₇NO₁₁.

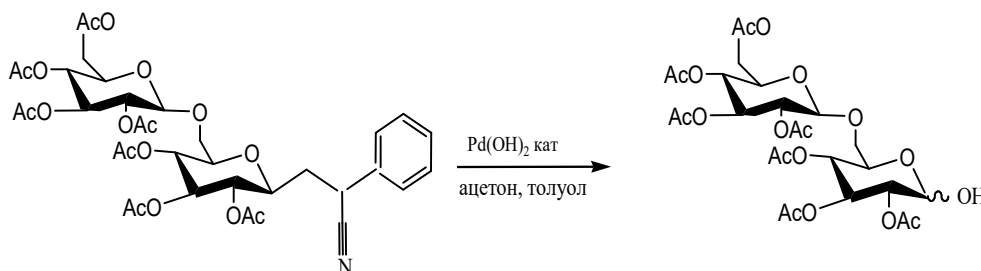


The reaction was performed in a pyridine medium and continued for 12 h.

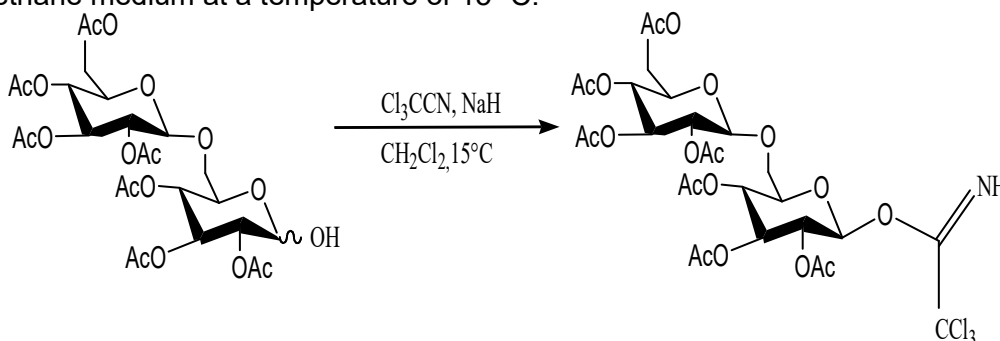
The resulting ester is catalyzed in acetone, toluene under the action of a



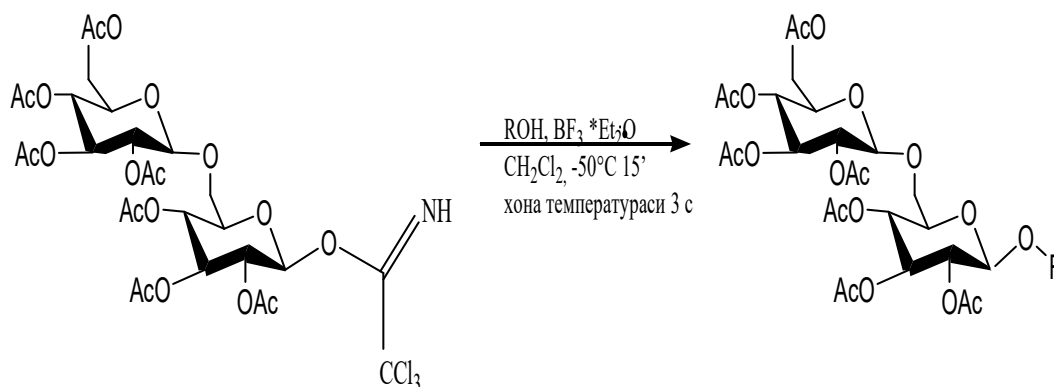
catalyst:



The resulting product was exposed to acetonitrile in the presence of sodium hydride in a dichloromethane medium at a temperature of 15 °C:



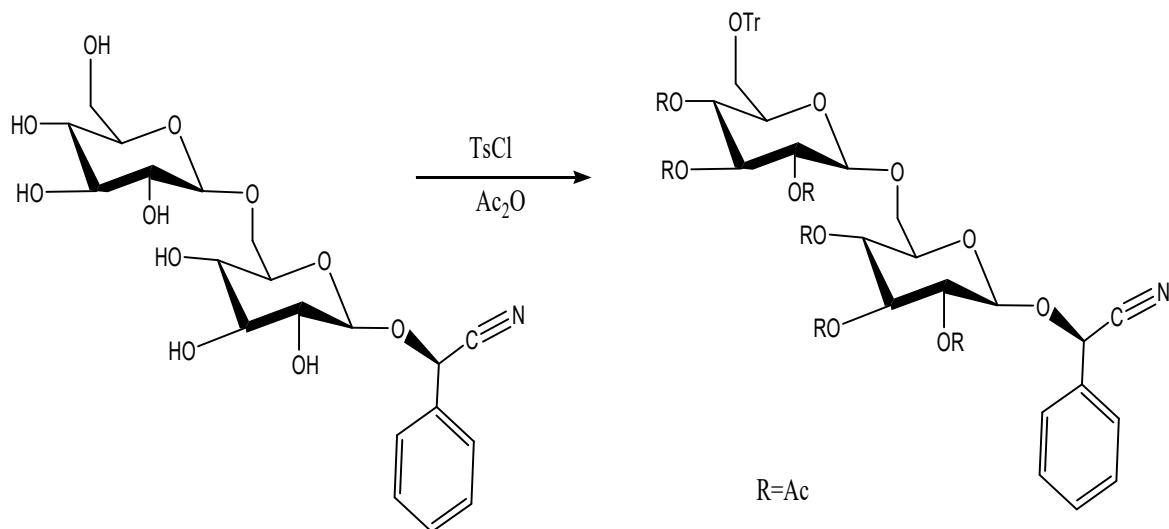
In the next step, the obtained product was first exposed to BF₃, diethyl ether and alcohol at room temperature for 15 minutes at 50 °C for 15 minutes in a dichloromethane medium:



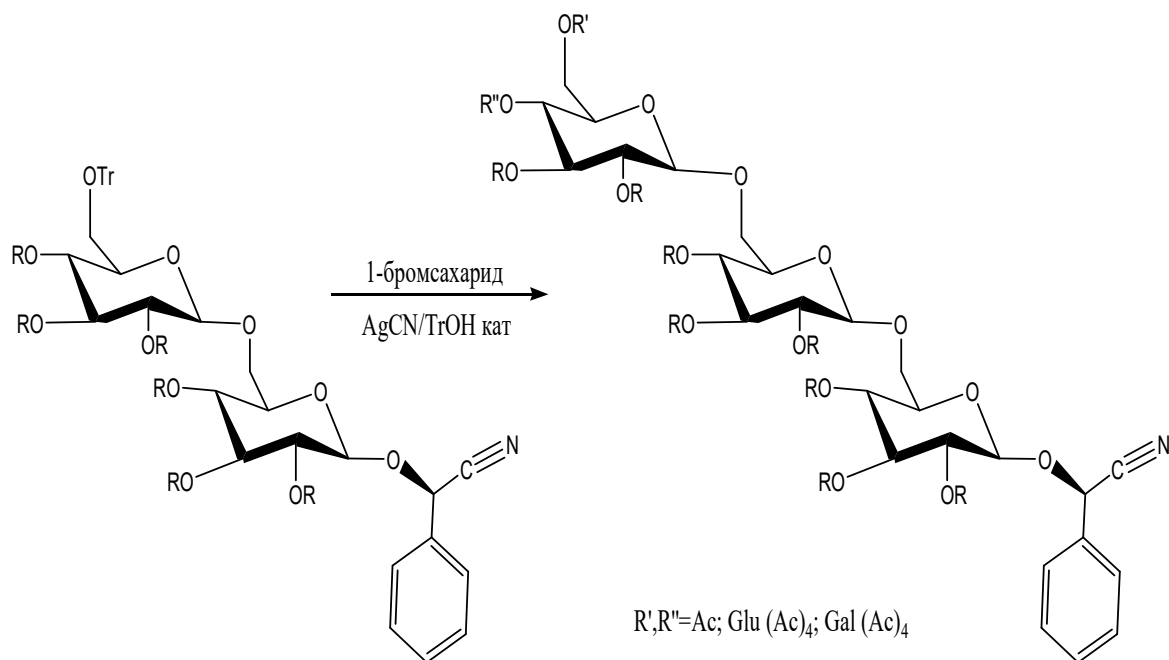
The final product obtained at the end of the reaction was treated with alkali.

In addition, the synthesis of its esters based on amygdalin has been performed [2].

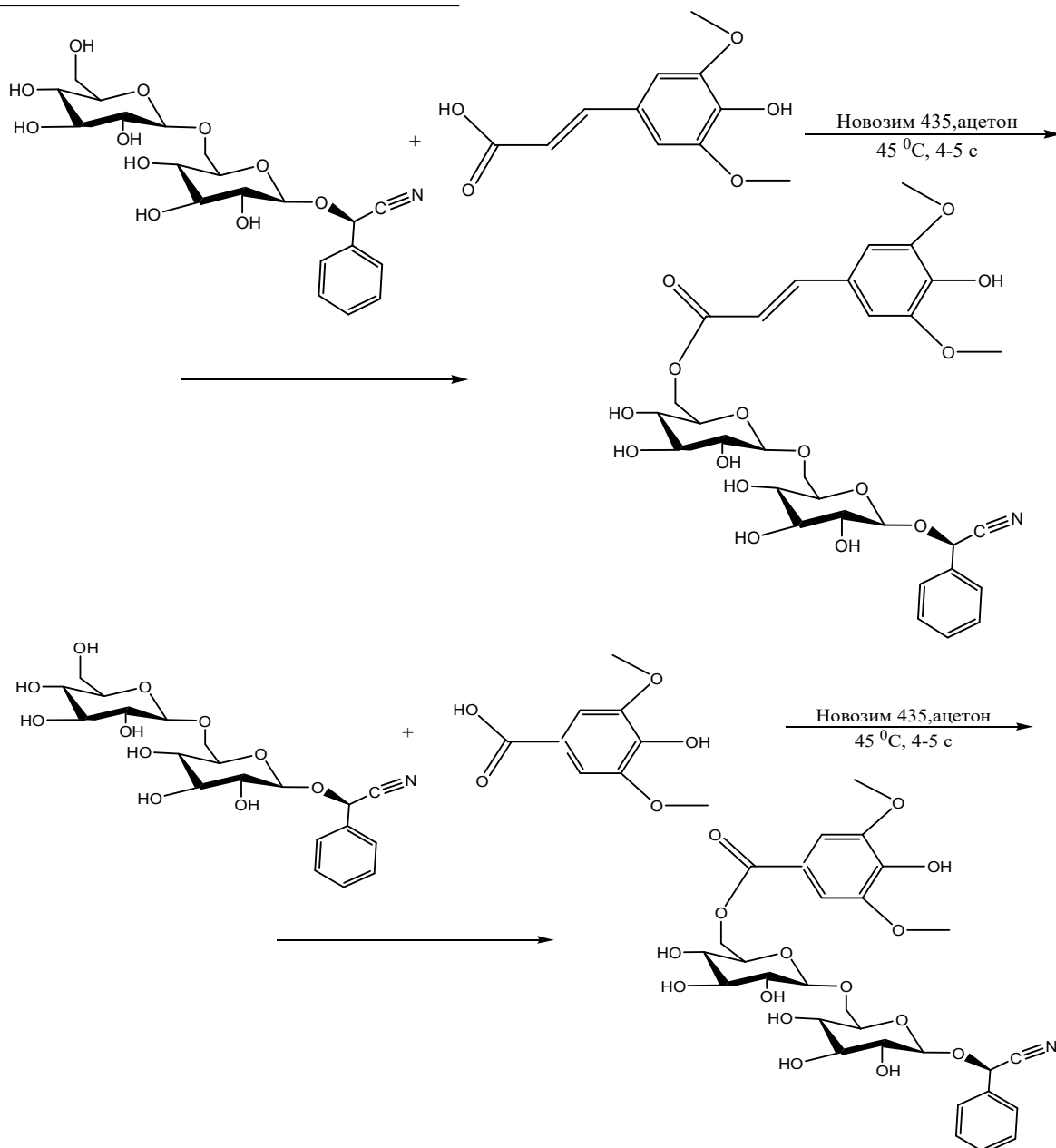
In this case, the amygdala was first synthesized by the action of pure chloride and acetic anhydride:



A new trisaccharide was obtained by bromsaccharide in the presence of a catalyst:



Indian scientists have synthesized complex esters of amygdalin with 3,5-dimethyl esters of synaptic acid and gal acid in the presence of biocatalyst-immobilized lipase (novozyme 435) [3].



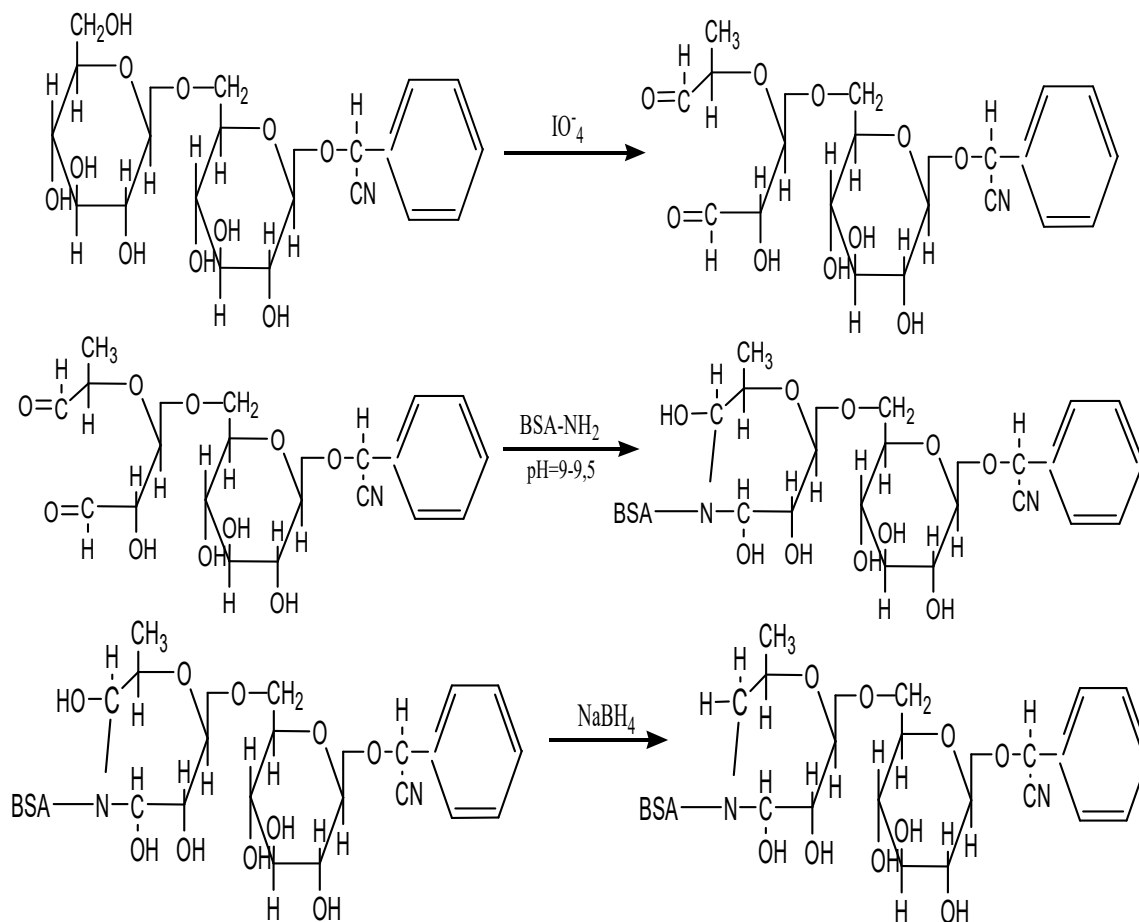
The biological activity of the synthesized compounds has been tested against *S. aureus*, *P. aeruginosa*, *E. coli*, *P. mirabilis* bacteria and against the pathogenic fungi *C. albicans* and *A. niger*.

Cyanogenic plant species are abundant in the flora. Because of the different cyanide ions in these plants, many studies have shown that they are different in humans and animals. Among these, the role of both cyanogenic glycosides is of some importance.

Consumption of cyanogenic plants can cause serious problems related to human health. Finding ways to detect and quantify cyanogenic glycosides that form cyanides can help prevent cases of poisoning from improperly processed cyanogenic plants. The hapten-protein conjugates with amygdalin and linamarin have been synthesized by the authors based on a new approach [4].

Compounds with a molecular mass of less than 1000–10000 typically do not have immunogenic properties unless they are bound to another larger, immunogenic property by a covalent bond in the form of haptens, a molecule (in most cases a protein). Conjugated with bovine serum albumin (BSA), hemocyanin (KLH), ovalbumin, ovomucoid, thyroglobulin, or fibrinogen, which are typically hapten-carrying proteins, allow stimulation of the antibody response to T-cell-helper epitomes.

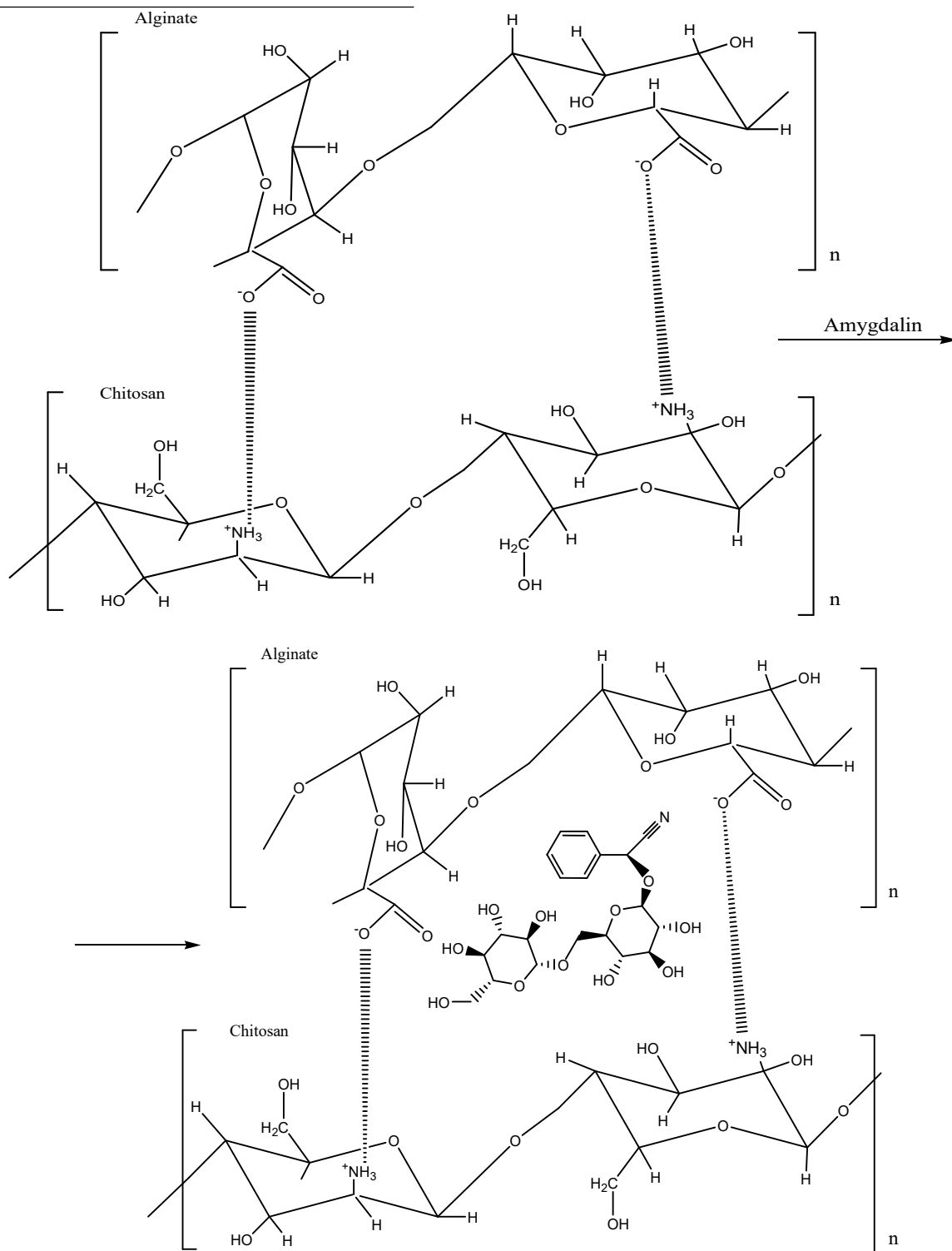
BSA is a protein-carrier for haptens (amygdalin and linamarin) in the production of immunogens in the production of antibodies.



It is known that many drugs are produced in capsule form to ensure that they do not break down into organs or damage the gastric mucosa.

Given the use of amygdalin in the treatment of cancer, scientists have worked to encapsulate amygdalin through alginate-chitosan nanoparticles to ensure that it reaches cancer cells completely without hydrolysis [5].

Studies have shown that encapsulated amygdalin, based on biomassable and biodegradable alginate-chitosan nanoparticles, is harmless to healthy cells with a slight increase in cytotoxic effects on cancer cells. These types of encapsulated nanoparticles have proven their effectiveness in medical practice.



Amygdalin-based drugs have been manufactured and used in the United States, Germany, Italy, Japan, the Philippines, and more than 20 other countries. Numerous studies have found a positive effect of amygdalin on expectorant and antiastatic effects, as well as on the digestive organs. In addition, the pharmacological action may include antiaretogenic, inhibitory renal interstitial fibrosis, treatment of pyelonephritis, pulmonary fibrosis, increased resistance to pneumonia, immune suppression, immune system management, anti-tumor therapy, anti-inflammatory and anti-ulcer effects [6]. It has also been used to treat asthma, bronchitis, pulmonary emphysema, procrastination, colorectal cancer, and vitiligo [7]. As a result of hydrolysis of amygdalin, benzaldehyde and cyanide are broken down into acid. The resulting benzaldehyde has an analgesic effect and analgesic effect in tumors [8]. Its anti-tumor effect is manifested in

inhibiting the growth of cancer cells in the body, reducing the incidence of lung, colon and rectal cancers [9].

Amygdalin increases the activity of collagenase, which produces renal fibroblasts of type I [10]. It also strengthens the body's immune system, ensuring the production of large amounts of polyhydroxyanoates. [11].

The role of amygdalin in T-cell expression is important, as it prevents the formation of aortic occlusions, dilates blood vessels, and is used in the treatment of atherosclerosis. The positive effect of amygdalin in the treatment of peptic ulcer disease has been determined experimentally. It has been shown to slow angiogenesis in endothelial cells of diabetic rats [12]. Studies have shown that amygdalin has a positive effect on many organs, including sedative and protective properties in digestion, improves urinary function, normalizes the process of apoptosis, improves renal fibroblast function, has a positive effect in the treatment of asthma, bronchitis, emphysema, cough, owns [13].

We have synthesized esters of amygdalin in acetic anhydride and p-ferrocenylbenzoic acids, studied the structure and some physicochemical properties of these compounds. The effect of the biological activity of the newly synthesized compounds on seed germination has also been studied. The synthesis of new compounds of amygdalin and their biological activity is the main goal of our research to develop drugs not only for plant growth, but also for the treatment of diseases in the human body.

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