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DANDELION PLANT ABOVE GROUND PART OF THE RESEARCH ON THE STRUCTURE, COMPOSITION AND DISTRIBUTION OF PECTIN

Abstract. This article describes the amount of pectin in dandelion plants. The composition of pectin, the degree of elimination, the size and structure were proven microanalysis physico-chemical methods, also, the functional groups of pectin substances were determined using a quantitative method. The isolated pectin substances were prescribed with a KBr tablet in the IR spectrum of the Impact 410 "Nicolet" brand in the 400-4000 cm^{-1} zone.

The composition and structure of pectin substances separated from the ground part of the garden vegetation were identified in ^{1}H and ^{13}C NMR spectroscopy and elemental analysis methods.

Key words: dandelion plant,biologically active substance, pectin of substances, Infrared spectroscopy, Nuclear magnetic resonance

Introduction. Nature is rich in a wide variety of plants, aroma and refreshing and gave the new power of the person. Further development of the production of medicinal preparations on the basis of the raw materials from the plant will be carried out, namely: production of essential oils, without going into modern technologies of medicines; carbonic acid extracts; production of cryosaurs is impossible. Fruit Tree (Taraxacum) is a plant that grows one or two year old grass seedlings, sometimes referred to as the seedlings family.There are 59 species in Kazakhstan, 23 of which are rare plants. The most common are medicinal herbs (Taraxacum officinale), roasted peanut (Taraxacum koksagnuz). They grow in meadows, on the edge of the road, in shallow grass, in the foothills. Biologically active substances of medicinal herbs have gallbladder, diuretic, spasmolitic, abdominal, sputum, calming, sleeping, and urinary properties [1, 2]. The recently published article provides information on health, blood sugar levels and hepatitis B activity as well as its safety, such as antioxidant activity in the garden, anti-inflammatory activity [3].

From the earliest times, the herb of plants (Taraxacum officinale L) – is a source of vitamins, minerals, nutrients, and also sources that have a positive effect on various complicated diseases.The purpose of this overview is to demonstrate the diversity of gardening products that help prevent or reduce the risk of developing a number of diseases, including cancer, obesity, hepatitis, arthritis and cardiovascular disease.

Plant with such importance is rich in pectinic substances.

Pectin is a group of organic compounds that are carbohydrates. It is rich in fruit and berries. If it is heated with sugar and fruit acids it becomes a network. Used in confectionery production [4].

In pharmaceutical and food industry, matter is very popular and its benefits last for a long time. In pharmacology, pectin is used to produce physiologically active substances that have beneficial effects on the human body, so privileges are unquestionable, which is confirmed by many statements. Another benefit of pectin is the ability to normalize the gastric mucosa, improve microflora of the intestine, and create favorable conditions for increasing beneficial microorganisms in the human body.

This important biological active substance is separated from pectinic plants and research is underway.

According to the literature, information about the pectin separated from the roots of the medicinal herb collected from the village of Urmash in the Republic of Bashkortostan of the Russian Federation.

Non-traditional raw materials Arctium lappa L. and Taraxacum officinale Wigg pectin polysaccharides from the fertilizer were obtained, the substance was studied by physico-chemical methods. Indications: gelatin ability, carbazole reactions in uronide, degree of etherification, composition of free carbon groups [5].

From the Irkutsk region of Irkutsk region of Russia, the roots of the herbaceous plant found in June were researched. The result of this research is that the amount of water-soluble pectin is relatively high [6, 7].

The purpose of the study: The research distribution pectin surface portion culture dandelion and composition, structure.

Research methods: The Taraxacum plants moisture and ash content of the herbaceous vegetation were determined by gravimetric method [8], extruding by extraction method [8] and pectinic substance by tithymmetric method [9]. Melting temperature was determined by the "Boetius" electron heater [10]. The microanalysis content of pectin-derived products from the herbaceous plant is determined by the JSM-6510LA vacuum electron microscope at the JEOL (Japan) company [11]. IR-Fourier spectrometer for detection of the galacturic acid construction formula of the IR was recorded by the KBr tablets in the 400-4000 cm-1 region of the Impact 410 "Nicolet" IR spectrum, NMR [12].

DISCUSSION OF RESEARCH RESULTS

The object of the research: Grassy vegetation of the Almaly region dandelion, which is harvested in spring and autumn of 2018-2019 in Almaty city (flower, leaf).

According to table 1, the raw material moisture content and the ash content do not go far beyond the pharmacokopic standard. Dandelion extract water, the size of the alcohol is approximate.Extractivity in water and 90% ethyl alcohol in 2 hours. Extractiveness in water is effective and cheap. The value of pH-value of the leaf saplings in aqueous and spritic solution indicates a weak acid medium. Well, dandelion flower shows the value of the pH-neutral environment. As for pectinic substance, there is a high content of water-insoluble pectin (45.45% in leaf and 25.09% in class).

Table 1 – The chemical composition of the part of the Dandelion

№	Raw material name	Humi-dity, %	Ash con-tent, %	Esctivity, %		pH		Pectinic substance, %	
				in the water	in the alcohol 90%	in the water %	in the alcohol %	water-soluble	insoluble in water
1	Dandelion leaf	12,00	15,45	34,63	35,50	6,57	6,88	18,06	45,45
2	Dandelion flower	13,56	12,00	35,90	34,50	7,07	6,86	18,50	25,09

Dandelionplantseparated from the earth's surfaceproof of pectinous substance. Physical properties of the dandelion plant pectin odorless, white-gray powder. Humidity, ash content was determined by a gravimetric method. Given the amount of pectin humidity is 12.6%, ash content of 2.5%.

Table 2 – Degreeof etherification of pectin

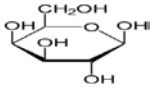
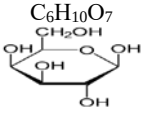
Pectin	Volume of the Trial, ml		Degreeof etherification, %
	V_1	V_2	
Leaf	23,2	1,9	8,23±0,3
Flower	22,7	1,9	7,85±0,4

Pectin substances functional groups determine the numerical methods. Determination of the total carboxyl groups in the functional groups of pectinic substances by the tithymmetric method as well as the determination of methoxy groups

Table 3 – Size of functional groups of pectinic substances

N	Raw materials	K_c %	$K_м$ %	K_0 %	λ (esterification)	CH_3O %
1	Leaf	13,05	9,04	22,09	8,23	6,23
2	Flower	12,15	6,65	18,8	7,85	4,59

Table 4 – The amount allocated for the dandelion plant pectin microanalysis

Raw materials	Melt temp^{0}C	Calculated, %		Gross formula	It has been found, %		Cost, %
		C	H		C	H	
Leaf	165	46,36	5,26	$C_6H_{10}O_7$ 	48,76	6,23	10,5
Flower	170	47,56	6,13	$C_6H_{10}O_7$ 	49,31	6,89	8,6

Pectin is divided into dandelion plant product formula $C_6H_{10}O_7$. This is a galactoric acid of the polysaccharide group. Brown color crystal. Melting point 170 ° C,165 ° C.

If we analyze the IR spectrum of the subdivided pectinic substance: the valence band of 3183 cm^{-1}, 2988 cm^{-1}, 2873 cm^{-1} –OH, the valence oscillation of the 1426 cm^{-1} –C group, the valence oscillation of 1008 cm^{-1} –OH and the 2310 cm^{-1} shows the valentine oscillations of the –COH group

Analysis of IR spectroscopy of a pectin substance isolated from flowers of Dandelion shows a valence bond of 2864 cm^{-1}, 2310 cm^{-1} –ten groups, a valence bond of 1311 cm^{-1} –CH, a valence bond of 1008 cm^{-1} –COOH, and a valence bond of 2310 cm^{-1} – COH [12].

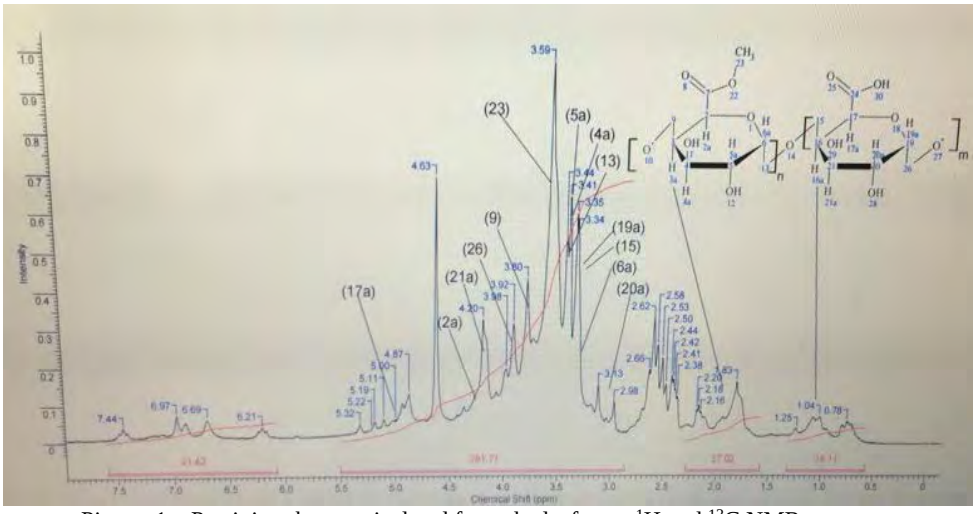
Dandelion plants from the land-based part of the pectin product ^{1}H and ^{13}C NMR spectrum. The analysis was recorded on the JNN-ESA 400 spectrographometer of the Jeol company. The protons of the methoxy group are characterized in the range of 1.5-2.8 m. In addition, pectin contains 2-ramnopyronosis residue, methyl group, which shows a strong area in resonance line 1-1.4 m.d. High intensity signals correspond to the pyranose proton signal of 3-5.5 m. At the same time, the resonance line of aromatic hydrocarbons is observed in 6,7-7,5 mph. It is found in plant tissue and some seaweed in surface tissues. Pectinic acid derived from D-galacturanic acid residues to pectinic substances, linked to long chains with α-1,4-glycoside bonds (the basis of all pectinic substances).

The intensity of the area signal corresponding to the percentage of methyl and methoxy groups can be found.

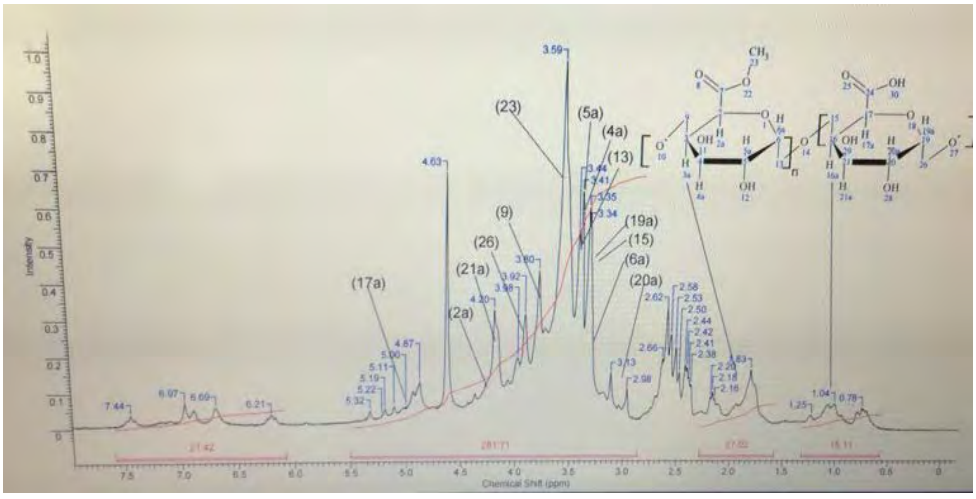
$q(X) = \frac{\mathbf{I(X)}}{\mathbf{I}(general)}$ I (X) - the mean value of the integral intensity of the corresponding region. The results of the research -kestede and figures [12].

Table 4 – Dandelion plant is divided into the amount of pectin substances in the analysis of the functional groups

Group	Amount, %	
	pectin isolated dandelion plants flowers	pectin isolated dandelion plants leafs
CH_3	4,39	1,59
OCH_3	5,97	7,03
$\nu(CH_3)$: $\nu(OCH_3)$	1:1	1:4



Picture 1 – Pectinic substance isolated from the leaf stem ^{1}H and ^{13}C NMR spectrum



Picture 2 – Pectinic substance isolated from the flowers stem ^{1}H and ^{13}C NMR spectrum

Conclusion. The leaves of the dandelion plant (flower) pectin was separated from the substance, composition, structure identified. Physical properties of the dandelion plant pectin odorless, white-gray powder.Humidity, ash content was determined by gravimetric method. The moisture content of pectin is 12.6%, ash content of 2.5%.

The degree of etherification of the pectin from the dandelion leaf is -8.23±0.3 and flower - 7.85±0.4. Pectin is divided into dandelion plant product formula $C_6H_{10}O_7$. This is a galactoric acid of the polysaccharide group.Brown color crystal. Melting point 170 °C, 165 °C. Dandelion leaves, the amount of pectin substances, 8.6 and 10.5%, and a bouquet.

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Резюме

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ИССЛЕДОВАНИЕ СТРУКТУРЫ,
СОСТАВА И РАСПРЕДЕЛЕНИЯ ПЕКТИНА
В НАДЗЕМНОЙ ЧАСТИ ОДУВАНЧИКА

В статье описывается количество пектина в растениях одуванчика. Состав пектина, степень элиминации, размеры и структура были подтверждены микроанализом физико-химическими методами, также количественным методом определены функциональные группы пектиновых веществ. Выделенные пектиновые вещества выписаны таблеткой KBr в ИК-спектре марки Impact 410 «Nicolet» в зоне 400–4000 $см^{-1}$.

Состав и строение пектиновых веществ, отделенных от наземной части одуванчика, идентифицированы в спектроскопии ЯМР ^{1}H и ^{13}C и методами элементного анализа.

Ключевые слова: растение одуванчик, биологически активное вещество, пектин, инфракрасная спектроскопия, ядерный магнитный резонанс.

Резюме

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ЖЕРБЕТІ НЕГІЗГІ БӨЛІГІНДЕГІ ПЕКТИННІҢ ҚҰРЫЛЫМЫН, ҚҰРАМЫН ЖӘНЕ БӨЛІГІН ЗЕРДЕЛЕУ

Мақалада тозғанақ өсімдігінің құрамындағы пектин мөлшері келтірілген. Бөлініп алынған пектиннің құрылысы, өлшемі, элемирлену дәрежесі физика-химиялық, микроанализдік әдістермен дәлелденді, сондай-ақ пектинді заттардың функционалдық топтары сандық әдіспен анықталды. Бөлініп алынған пектинді заттар ИҚ-Фурье спектрометр Impact 410 «Nicolet» маркалы ИҚ-спектрінде 400–4000 $см^{-1}$ аймағында KBr таблеткасымен жазылды.

Тозғанақ өсімдігінің жер үсті бөлігінен бөлінген пектинді заттардың құрамы мен құрылысы ^{1}H және ^{13}C ЯМР спектроскопиясында және элементтік анализ әдістерімен идентификацияланды.

Түйін сөздер: тозғанақ, биологиялық белсенді зат, пектин, инфрақызыл спектроскопия, ядролық магниттік резонанс**.**