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Жинаққа студенттердің, магистранттардың, докоранттардың және жас ғалымдардың жаратылыстану-техникалық және гуманитарлық ғылымдардың өзекті мәселелері бойынша баяндамалары енгізілген.

The proceedings are the papers of students, undergraduates, doctoral students and young researchers on topical issues of natural and technical sciences and humanities.

В сборник вошли доклады студентов, магистрантов, докторантов и молодых ученых по актуальным вопросам естественно-технических и гуманитарных наук.

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the Faculty of Chemistry, then it is better to study chemistry in depth, outside the school curriculum. Set goals, achieving them over time and raising the bar. Decide how you will study - on your own, with a tutor or in online courses. In the first case, you need to choose textbooks, workbooks, find problem books (preferably with answers), draw up a plan, etc. In the other two cases, you do not have to do this yourself - the teacher already has a ready-made curriculum and materials for training. Most importantly, don't stop testing your knowledge with different tests to see the results. As soon as you notice progress immediately, your desire to study chemistry will instantly increase, as you see that you are reaching some peaks.

Based on all this, the most important thing, you can say that the stereotypes about chemistry have been refuted. Stereotypes interfere with students by instilling incomparable thoughts that overwhelm interests. Even if stereotypes are the most important pranksters of their kind that interfere with humanity, it cannot be said that the entire effect is due to stereotypes alone.There are many factors that affect students, lack of reagents, and chemical laboratories, studying only through theory and sitting at boring books, difficult tests, repeating the same thing a million times, failures and low grades, untidy appearance of teachers, passivity of teachers, lack of enthusiasm, all this leads only to worse results, and most importantly, the appearance of stereotypes such as mentioned above. Chemistry is one of the most demanding sciences today. A sufficient amount of knowledge in chemistry and its correct use helps to refute the problems of mankind and nature. And ignorance and misuse will only accelerate the process of decay of nature. The role of chemistry in the life of society is very important. Understanding the nature of substances, their composition, the dependence of the properties of elements on the electronic structure of the nucleus, the features of the flow of organic and inorganic chemical reactions - all this is necessary for studying such disciplines and specialties as physics, biology, medicine, technology. Currently, chemistry permeates literally all spheres of human existence. Scientists are working on the possibility of influencing the gene material, and DNA is the largest organic molecule, and methods of influencing it also belong to the field of chemistry. Nanotechnology also includes the creation of the necessary materials and devices at the molecular level, which means that chemistry cannot be dispensed with here either.What can we say about such traditional processes as food fermentation, the production of dyes, the smelting of metals - all these industries are directly related to chemistry.The role of chemistry in modern society is very large, so a good mastery of knowledge in this subject in high school is the key to further success in work and career.

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PRELIMINARY ANALYSIS OF *HELIANTUS ANNUUS* L. EXTRACTS

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Sunflower (*Helianthus annuus* L.) is an annual dicotyledonous plant of the Asteraceae family, widely distributed in Eastern Europe, North America, and Northern China [1]. According to the Central Asia market analysis report, Kazakhstan is the largest producer of sunflower seeds in 2023 among the countries of Central Asia [2].

Sunflower seeds and sprouts contain valuable antioxidant, antimicrobial, anti-inflammatory, antihypertensive, wound healing and cardiovascular properties found in its phenolic compounds, flavonoids, polyunsaturated fatty acids and vitamins [3]. Group of sientists from the Japany have isolated oleanane type triterpene glycosides from a n-butanol-soluble fraction of a methanol extract of sunflower (*H. annuus*) petals. All of the compounds tested exhibited marked anti-inflammatory activity [4]. Allelochemicals in sunflower leaves, stems and roots were detected using thin layer chromatography (TLC) for alkaloids and spectrophotometry for phenols and flavonoids [5]. Also chemical compounds such as phenolic acids (sinapic acid, chlorogenic acid, caffeoylquinic acid, gallic acid, ferulic acid, protocatechuic acid, coumaric acid, and caffeic acid) and flavonoids (quercetin, heliannone, kaempferol, apigenin, luteolin) with pharmaceutical activities were identified from sunflower sprout and seed [6-8]. Group of scienticts have investigated the chemical composition and antimicrobial and antioxidant activities of essential oil of sunflower. The main components of essential oil of sunflower were α-pinene (26.00%), verbenone (7.40%), terpinolene (1.69%) and α-terpineol (1.27%) [8]. Using gas chromatography (GC)/mass spectrometry (MS) analysis, 69 compounds were identified in the essential oils of leaves and flowers of sunflower plants. In the studied essential oils, the main compounds were monoterpenes (α-pinene, sabinene, limonene, germacrene D, isobornyl acetate, camphor and β-pinene), which accounted for about 80% of the total oil; a small amount of sesquiterpenes was also presented in the work [9]. In addition, phytochemical screening results of sunflower leaves revealed terpenoids, triterpenoids, sesquiterpenoids, and steroids.

In this study, in order to study the chemical composition of sunflower seeds, we carried out the extraction of dry matter with the selection of the optimal solvent, and also investigated the presence of some groups through IR spectroscopy.

H. annuus seeds were dried in open air in the shade until constant weight and kept in a dark room.

The air-dried seeds of *H. annuus* were extracted with ethanol at RTP and boiling temperature, ethyl acetate, chloroform by soaking for several days each at room temperature two times. Removing of solvent was carried out by rotary evaporator until getting concentrated liquid-phase substance. Solvent residues were evaporated by leaving the liquid-phase substance in a dark, well-ventilated place for 7 days. Each fraction was applied to TLC plates using microcapillary tubes, and the prepared TLC plates were eluted using a solvent system of ethyl acetate and benzene in a different ratio.

Thick extracts are weighed to constant weight and the extract is calculated as mass (g) from 10 g of raw material and expressed as a percentage of dry weight.

IR spectroscopy of the extracts

Extracted crude residue from the different solvents was prepared to the spectroscopy. IR spectra were recorded in the 4500–500 cm^{-1} range at a scanning speed of 2 mm/s with a resolution of 4 cm^{-1} at room temperature (25 °C) and relative humidity of 25-30%. The background air spectrum, water vapor and CO_2 interference were subtracted from these spectra.

Results and discussion

The extract yield is especially important for the industry because a higher extract yield means a lower cost. Therefore, extract yield optimization is important in food research, especially in the production of natural products and drugs. The investigation shows that the chloroform extract has a maximum yield, unlike other extracts. In contrast, room temperature ethanol extract showed a minimum yield. Presumably, such a difference in the yield of extracts is associated with a high content of non-polar compounds in sunflower seeds.

Figure 1 is shown FT-IR spectra for the ethanolic (RTP) (a), ethanolic b.t. (b), ethyl acetate (c), and chloroform (d) extracts. The main peak position includes the broad band around 3302-3418 cm^{-1} corresponding to the stretching vibration of hydroxyl for ethanol extracts (a,b).

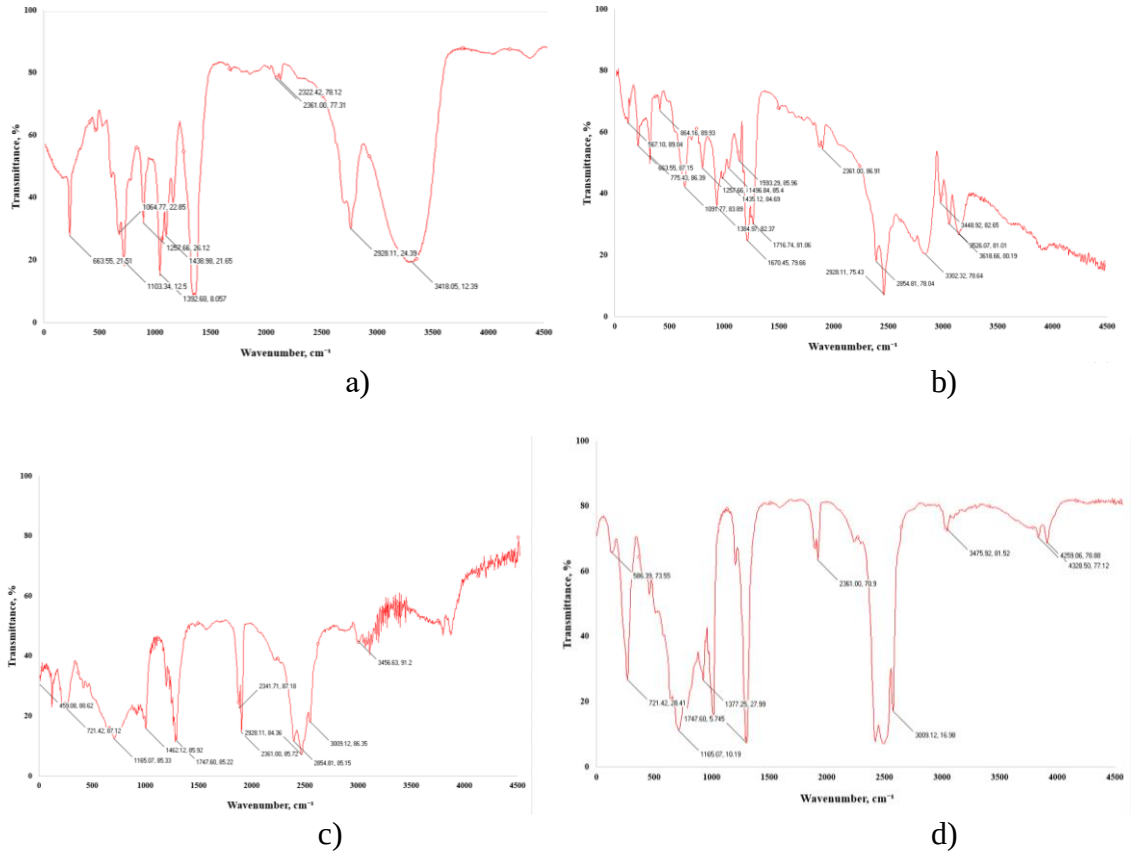

Figure 1 FT-IR spectra of the sunflower seeds (*H. annuus*) extracts with EtOH at RTP (a), EtOH at b.t. (b), EtAc (c) and chloroform (d)

In contrast, ethyl acetate (c) and chloroform (d) extracts show a slightly visible band for the hydroxylic group in alcohol, but the strength band at 3009 cm^{-1} corresponds to the hydroxide fragment in a carboxylate group. The peak around 2928 cm^{-1} and 2854 cm^{-1} corresponds to the stretching vibration of -CH_3 and -CH_2-, respectively. Furthermore, inconspicuous peaks of ethyl acetate (c) and chloroform (d) extracts indicate –O–C=O ester band at 1747 cm^{-1} which is attributed to the presence of the carbonyl group resulting from the reaction between hydroxyl and carboxyl groups. Despite the absence of ester bonding, alcohol extracts showed the presence of an olefinic bond at a peak of 1670 cm^{-1}. The peak at 1165 cm^{-1} corresponds to the stretching vibration of -C–O–C- group. The peak in the fingerprint region at 721 cm^{-1} shows pendulum vibration of -CH_2 bond.

This study was designed to investigate the effect of various extractants on extraction yield and to further examine extracts for the presence of certain functional groups.

From the results obtained here, it can be concluded that the chloroform extract has a maximum yield with respect to the raw material. The FT-IR spectrum of ethanol extracts of *H. annuus* indicate the presence of hydroxyl, saturated and unsaturated hydrocarbon bonds. On the contrary, extracts of non-polar extractant show the presence of carboxyl and ester groups, which confirms the presence of sesquiterpene lactones in the extracts.

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