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Editorial address
AZ1073, Baku,
Matbuat Avenue, 529,
"Azerbaijan" Publishing House,
6-th floor

Tel.: +994 50 209 59 68
+994 55 209 59 68
+994 99 805 67 68
+994 12 510 63 99

e-mail:
tebiet.elm2000@aem.az

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MEDICINE AND PHARMACEUTICAL SCIENCES

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Ibadulla Aghayev
Azerbaijan Medical University
Doctor of Medicine
amuepid@mail.ru
Flora Taghiyeva
Azerbaijan Medical University
Doctor of Philosophy in Medicine
flora-tagiyeva@mail.ru
Vagif Vakilov
Azerbaijan Medical University
Doctor of Medicine
vekilov.vaqif@inbox.ru
Shalala Aliyeva
Azerbaijan Medical University
shalalaseyidova@gmail.com
Peri Isagova
Azerbaijan Medical University
İsagovap@mail.ru

CHARACTERISTICS OF TEACHING THE EPIDEMIOLOGY OF CHRONIC DISEASES AND DISABILITIES

Abstract

In modern times, as a result of the fact that the boundaries of prevention have gone beyond the boundaries of infectious pathology, not only infectious, but also non-infectious diseases, thanks to the application of the population approach to the study, "Epidemiology of non-infectious diseases" (ENID) or, with new terminology, "Epidemiology and prevention of chronic diseases and disabilities" (EPCHDD) began to develop rapidly. The Epidemiology and prevention of chronic diseases and disabilities are studied through the method of epidemiological examination of somatic, non-infectious diseases of mass spread. Currently, this direction is developing rapidly, and along with the epidemiology of infectious diseases, the concept of epidemiology of non-infectious diseases (ENID) is widely applied.

The achievements in epidemiology in the fight against infectious diseases have aroused interest in the epidemiological study of widespread non-infectious diseases, and now the epidemiology of non-infectious diseases (NIDE) has developed and gained freedom. The purpose of the National Institute of Health and Welfare is to determine the patterns of development of chronic diseases in the population and to develop ways of controlling them. The main object and ultimate goal of examinations is the person, his health condition, and health protection.

Keywords: *infectious and non-infectious diseases, chronic diseases, disabilities, epidemiology, prevention*

Introduction

The subject of the epidemiology of chronic diseases and disabilities or epidemiology of non-infectious diseases (NCD) is to study the causes and patterns of development of a number of somatic diseases that have an epidemic character and depend on certain biological medical factors and social conditions (Aghayev, 2022:822).

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In the 50s of the 20th century, the relationship between smoking and lung cancer was proven (Aghayev, 2020:94). This initiated the expansion of scientific research and the evaluation of a number of factors, which in turn led to greater success in epidemiology (Belyakov, 1989:25).

Epidemiology contributed greatly to the understanding of the causes of rheumatism and rheumatic disease of the heart (Iskakov, 2017: 68). The role of social and economic factors that contribute to the emergence of rheumatism flares with the help of epidemiological methods is disclosed (Brico, 2013:28). This allowed us to dramatically lower the incidence of rheumatism in many countries (Aghayev, 2012:56). It is known that iodine deficiency produces an endemic probe. Epidemiology has also played a positive role in solving the problem of iodine deficiency. Epidemiology has also played a crucial role in discovering the causes of many diseases caused by environmental pollution. Epidemiology has also played an important role in the development of prevention of hypertension (Zueva, 2005:647). As the information listed shows, epidemiology is important in detecting the causes of illness with any pathological condition (Belyakov, 1986:86). Understanding these causes allows us to reduce the scale of the problem to one degree or another through the development of prevention measures (Zueva, 2006:650). At the same time, clarification of these issues opens up new perspectives on the study of the etiology, pathogenesis, and prevention of mass non-infectious diseases (Vtert, 1990:95). Thus, as the boundaries of prevention move beyond the boundaries of infectious pathology, not only due to the use of a populous approach in the study of infectious diseases (Pokrovskiy, 2006:58) but also in the study of on-infectious diseases, the «Epidemiology of non-infectious diseases» began to develop more rapidly (Bigkhol, 1994:98).

Taking this into account, the subject of "Epidemiology and Prevention of Chronic Diseases and Disabilities" has been taught at the Faculty of Public Health of AMU for the last 2 years, during which various issues on the general characteristics of Chronic Diseases and Disabilities, epidemiology, and prevention of their individual nosological forms are studied.

The objective of the subject is to study the basic concepts and methods related to the Epidemiology of Chronic Diseases and Disabilities and teach how to make and take important decisions through the study of population health protection, prevention of transmission, causal relationship of the occurrence of non-infectious diseases, implementation of necessary prevention measures, designation of risk groups and risk factors due to population health indicators analysis, prevention of epidemiological condition deterioration, effective planning of health services activities for the protection of population health. At this time, the subject matter aims and objectives, methods, developmental history; features and general issues of the epidemiology of chronic diseases and disabilities, and application of the Epidemiological Observation (Examination) method. The risk factors of the emergence of Epidemiology of Chronic Diseases and Disabilities (CDD), the risk groups. Socio-economic consequences of Epidemiology of CDD, prevention, and prevention of epidemiology of diseases and disabilities. Theoretical foundations of the epidemiology of chronic diseases and disabilities and the realization of them during specific pathology and more are studied. It also includes the study of individual groups of patients, including oncological, cardiovascular, environmentally conditioned, allergic diseases, metabolism disorders, conditions of traumatism, risk factors, and groups, manifestations of pathological process (disease structure, dynamics, etc.), their treatment, and prevention.

When teaching a subject, students should study:

1. The definition, subject, developmental history, goals and objectives, classification, strategy, and directions of epidemiology of chronic diseases and disabilities
2. Examination methods and types of analysis used in conducting studies using an epidemiological scanning method
3. Complications of the impact of chronic diseases and disabilities on health, manifestations of the pathological process. Health assessment and health indicators, criteria information

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4. Similarities and differences between the epidemiology of infectious diseases and epidemiology of non-communicable diseases, developmental legacies of the epidemic, and pathological process

5. General characteristics of the epidemiology of chronic diseases and disabilities

6. Distribution of non-infectious diseases among relevant professions and age groups, characteristics of their change in dynamics, effects of risk factors, etc.

7. Structure of specific non-infectious diseases, manifestations of pathological processes, conditions of emergence

Thanks to their knowledge in the teaching process, they should be able to:

1. To analyze the manifestations of the pathological process in non-infectious diseases and to detect the conditions that determine their presence;

2. Use data from hygienic and epidemiological studies in determining the main directions of combating and preventing non-infectious diseases;

3. Use the results of dynamic tracking on their determinants to combat specific non-infectious diseases and improve prevention measures

4. To use knowledge on the epidemiology of non-infectious diseases in the course of carrying out prevention measures and epidemiological surveillance.

Students must:

– To determine and evaluate the harm done to the organism by the pathological process in case of non-infectious diseases, to conduct an epidemiological examination of the changes taking place, to detect the complex determinants of factors involved in its emergence, to analyze the data of epidemiological population studies, to analyze the data of laboratory and clinical examinations, the data of social and hygienic monitoring and their application during the prevention of these diseases;

– To obtain samples for laboratory examination from various facilities (to obtain methods of taking material from persons suffering from non-infectious patients and from environmental facilities);

– To make decisions about risk groups, risk factors, ways of influencing the body and its spectrum;

– During various pathologies, treatment facilities, directions of therapy, duration of observation on patients, manner of regular observation on persons with or suffering from a non-infectious disease, manner of conducting their laboratory examination and manner of interpreting the results of examinations;

– In the case of non-infectious diseases, how to organize and conduct measures to prevent pollution of environmental facilities, waste disposal, and reduce their harmful effects on the body;

– Conduct epidemiological analysis to assess epidemiological status for various non-infectious diseases;

– Implement an adequate system of preventive and combat measures;

– Organize epidemiological surveillance, and plan the sequence of actions taken and the duration of their implementation.

The course is based on a newly developed program. The program teaches knowledge about the epidemiology of chronic diseases and disabilities in the modern era and presents the activities of treatment-prevention facilities and the functions of sanitary and epidemiological services in the fight against various diseases.

Taking account this, the developed Programme provided knowledge on the epidemiology of non-infectious diseases in the modern era and shared information from the scientific research carried out in recent years on the study of these diseases, their successes, and experience in profiling. Moreover, extensive information has been provided on the epidemiology of widespread oncological diseases, cardiovascular diseases, allergic disorders, and mental injury, as well as genetic diseases, traumatism, ecologically conditioned diseases, genetically conditioned diseases, etc. It describes methods for detecting high-risk groups through epidemiologic studies and methods

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for organizing preventive measures and treatment directions. Methods used during these examinations have also been interpreted.

The program consists of a general and specific part. In general, common issues of the epidemiology of non-infectious diseases: concepts, subjects, goals and objectives, methods, methodical principles of research, developmental history, short characterization, theoretical basis, etc., as well as features of the epidemiology of non-communicable diseases among adults and children are disclosed. In particular, the specific group of diseases, including oncological, cardiovascular, allergic, and environmentally conditioned diseases, epidemiology of traumatism, risk groups and factors, and the manifestations of the pathological process, epidemiological control, and prevention measures have been extensively and thoroughly interpreted. The information provided demonstrates the need to study the epidemiology of non-infectious diseases in modern times. The research facility of Epidemiology of Chronic Diseases and Disabilities is diverse and multidisciplinary. Therefore, the prepared program will be useful not only for medical university students and teachers, but also for specialists in various fields of medicine, especially epidemiologists, cardiologists, oncologists, hematologists, allergyologists, and hygienists. The program is designed based on examples taught in the field of epidemiology in the world experience and reflects both theoretical and practical issues.

Thus, during the course of teaching, lectures on the following topics: Epidemiology of non-infectious diseases: concept, subjects, goals and objectives, and methods. **Epidemiology of Chronic Diseases and Disabilities**- Methodical principles of its research, developmental history, short characterization; Comparative study of epidemiology of chronic diseases and disabilities with the epidemiology of infectious diseases; Preventing and combating chronic diseases and disabilities; Epidemiology of chronic diseases and disabilities with theoretical basis and specific pathology; Epidemiology of non-infectious diseases in children; Epidemiology of oncological diseases; Epidemiology of oncological diseases; Epidemiology of cardiovascular diseases; Risk factors of cardiovascular diseases; Epidemiology of ecological diseases; Epidemiology of ecological diseases; Socio-hygienic monitoring during ecologically conditioned diseases; Epidemiology of allergic diseases; Epidemiology of allergic diseases; Epidemiology of genetically conditioned diseases; Epidemiology of monogenic diseases (monofactor); Epidemiology of ecologically conditioned diseases; Epidemiology of traumatism.

In addition, practice lessons are conducted on the following topics: Epidemiology of non-infectious diseases: understanding, and methods, Epidemiology of oncological diseases, Characterization of manifestations of the disease; Risk factors of oncological diseases, Epidemiological surveillance; Preventive measures; Epidemiology of cardiovascular diseases and understanding history, Ischemic disease, Forms, criteria for myocardial infarction; Characterization of manifestations of disease with cardiovascular diseases, Risk factors; Epidemiological surveillance. Preventive measures; Epidemiology of ecologically conditioned diseases - understanding structure, groups of ecologically conditioned diseases. Some ecologically conditioned diseases of natural and technological origin; characterization of manifestations of disease with ecologically-conditioned diseases. Risk groups; Hygienic and epidemiological studies. Preventive measures; Epidemiology of allergic diseases – understanding. Types, types of allergic reactions; Prevalence of allergic diseases. Dynamics (perennial). Structure. Risk factors; Risk factors for the formation of bronchial asthma in children. Allergic rhinitis. Awareness programs and prevention; Epidemiological characterization of genetically conditioned diseases-exposure. Hereditary diseases: classification; Types of hereditary transmission of monogenic diseases. Epidemiology of polygenic or multifactorial diseases; Epidemiology of traumatism - understanding. Dynamics (biennial); Age structure of traumatization; Risk factors, Epidemiological control, Prevention.

Students' knowledge is assessed based on their test assignments during the semester. At the same time, they prepare presentations on given free work topics that are heard, discussed and evaluated throughout the course. It should be noted that despite the fact that the subject is still

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taught for 2 years, the high-quality performance of the students proves the necessity of its teaching. This promotes the need to study disease both in country pathology and with worldwide chronic diseases and disabilities. We also believe that this subject should be taught not only in the School of Public Health but also in other faculties.

Conclusion

Thanks to the training, students are able to: determine and evaluate the harm done to the body by the pathological process during chronic diseases and disabilities; to conduct research on the epidemiological examination method of the changes taking place, to detect the complex of factors or determinants involved in its creation, to conduct data analysis of epidemiological population studies; to analyze data from laboratory and clinical examinations, data from social and hygienic monitoring, and their application during the prevention of these diseases; to analyze manifestations of the pathological process in chronic diseases and disabilities, and to detect conditions that determine their presence; to analyze samples for laboratory examination from various facilities knows how to take; is able to develop algorithm for disease prevention and prevention measures by determining rash groups, risk factors, risk area; knows the duration of observation on patients during different pathologies (cardiovascular, ecologically conditioned diseases, etc.), how to carry out regular observation on persons who have had or are suffering from non-infectious disease, and how to interpret the results of examinations; know how to prevent contamination of environmental objects during chronic diseases and disabilities, organize and conduct measures to reduce waste disposal and their harmful effects on the body; assesses the epidemiological status of various epidimiology of chronic diseases and disabilities able to perform annual and biennial epidemiological analysis of sickness; able to calculate biostatistical indicators of diseases, to construct charts and graphs based on epidemiological indicators for diseases.

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Khatira Khalafli
Azerbaijan Medical University
Doctor of Philosophy in Medicine
khalafli@mail.ru
Maharram Niftullayev
Azerbaijan Medical University
Doctor of Medical Sciences
mniftullayev@gmail.com
Khatira Jafarova
Azerbaijan Medical University
Doctor of Philosophy in Medicine
khatira.cafarova@mail.ru
Daste Gasimova
Azerbaijan Medical University
qasimovadasta@gmail.com
Shalala Aliyeva
Azerbaijan Medical University
shalalaseyidova@gmail.com

HISTORY OF THE DEVELOPMENT OF EPIDEMIOLOGY AS A GENERAL MEDICAL SCIENCE

Abstract

The article provides brief information on the history of the epidemiology of infectious and non-infectious diseases and shares the achievements and experience of studying these diseases in recent years. Epidemiology, as a general medical science, studies the causes, conditions, and mechanisms of population morbidity, its distribution across the territory, among different population groups, and within space. Currently, the list of infectious diseases cannot be said to decrease, because in fact, new infections are constantly appearing, but they are not always detected in time and sometimes run in a hidden, latent manner. In the history of medicine, there are known cases of the emergence of new diseases, but the etiological origin of which is unknown and which covered large areas and then disappeared. In recent years, the general principles and methodological bases of studying all diseases at the population level have been developed. For this purpose, the term epidemiology is widely used. After the bacteriological discoveries, epidemiology was formed as a science that studies the regularities of the epidemic the process during a century of development. The formation of epidemiology as a science about epidemics coincides with the period of the emergence of ancient medicine.

Keywords*: epidemiology, prevention, non-infectious diseases, diagnostics, infectious diseases, epidemiological aspects, epidemiological control*

Introduction

As it is known, Epidemiology, as a general medical science, studies the causes, conditions, and mechanism of clarification of the disease of the population, spreading it throughout the territory, among different populations, and within the space. In other words, Epidemiology is concerned with studying the characteristics and frequency of spread of infectious and non-infectious diseases in specific populations Agayev, 2020: 132). The tasks facing epidemiology are constantly expanding, they are changing under the influence of the socio-economic conditions of human society, as well as due to the increase in infectious pathologies. Human beings are constantly subjected to the "aggression" of new types of infectious diseases. At the moment, there is no telling the decline in the list of infectious diseases, because in truth, new infections are constantly occurring, but they are

not always timely, and sometimes drive in a hidden, latent manner (Agayev, 2022: 48). New diseases are known in medical history, but the etiological origin is unclear and large areas have been covered, and then disappeared. In addition, there are known cases of new infections that are caused by unknown perpetrators but do not enter the WOS list. In modern times, coronavirus, HIV infection, tuberculosis, malaria, and hemorrhagic fever induced by the Ebola virus are considered the leading noisy forms.

At present, infectious diseases spread through the mechanism of «cosmopolitan» transmission are widespread and do not know any geographical boundaries. Diseases not controlled by immunoprophylaxis are common globally.

The interest of epidemiology includes issues such as the retention of the perpetrator in nature, the formation of collective immunity, the impact of human activity on the spread of infection, the evolution of infectious diseases and the emergence of new perpetrators.In history, humanity has encountered massive, and sometimes devastating infectious diseases. In certain years, the mortality rate of people with infectious diseases has reached 70%. Just to give you an idea of the damage infectious diseases cause, 20 million people died in the world during the 1918-1919 influenza pandemic. Within the causes of death in economically backward, developing countries, the particular incidence of infections as before is high (Agayev, 2022: 128).

Research

Initially, epidemiology was established as the science of studying infectious diseases. But later, the methods used here were also applied to the study of non-infectious diseases (Caliphate, 2021: 38). As a result of this, the concept of "epidemiology of infectious diseases" and "epidemiology of non-infectious diseases" was formed, and the aims and objectives of both are the same. There are many definitions of the term «epidemiology». The best was given by Last J.M. (1988): “Epidemiology is the science that studies the causes and prevalence of diseases in society and applies the acquired knowledge to solve health problems.” It combines several key concepts that reflect the essential principles of this discipline:

- “Epidemiology” as science is a free scientific discipline sometimes referred to as the principal science of public health and has unique scientific examination methods;
- «Epidemiology» is the study of the characteristics and frequency of spread of infectious and non-infectious diseases in specific populations.

The formation of epidemiology as a science about epidemics dates back to the emergence of ancient medicine. The term epidemic («Epi» over + «demos» population) is understood as the incidence and incidence of infectious diseases that are not previously mentioned in a given area. Accurate information about infectious diseases can be found 4,000 to 3,000 years ago, but the adaptation of most infectious diseases to the human body falls in the course of human emergence as a conscious species (H.Sapiens). In papyruses from ancient Egypt, B.C. There are records of the presence of a disease similar to natural "smallpox" in 3700-3710; the first reports of leprosy are there in B.C. It was issued in the 3000-2500s. There are records in ancient religious documents of the pestilence epidemic among Jews who were transferred from Egypt in 1120 BC. The ancient Indian holy book about the relationship of pest to rats shows that if “rats fall from the roof and die, this indicates that tuna is near.” The first information about many infectious diseases is found in the works of Hippocrates (460-377 BC) (“Air, Water, Earth”, “Epidemics”, Books I-VII, etc.).

«With the epidemic constitution («myasmatic») theory, Hippocrates B.C. In 460-377, he brought the term "Epidemiology" to medicine. He explained in this term that a number of epidemics are developing in these areas or other areas. Scientist linked epidemics to climate, behavioral, atmospheric and other impacts, and also said they occurred depending on different natural phenomena: volcanic eruption, floods, etc. (Agayev, 2022; 37).

Despite the widespread of infectious diseases in the Middle Ages, there is no innovation in the study of epidemics. The devotees prevented the formation of new ideas in this area and prevented the implementation of measures introduced in ancient times. During the Renaissance (XIV-XV century), the eminent Italian physician and astronomer Ciralamo Fracastro (1478-1553) attempted

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to create a theory about the emergence and development of epidemic diseases for the first time («contagions, contagious diseases and their treatment») in his book. In this book, written in 1546, he mentions the importance of living creatures in infectious diseases (natural smallpox, plague, measles, rabies, leprosy, etc.) with great foresight that they have the ability to increase. They spread through the air even when in direct contact with the patient's belongings. Subsequently, during the industrial revolution (XVI-XVIII century), the number of scientific works performed in natural science, which played a role in transforming epidimiology into free medical science, increased. The favorable conditions at that time stimulated the emergence of a new science - bacteriology, which in turn boosted the progress of all medical science, as well as epidemiology, a science with scientific and practical activity in the field of combating infectious diseases. Among the scientists of the time, two opposing views existed, one explaining the nature of infectious diseases: 1) miasmatics, 2) contagionists.

The first (miasmatics) believe that the formation of an epidemic depends on the change in the «epidemic constitutions» of a climate-dependent atmosphere. In certain conditions, «harmful onset» (miazes) increases in the soil, infecting people by spreading air and producing disease. Thomas Saydenham (1524-1689), a famous English physician, was a supporter of this direction in medicine. When dealing with infectious diseases, he described a wide range of diseases, including measles, blueberries, natural flowers, dung, scarlet, malaria, and other infectious diseases (Bhopal, 2003: 23). Saydenkham "Epidemic constitution" or myasmatic-contagiosis in theory (1624-1639) has shown that the "onset" factor that induces epidemic diseases originates in decaying substances. This theory, together with the views about the "arbitrariness of microbes" and the theory of the "epidemic constitution", which acknowledges the "constitutional" nature of epidemics, confirmed their role in the creation of diseases, and transmission through infected persons and dirty objects. The miasmatic contagiosis theory ruled until the end of the 19th century.

According to the second ones (contagionists), the disease is caused by a growing “contagion” in the patient's body and by creatures (contagions) secreted into the external environment. The author of this opinion was Danilo Samoylovich, a prominent Russian physician (1744-1805).

The fact that people were vaccinated with cowpox by the English physician E.Cenner (1749-1823) in the development of epidemiology was a great help. However, thanks to the scientific work carried out by L.Paster (1822-1825), I.I.Mechnikov (1845-1916), R.Kox (1843-1910), D.I.Ivanovsky (1864-1920) in the second half of the 19th century, the rapid development of microbiology confirmed the modern ideas currently present in the epidemiology of infectious diseases (Gordis, 1996: 49).

The cause of epidemic diseases – living organisms (contagium virum) - its proponents believed that these organisms were transferred from patients to healthy persons. This information is provided by B.C. It can be found in the description of the “disease of killing” in 430. The theory of biological factors first discovered the perpetrators of chickenpox, postpartum fever, irritable abscesses, and osteomyelitis, L.Paster brought facts proving microbial nature of infectious diseases: e.g., returning whooping (1873), leprosy (1874), abdominal whooping (1880), tuberculosis, mangoes (1882), and the like, diphtheria, tetanus (1883-1884), brucellosis (1886), plague (1894), botulism, dysentery, etc. Sometimes they believe that discoveries in bacteriology have also led to a revolution in epidemiology. But it was not just epidemiology alone, but the achievement of medicine altogether. Training on infectious diseases under the influence of an emerging new medical science - bacteriology - has been developed. Also new medical sciences: immunology, and clinics of infectious diseases (Murray, 1997: 86).

The revival of epidemiology took place thanks to the progressions of new medical sciences. These achievements were achieved by the work of D.K.Zabolotny (1866-1929), L.V. Gromashevsky (1887-1980), V.A. Bashenin (1882-1978), Y.N. Pavlovsky (1884-1969), distinguished scholars of the twentieth century. D.K.Zabolotny is the founder of Soviet epidemiology, author of the first book «Foundations of Epidemiology» (1927). The subsequent

development of epidemiology is due to the names of L.V.Gromashevsky, V.A.Basheen and Y.N. Pavlovsky, leaders of 3 schools over several decades.

L.V.Gromashevsky was a proponent of an unconventional way of developing epidemiology. Its main method of screening is the synthesis of knowledge that studies infectious diseases. It reflects the synthetic role of epidemiology. The author limits outbreak information to infectious disease and divides it into 2 parts:

a) the narrow sense of the "epidemic" is consistent with the previous designation of the epidemic, b) in addition, it explains the epidemic in broad terms or as a concept of the epidemic process. It also defines epidemiology not only as the science of epidemics (in a narrow sense) but also as the science of the epidemic process and all its manifestations (from epidemics of infectious diseases to single illnesses) (Khalequzzaman, 2017: 96).

Conclusion

Infectious diseases are the leading health concern to date, determining people's health, age, and causes of death. Compared to other diseases, infectious diseases stand in the second-tenth place of the planet's population in the world. It is known that the nosological independence of any disease is determined by the etiological agent. Of course, there are many successes to consider in combating infectious diseases. For example, 7-8 million of 135 million sick children per year worldwide before getting the vaccine against measles, but now 42 mln.| Only 1 million more than that are destroyed (Vahle, 2016: 49).

Due to planned preventive measures, the issues of poliomielitis, complete reversal of the diseases of drachunkulosis (rishta) and leprosy, which are no longer a serious problem, have been realized (Vuorimies, 2017: 43).

Hundreds of millions of deaths in the past millennium have been caused by a pandemic and outbreaks of common plagues, boils, natural smallpox, sprouts and gastroenteritis, diphtheria, malaria, influenza, and other diseases in the past. At the beginning of the twentieth century, mortality rates at high levels of disease were 65-100%, 45% at plagues, 25-40% at gastroenteritis and at choleras (Agaba, 2019: 123).

However, despite success in diagnosing and treating diseases, infectious diseases remain an important pathology of human beings: every second patient who visits a doctor is infected with infectious diseases, and 70% of patients of field pediatricians are children suffering from infectious diseases.

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Aybaniz Gulmammadova
Scientific Research Institute of Medical Prophilaxy
named V.Akhundov
aybenizgulmammedova@gmail.com

METHODS OF CAPTURING GNATS IN THE WORLD

Abstract

Leishmaniasis is one of the dangerous diseases that are widespread in the world. Its vectors are mosquitoes. One of the main reasons for the significant increase in the number of leishmaniasis is that the methods of combating vectors are not widely known. It is very important to prevent the disease and determine its species composition. The article shows various methods used to catch mosquitoes. This methods are widely used in research work. When applying the used methods, care should be taken not to disturb the chemical balance and not cause changes in species composition. In the future, steps should be taken to find safer methods.

Keywords: *leishmaniasis, causative, transmitter, gnats, catching methods*

Introduction

Leishmaniosis is a common disease in the world. It covers a lot of countries. It was also widespread in Azerbaijan as early as the last century. Subsequently, it was practically cancelled. Leishmaniosis belongs to a group of diseases caused by cellular internal protozoa belonging to the genus Leishmania. The perpetrators of the disease are parasites, revealed by Donovon in 1903 and named after Leysmania Donovani. There is a growing awareness in the references of the world that one of the main reasons for the considerable increase in the number of leishmaniasis infections in various regions of the world in recent years is that leishmaniasis is tolerable and perpetrators persist in the chemical drug, making it a little harder to reverse leishmaniasis.

Natural reservoirs of leishmania parasites include humans and about 70 species of animals, the predators included in this support include wolves, jackals, vets, etc. About 21 species of leishmania parasites are known to be pathogenic to humans and spread through gnats. (Godverdiyev, Baghirov, 2023:13-15)

Epidemiological features of leishmaniosis depend on the ecology of parasites and moths, the prevalence of infection, and whether the population has been in contact with the pathogen at this time and in the past. The prevalence and severity of leishmaniasis are related to factors such as heat, humidity and economic development, and vegetation.

There are 3 clinical forms of the disease.

- Visceral leishmaniasis
- Cutaneous leishmaniasis
- Cutaneous and mucocutaneous leishmaniasis

The cause of cutaneous leishmaniasis is Leishmania tropica. Cutaneous leishmaniasis mainly damages the skin.

In Azerbaijan, the perpetrator of visceral leishmaniasis is Leishmania infantum. Visceral leishmaniasis is accompanied by damage to the internal organs and anemia. The reason for the widespread spread of these diseases is that the population in these areas is not marginalized about the disease, is not accurately diagnosed, is not properly treated, have poor disease control, etc. (Salehov, Vahabov, Huseynov, 2022: 30).

Leishmaniosis occurs when the blood clots of females are infected with Leishmania parasites. Gnats are small-sized insects belonging to the blood-sucking insect complex of Diptera, included in the subfamily Phlebotominae of the family Psychodidae. It is found mainly in tropical and subtropical zones, with rare mild climates. There are currently 800 species of gnats. More than 90 species of them are singled out as conductors of leishmaniasis. The length of the gnats reaches 1.5-2

mm, rarely 3 mm. They are covered with dense yellowish-brown hair and can be colored from white to gray.

Gnats feed larvea with natural sugars, plant saps, and decaying organic matter. However, the female body needs blood to develop her eggs. For this purpose, females attack people and animals. The development period of the egg, the absorption of blood, depends on the ambient temperature (Guliyev, 2014: 202-206).

The eggs, larvae, and pupa of hatchlings thrive in habitats-as basements, chickens, cattle-stained stalls, buildings of brick walls, and in nature--buildings, birds' nests, rodents' nests, that is, on a moist substrate rich in organic matter away from the rays of the day.

An adult's residence includes a daytime shelter- a stall, porch, basement, and wetlands. In nature, their refuge is the roost of a tree and the nest of rodents. Aliyev, Hajiyev, Hajibeyov, Safarova, Safarli, 2017;116-117).

Gnats are active during the twilight hours and late night, and they fly quietly. There are times when gnats are active. Annual activity is from the end of May to mid-September when temperatures haven't dropped below 20 degrees per day. Daily activity is from 7 am to 9 pm and from 4 pm to 5 pm in the morning. To complete the normal development of gnats, the summer season should not be less than 4 months per year and the average daily temperature should not fall below 18 degrees. Gnats don't like bright spots because the direct falling sun rays ruin their vision. In the evening and at night, sunshine attracts gnats. In areas where gnats are common, it is necessary to conduct regular observations to determine species composition, species dominance, and seasonality. Observations of gnats should be made both in residential areas and in nature. The gnats have different methods of withholding. Half perch paper or A4 sheets up to 20x30cm long are used. Both sides are lubricated with castor (Ricinus) plant oil. In living areas, greaseproof paper should be placed mostly in dark corners, under the ceiling, and on the balcony. The greaseproof papers should be nailed to the wall side by side. The surface of the greaseproof paper should be parallel to the wall and placed 3-5 cm away from it. Greaseproof paper is deposited in places that are considered gnats' shelters. Greaseproof paper can be stored for 1 day or more. Paper is collected from the places we put it. Each paper is labeled on the top. 1) Date and location of seizure 2) Location of the building

The gnats are removed from the greaseproof paper. The collected gnats are placed in small test tubes in 96 percent alcohol. Low-power alcohol does not dissolve Ricinus oil. The label is inserted into a test tube and the tubes are bonded to cotton and stored in a slightly larger container of alcohol. It is delivered to the laboratory and the preparations are prepared and authenticated.

In nature, gnats are found in mammals, birds' nests, treehouses, caves, and shrubs. Greaseproof paper is used to hold gnats. Oily diapers are placed 1 hour before sunset since the gnats are night hops. It is collected early in the morning to protect it from damage (Dergachova, 1986:100).

There are many different ways of capturing gnats in the world. Hatching gnats is a difficult task. So why do we need to keep the gnats? One reason is a scientific study and the other is to reduce the amount. Adult gnats can be held in two ways. Active or passive. In the first case, we will try to detect areas where there are gnats and capture them with special vacuum cleaners, and in the second case, very attractive devices are used for gnats. These devices are the ones that go above and beyond.

1. CDC light trap.
2. Ultraviolet and colored LED trap.
3. The magnetic trap of gnats.
4. The Shennon Trap.

1) CDC miniature light trap.

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Figure 1.

Used by U.S. disease control centers for arbovirus and taxonomic research, locating stacks is a reliable and transportable sampling device on the fly. The battery-operated trap has become a widely used tool for fighting against gnats. The trap is turned on at twilight and extinguished early in the morning. There is an air-operated door system. With the air from the fans, the door opens and closes with counterbalancing weights. However, this trap causes difficulties for Africa due to procurement costs and transportation time. Traps made in Africa that are equally efficient in the CDC light trap, can be used in African settings, and are used to improve local vector control. This study is a solar-powered light trap (8).

The solar-powered SB trap was compared to the CDC light trap in the field. Since charging is difficult in remote settings, the SB trap is more promising.

2. Ultraviolet and colored LED trap.

Figure 2.

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The 368 nm ultraviolet emits a wave of light and the trails automatically escape into the colored power grid. This appliance is primarily used in the home. With this device, we can basically protect our family from the bite of gnats (9).

3) Magnetic trap of gnats.

Figure 3.

This device is also called a wireless magnet trap. This machine is placed in locations where there are lots of gnats. It is placed 30-40 meters away from people. This device has a propane tank and this technology converts propane into CO2. The released CO2 is self-sufficient and increases the retention surge by up to 10 times. Trap blows gnats into the torches leaving them thirsty and they die in the torches (7).

4) The Shennon Trap.

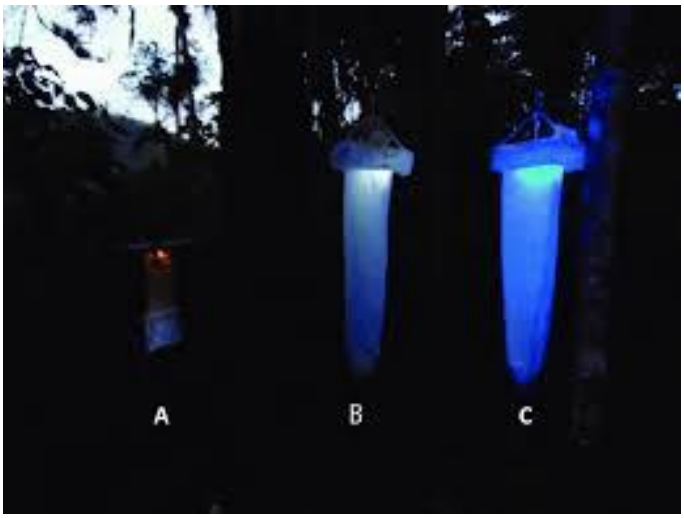

Figure 4.

It is made from a hanger and tent. White and black light is used. The light hangs upside down in the tent. The Shennon trap is set 1 metre from a tree branch. After each trap is set, a cumulative aspirator is used. From the top of the fabric cover, mugs attracted to light are collected and held to the top of the trap (6). There are other ways to capture the gnats. In 2016, researchers at Laurentian University released a cheap trap design called Ovillanta, which consists of water connected to an attractive part of a discarded rubber wheel. Water is filtered regularly to remove any eggs and larvae. Water, which then contains the egg-laying pheromone “egg-laying”, is used to attract more

people (10). Some new hatchery traps or known hatchery attractants spread a carbon dioxide feather along with other hatchery attractants such as sugar smells, lactic acid, octenol, heat, water vapor, and sounds. It can mimic the smell and output of mammals, pulling the trap female harnesses towards itself, and they are usually absorbed by the electric fan into the net and handler, where they are collected. They are useful in sampling studies to identify species to a common hatchery in an area but are usually very useful to reduce the population of the hatchery. Another method is the method of collecting gnats from any surface using an *exqauzer* (a special tool). Thus, as described above, the methods of seizure of gnats in nature or habitats are numerous and varied. The stacks explored by researchers have the option to select methods accordingly instead of withholding them. However, while existing traps offer temporary paths, they are often unsuccessful due to the limited duration of effectiveness and non-sequential effectiveness among different types of gnats. Future researchers need to develop a solution to more universally effective and sustainable gnats.

Conclusion

Eliminating the environmental impacts of widespread use of chemical attractants is also important. Careful assessment is required to ensure these methods do not harm non-target species or disrupt ecological balance. Using these concepts in pratic senators can change the way we manage our ambulance populations and reduce disease transmission. With ongoing technological advances and a deeper understanding of gnats ecology, we can ensure the development of new traps that are resilient and environmentally friendly (11, 12).

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CHEMISTRY

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Gulnara Ismayılova
Azerbaijan State Pedagogical University
PhD in Chemistry
gulnara.ismayilova@yandex.ru
Sona Kadirova
Azerbaijan State Pedagogical University
master
kadirovasona27@gmail.com

CHEMISTRY EXPERIMENTATION IN SECONDARY SCHOOLS AS A WAY TO BUILD COMPETENCE IN STUDENTS

Abstract

This article is devoted to the description of competencies as one of the important issues in developing and forming the student's personality in modern times. The article shows the types of chemical experiments, the possibilities of their application and their direct role in the development of competencies. Conducting experimental experiments and their conscious use in the development of competencies has a positive effect on the acquisition of new knowledge, skills and habits.

Keywords: *student, competence, chemistry experiment, laboratory experience, quality education, knowledge, skill, habit, learning, teaching process*

Introduction

In modern times, people are faced with a demand for the acquisition of a number of new and, most importantly, excellent qualifications. This is not only a priority in a globalized world, but also plays an important role in the formation of the student's personality, in the process of self-development, as well as in the promotion of productive activity in students. An interesting fact is that recently the nature of the competencies expected of people has changed. **Competence is the combination of knowledge, skills, habits, qualities and values.**

Currently, the list of qualifications that people should acquire was presented by the Council of Europe in 2006 (Taim, 2024: 23):

- Literacy competence
- Multilingual competence
- Maths, science and engineering competences
- Digital literacy
- Personal, social and learning competence
- Citizenship qualification
- Entrepreneurial competence
- Cultural awareness and self-expression

Building common competences creates opportunities for students to build their future lives, careers and take their place in life.

Since chemistry is closely related to many subjects, it has the ability to create integration opportunities in the teaching of any subject. The competences listed above can also be specialised by making reasonable use of opportunities to create interdisciplinary links.

In order to realise a radical reform in chemistry courses and to gain competences, the following problems need to be solved (Guliyev, Aghazade, 2018: 4-11; 9).

- Principles and methods of chemistry teaching and the use of modern didactic principles, especially chemistry experiments;

- Using trials educational possibilities of chemistry teaching and their application;

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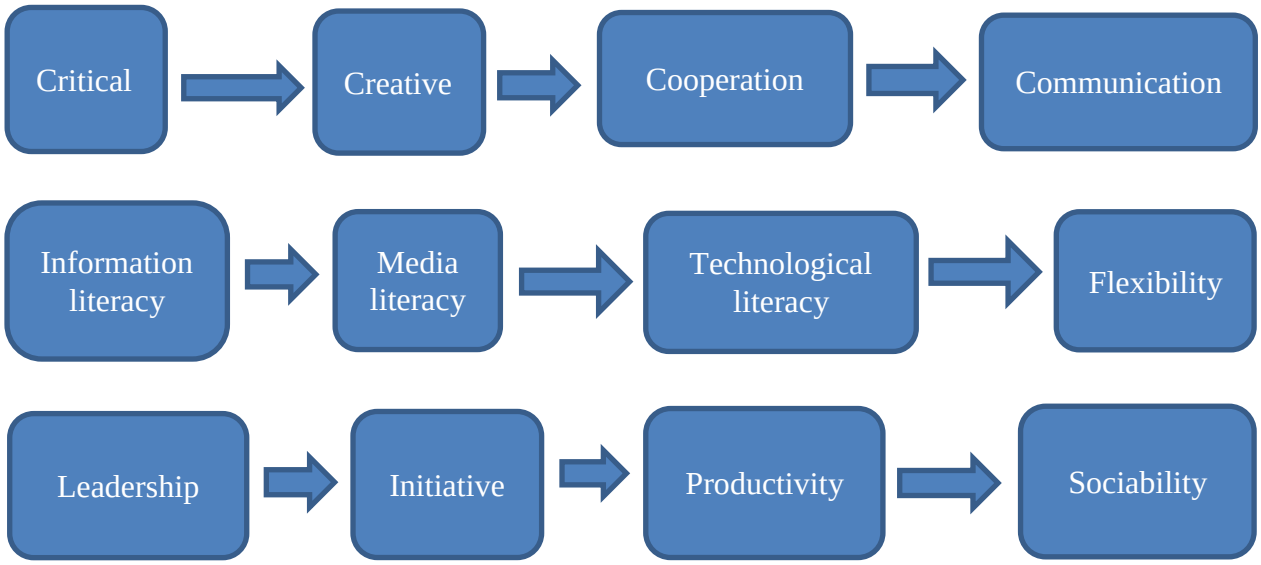
- Organisation and implementation of experiments to make chemistry lessons interesting and high level;
- To strengthen the practical aspect of chemistry through experiments;
- Activation of students and development of cognitive activity in chemistry lessons using experiments;
- Associating chemistry teaching with production.

The qualifications defined in the document on “state standards of general education in the Republic of Azerbaijan ” (2020) are based on these competences and skills. The basic skills that 21st century people need are defined as follows: (Taim, 2024).



The formation of these skills in students serves to develop their metacognitive knowledge, meta-thinking and meta-skills.

Among these, one of the qualifications that is particularly relevant to our professional orientation and of particular interest to us is the learning to learn qualification.

Learning skills are based on the 4K (4C learning skills) scheme. Critical thinking is one of the most important of these. The following skills are available to develop critical thinking:

1. Analysing - learning by breaking a whole into several parts and breaking it down. Determining the relationships of small parts to each other.
2. Making an argument - it is a judgement based on evidence and serves to reach a conclusion.
3. Classify - to identify features to distinguish categories from each other.
4. Comparing - the identification of different and similar features between two or more events, processes, situations.
5. Explain - is the ability to explain when any process took place and what it resulted in. The main thing in this case is to explain the idea to the other side.
6. Evaluate - compare the new decision with the existing decision and assess its effectiveness to propose a different solution.
7. Problem-solving - Investigating the cause of the problem, determining the result and ensuring that the problem is eliminated.

Today, the new educational reform in our schools serves the acquisition of quality knowledge by pupils (students) (Mammadova, Bakı 2012). In the normative legal documents on education adopted in recent years, it is stated as an important condition to educate mentally, morally, ethically, aesthetically developed, physically healthy, life-skilled students.

Today we live in a world where events, science, technology and technology around us are changing rapidly. Such changes impose new demands on the development of the student's personality. In order to adapt to constantly changing conditions, man needs to have the necessary

life skills, flexible thinking, readiness for self-development and self-development, and strive to realize his potential. Of course, these qualities are transmitted to students in general education schools.

In the process of chemistry teaching, besides the development of students' theoretical knowledge, the development of practical skills, which is the basis of empirical thinking, has always been of special importance (Vakhtiyarova, Minnulin, Galoin, 2014). Laboratory studies have a special importance in the development of empirical thinking in students and the formation of theoretical propositions.

The skills acquired in carrying out laboratory work and practical work in chemistry help to solve problems encountered in life. Depending on the nature of the laboratory work, it can be organized in school laboratories, subject offices, school gardens, and industrial establishments.

Chemistry, which is taught as a course in general education schools, has wider opportunities than other courses in terms of developing both practical skills and theoretical knowledge of students and shaping existing knowledge. Empirical knowledge of objects and events is acquired with the help of sense organs and expressed in concepts (declarative knowledge). Empirical thinking is based on methods such as observation, comparison, description, experimentation, and systematization, and the life skills acquired through these methods develop and improve. In contrast to empirical thinking, theoretical thinking is based on methods of analysis, modeling, idealization, abstraction, drawing conclusions, analogy - and similarity.

The ethical knowledge and skills acquired by the students are checked with the help of an experimental assessment tool. At the same time, through this assessment, students gain conceptual knowledge and acquire certain skills. The algorithm of performing demonstration and laboratory experiments in students is created through assessment with experimental content. (Khalilov, Azizov, 2008).

The organization of chemistry experiments is fundamentally different from chemistry lessons in terms of direction, content, character, and methods of implementation. Experiments are organized and carried out in various ways in accordance with the forms of work independent of chemistry, the creative wishes of the students, their interest in chemistry. Experiments in chemistry serve not to eliminate the missing aspects of the knowledge gained from chemistry, but to create the ability of students to apply the knowledge they have acquired. The role of chemistry teachers when conducting chemistry experiments should be completely different. The chemistry teacher gives the students the right advice during the chemistry practical course, helps them when necessary, guides them in their independent work, and directs them to get the right results in laboratory work.

The main purpose of laboratory work in chemistry is to examine new materials and to acquire new knowledge (Aliyev, Zulfugarova, 2015, 70-91).

Chemistry laboratory experiments are carried out in the following ways.

1) In the individual method, students carry out the experiments individually.

2) In the group method, a group of students who fulfill different functions do the same work at the same table.

3) In the collective method, different groups of students sitting at the table report the results obtained, i.e. they carry out the laboratory work collectively.

The methodology of the practical work (laboratory experiments) is as follows.

1. The interview.

2. Problem encountered and solving problems with experiments.

3. Oral and written instructions for doing laboratory work in chemistry.

4. Teachers' responses to students' questions about the rules of laboratory work in chemistry.

5. Independent work of students during the experiment.

6. Depending on the teaching, the quality of the students' performance during the realisation of the laboratory work should be clear.

Chemistry experiments have a great role in increasing the interest in the subject in the process of chemistry teaching in high school. In chemistry programmes, which are one of the components of

the educational process, annual programming should include instructions for conducting experiments (demonstration experiments, laboratory experiments, practical exercises and experimental problems). Chemistry experiment - helps to implement the didactic function with the help of various forms, methods and teaching aids. As a whole, it reflects the direction of independent acquisition of knowledge by students: from observation of experiments carried out by the teacher, and preliminary laboratory work to practical work and solution of experimental problems.

Chemistry experiment not only helps to develop independent thinking abilities in students and increase their interest in chemistry but also serve to increase their cognitive activity (Aliyev, 2003). It has been confirmed many times that students' acquisition of abstract concepts and knowledge is a difficult process. The systematic conduct of chemical experiments is a key tool in the formation of knowledge, skills and habits. Usually chemistry experiments are carried out in stages (table 1).

First phase	Second phase	Third phase.
Collection of resources and equipment necessary for the implementation of experiments, a set of theoretical knowledge about the course of work.	Conducting experiments in active-interactive conditions in accordance with the rules of safety techniques.	Analysis, evaluation and assessment of the results obtained.

The first phase of the experience is based on the theoretical foundations of the knowledge acquired by the students. Making observations, putting forward hypotheses and explaining the results based on arguments are taken as the main elements in the process of conducting the experiment. Several methodological requirements are imposed on the conduct of school chemistry experiments.

Based on the aforementioned information, it is very important to evaluate the role of chemistry experiments in the realisation of opportunities for students to gain knowledge, skills and habits and to develop competence in them.

The competences listed above can be gained by performing chemical experiments during chemistry teaching in secondary education institutions.

For this purpose, we consider it appropriate to examine various laboratory experiments:

Experiment 1. Required resources: plastic container, 150 ml hot water, yeast, sugar, small spoon, balloon.

Procedure: 1. Add three teaspoons of dry yeast and two spoons of sugar to a plastic container. 2. Then gradually pour warm water over the mixture. 3. Attach the ball to the neck of the plastic container and wait 25-30 minutes.

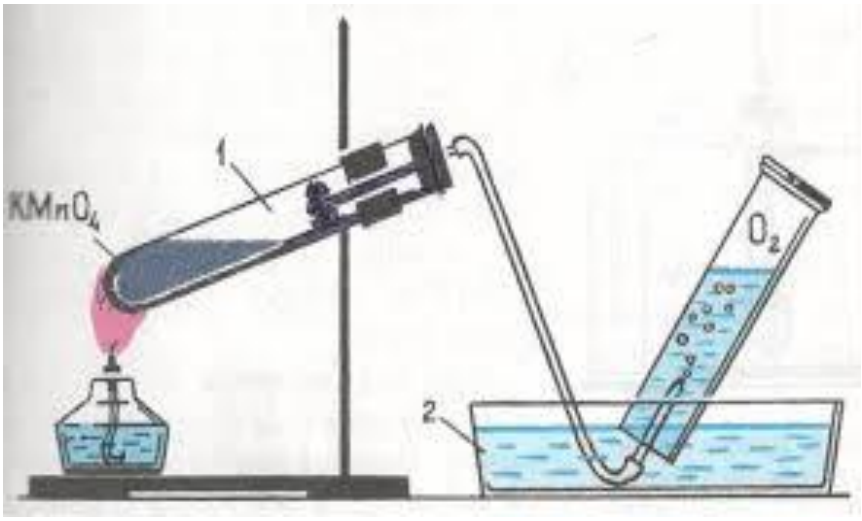
Observe the result. The liquid will first begin to foam and fill the balloon.

Explanatory phase: Yeast consists of a collection of microscopic fungi. They feed on sugar and release carbon dioxide (carbon dioxide). A large number of gas bubbles are collected and separated to fill the balloon with gas.

Observations and results are recorded by the students in their notebooks (Aliyev, 2006: 39-72).

Experiment 2. Obtaining sodium peroxide.

In this experiment we begin to explain in advance the method of obtaining and collecting oxygen in the laboratory (Zulfugarova, 2017, 58-62).



To do this, install the device shown in the picture and check its tightness.

Prepare the necessary resources for the experiment. Place the test bottle filled with water in a container of water with the spout facing downwards, covered with a glass dish. Add potassium permanganate salt (a little) to another dry test bottle. Close the mouth of the test bottle using a stopper with a blowpipe. Insert the end of the boiling tube into a test tube containing water. Set aside the glass plate that you have inserted into the mouth of the test tube. Heat a test tube containing potassium permanganate. The release of oxygen gas is recognised by the formation of gas bubbles. As soon as the test flask containing water is filled with oxygen, cover it with a glass dish. Save the oxygen collected for use in the sodium peroxide extraction experiment. In the second stage of the experiment, after thoroughly cleaning the sodium in the porcelain mortar, cut off a small lentil-sized piece. Dry the sodium between filter paper. Place a piece of cloth in a metal spoon with a long handle. Then put the sodium in it, hold the spoon over the fire and heat it until the sodium melts.

Place it in the cylinder filled with the oxygen obtained in the experiment above. Pour some distilled water into the cylinder and shake it.

Task 1. Why was oxygen collected in a test bottle filled with water?

Task 2. Write the equation of the reaction that occurs when heating a test flask containing potassium permanganate.

Task 3. How to check the presence of oxygen in a test bottle?

Task 4. When collecting oxygen in a test bottle, what safety techniques should be observed when collecting gases on water in general?

Task 5. Write the equation of the reaction between sodium and oxygen.

Task 6. Write the equation of the reaction when distilled water is poured into a cylinder and shaken.

Task 7. Describe the physical properties of alkali metals.

Except for some demonstration experiments in the chemistry laboratory, the rest of the work should be done individually by each student if possible. Due to the complexity and lack of equipment and materials, some practical work can be done in teams of 2-4 students under the instruction of the teacher.

Since the above experiment is a bit complex, it can be carried out collectively with the participation of a teacher or laboratory assistant.

By dividing the students into groups, they are taught to freely observe and work on the results of the tasks. After discussions among themselves in the group, the students come to a common opinion and conclusion, one person gives the answer.

Answer to question 1: Students make a general judgement and express their opinions. One of them answers. Since oxygen gas does not react with water, it can be squeezed out and collected in a test tube.

The answer to question 2:

$2KMnO_4 \rightarrow K_2MnO_4 + O_2\uparrow + MnO_2$

Answer to question 3: The presence of oxygen can be checked by placing a red-hot stick in the test flask. The stick is then observed to catch fire.

Answer to question 4: When gas is obtained by heating solids or by collecting gas on water, the end of the gas tube must be removed from the water before the reaction test tube is stopped heating. Otherwise, water may be drawn into the test tube and the solid will fill the heated test tube and the test tube will explode.

The answer to question 5:

$2Na + O_2 \rightarrow Na_2O_2$ (sodium peroxide)

Answer to question 6:

$Na_2O_2 + H_2O \rightarrow 2NaOH + H_2O_2$

Answer to question 7: Alkali metals are soft, lighter than water, easy to cut, silvery-white (cesium is yellowish-golden) metals that conduct electricity well. Of these, lithium is the lightest metal. They are stored in kerosene or aromatic hydrocarbons because they oxidise quickly in air. They have a metallic lustre and low melting point. From lithium to cesium, their density usually increases and their melting temperature decreases. It is important to carry out experiments of an empirical nature to acquire new knowledge.

Experimental work 1.

The teacher adds a solution of potassium halides to four test bottles (Taghiyev, Zülfüqarova, 2015: 23-28). Ask the students to identify which salt is in which test tube. Students discuss their knowledge about halogens among themselves. After determining which reagent will be used to carry out the detection reactions, it starts. The groups use silver nitrate solution for the determination of halides. Add 2-3 drops of silver nitrate solution to four test bottles. A test bottle containing potassium fluoride does not precipitate. This is because the reaction forms potassium nitrate and silver I-fluoride. Students observe the formation of a white precipitate in the second test tube, a yellow precipitate in the third test tube and a yellowish precipitate in the last test tube. As a result of the co-operation in group work, the students determine the composition of the precipitates and develop their ideas.

Conclusion

A white precipitate is chloride, a yellow precipitate is iodide and a yellowish precipitate is bromide. Reaction equations are written on the board by the group members under the guidance of the teacher.

$KF + AgNO_3 \rightarrow AgF + KNO_3$

$KCl + AgNO_3 \rightarrow AgCl_{(white)}\downarrow + KNO_3$

$KBr + AgNO_3 \rightarrow AgBr_{(yellowish)}\downarrow + KNO_3$

$KJ + AgNO_3 \rightarrow AgJ_{(yellow)}\downarrow + KNO_3$

Students record their observations and results in their workbooks.

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Rasmiyya Karimova
Azerbaijan State Agrarian University
kerimova.resmiyye.@list.ru
Aybeniz Huseynova
Azerbaijan State Agrarian University
aybeniz.huseynova @gmail.com
Naila Mammadova
Azerbaijan State Agrarian University
mammadova.naila.1965@gmail.com
Elza Hasanli
Azerbaijan State Agrarian University
elza.gasanly@mail.ru

THE BENEFITS OF VEGETABLE OILS

Abstract

Oilseeds have become an integral part of our lives. Oil plants are grown as demand for a particular product. In order to successfully grow such a crop, it is necessary to study all the specifics, and features of these plants.

Vegetable oils contain some of the fat-soluble vitamins. Sunflower oil contains physiologically active substances valuable and necessary for human nutrition: phosphatides, fat-soluble vitamins A, D, E, aromatic and flavoring substances, as well as the so-called saturated linoleic acids and the like. Oil cake waste from the fat industry is the best concentrated feed for livestock. The fruits and seeds of oilseeds contain proteins, which include many essential amino acids (lysine, tryptophan, cystine, arginine, etc.). Many of the oil plants are good honey plants. Fats are concentrated sources of energy. They provide somewhere around 80-85% of a person's energy reserves. Fats are a source of nutrients - fat-soluble vitamins, phospholipids, and vitamins. One tablespoon of vegetable oil helps to absorb vitamins A, E. (Andreev, 1982:78). Oilseeds of plants that are cultivated for the production of fatty oils are suitable for food and technical purposes. These are annual and perennial plants of various families, mostly herbaceous: sunflower, soybean, peanut, flax, etc.; tropical trees, for example: palm trees, cocoa tree, wax tree. Fatty oils are also obtained from the seeds of cotton, anise, cumin, almonds, walnuts, cedar pine, pits, peach, apricot, etc. Sunflower seeds contain up to 57% oil , soybeans -16-26%, oil flax 50%, sesame-47-64%,peanuts-42-56%,poppy seeds-45-56%, rapeseed-45-56% (Higgins, Best, Jones.1988: 57-61). Sunflower is the main oil plant in our country. Sunflower is a high-yielding crop suitable for mechanized cultivation and harvesting. The sunflower fruit, the achene, contains more than 55% oil. The shell, like husk, makes up 20-25% of the weight of the seeds. In the process of technological processing, the husk is separated from the kernel, as a result of which the oil content rises to 65-66%.

Keywords: *energy reserve, fats, phospholipids, tissue culture, pressing, extraction.*

Introduction

Vegetable oils can be obtained from a wide variety of plants. We know many plants, such as: sunflower, olives, corn, palm trees, coconuts. Oils from these plants, like many others, are being studied in different countries.

All crops that are raw materials for the oil production industry can be divided into two groups: oil plants, which are grown to produce other products, and then oils are obtained. The first includes sunflower, castor bean, rapeseed (Kuliev, 2014: 352).

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The second group includes: cotton, flax, soybeans, peanuts, mustard, germ of grain crops, grape seeds, fruit seeds, etc.

Depending on the fat content in the kernel, all oilseeds are divided into three groups:

1) low-oil with a fat content of 15%-35% (soybeans) P9

2) medium oilseed with a fat content of 35%-55% (cotton)

3) high-oil crops with a fat content of 55% or higher (sunflower, flax, peanuts, etc.). Sunflower is the main oilseed plant in our country.

Before growing the corresponding plants and processing raw materials, it is necessary to estimate their cost, as well as calculate the amount of energy released by the oils. The determining factor here is the amount of oil that can be obtained per hectare of crops. Experiments with soybeans and sunflowers in the Midwest and southern Africa have shown that up to a ton of oil can be obtained per hectare, even if the extraction method is not the best. The oil content in the collected raw materials is 35-47% by weight. Two tons of oil are obtained from one hectare. (Galaktinova, 1989: 123).

The UK and Malaysia are leaders in the development of highly productive varieties of oil palm. Record yields were obtained, up to 14 tons of oil per hectare per year, which is 2-3 times higher than conventional varieties. These new varieties were quickly propagated using tissue culture techniques.

Palm oil is easier to obtain, can be harvested all year round, produces less waste that pollutes the environment, and one of the "wastes" from production is protein-rich animal feed. (Gurbanov, 2009: 360).

Vegetable oil can be used in pure form or mixed with diesel fuel for use in compression ignition engines. Many plant species synthesize hydrocarbons, which can be directly used as fuel or chemical raw materials.

Example: rubber obtained from cultivated Hevca brasilien trees. In recent years, serious attempts have been made to develop and cultivate plant varieties that synthesize hydrocarbons of lower molecular weight than rubber. American inventor Thomas Edison studied about 2000 plant species in this direction. While studying plants, he noted that many plants contained hydrocarbons, but only one or two of them had a molecular weight so high that they could, in principle, serve as a substitute for natural rubber from Hevea. Some plants, especially from the Euphorbiac family, accumulate hydrocarbons in latex with a molecular weight significantly lower than that of rubber. In Malaysia and Great Britain, oils are obtained from highly productive varieties of oil palm (Minkevich, 2019: 560). The resulting fuel from palm oil has a number of advantages over the production of ethyl alcohol from sugar or starch-containing raw materials. Palm oil is easier to obtain and can be harvested all year round. During production, less waste is generated; the basis of the "waste" of production is protein-rich animal feed (Wolf, Maleeva, 1969: 564).

Vegetable oil can be used in pure form or mixed with diesel fuel for use in compression ignition engines. However, the efficiency and durability of such machines increase if the oil is processed into methyl or ethyl esters. Many plant species synthesize hydrocarbons, which can be directly used as fuel or chemical raw materials. Of the latter, the best known is rubber obtained from cultivated Hevea brasilensis trees.

Vegetable oils, vegetable fats are products extracted from plant raw materials and consisting of triglycerides of fatty acids and their accompanying substances. Phospholipids, free fatty acids, waxes, sterols, substances that impart color, etc. (Vasilev, 2017: 174).

The raw materials for obtaining vegetable oils are:

Oilseed seeds (sunflower, soybean, rapeseed, cotton, flax, sesame, milk thistle, black cumin, mustard, poppy, etc.)

Fruits of oilseeds (palms, olives)

Oil-containing waste from the processing of vegetable raw materials (wheat germ, corn, rice, fruit seeds of cherries, grapes, apricots, melon seeds, pumpkin seeds, sea buckthorn).

Nuts (cedar, walnut, coconut, pistachio, hazelnut, almond).

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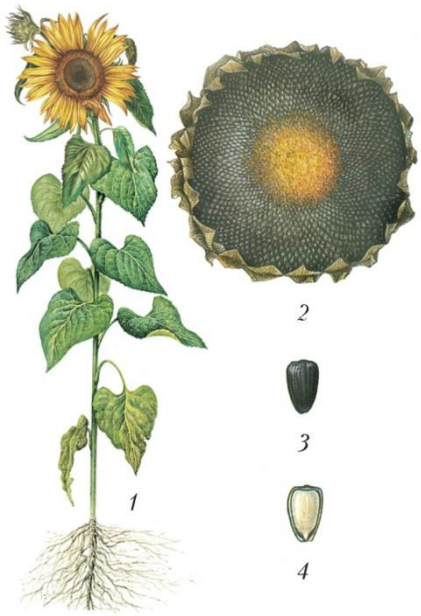

To obtain vegetable oils, pressing and extraction methods are used. Pressing is a mechanical extraction of oil on screw presses. Screw presses are used, which can be divided into 3 groups: presses for preliminary oil removal (forepresses), presses for final extraction (expellers), dual-purpose presses (Andreev, 1979: 217).

However, pressing technology does not ensure complete oil extraction. The oil remaining after pressing is extracted by extraction, which is characterized by greater efficiency (losses are 1.5-2.5 times lower than with pressing). To remove mechanical impurities, methods of settling, centrifugation and filtration are used.

From a chemical point of view, such hydrocarbons are substances that are more reduced (Higgins, Best Jones, 1988: 57-61) than carbohydrates. Recently, plant varieties have been grown that synthesize hydrocarbons of lower molecular weight than rubber.

A large number of plant species have been studied to determine the possibility of introducing oilseeds and hydrocarbon-producing crops (Buchanan, et al; 1978).

Component	Rubber		Oilseeds		Oilseeds	
	I	**I I**	**I**	**II**	**I**	**I I**
Total dry matter	13.500	100	17.900	100	22.500	10
Total protein	1.485	11	1.610	9	1.350	6
Rubber	1.350	10	360	2	-	-
Oil	810	6	2.150	12	2.250	10

Only a few of the larger number of plant species studied were selected for more detailed study as potential producers of rubber (12 species), oil and rubber (10 species), oil (9 species), etc.

However, despite this, only about 55,106 tons of vegetable oils are produced worldwide today.

Conclusion

Oilseeds play an important role in human life, as they are used in medicine, food, technical and soap industries for the production of polishes and paints. These include:sunflower, cotton, cumin, palm, cedar pine, walnut fruits, corn, etc. (Huseynov, Shukurov 1992: 128).

Vegetable oil is a product necessary for human life. In the food industry, vegetable oils are suitable for making mayonnaise, etc. In the technical industry they are used for the production of

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soap, polished paper, glycerin, glue, etc. Sunflower is a good honey plant, some of its species forms are used as an ornamental plant. Sunflower oil has many beneficial properties: it normalizes the functioning of the gastrointestinal tract and endocrine system, helps cleanse the liver and relieve inflammatory processes, and helps rheumatism and arthritis. Moderate consumption of sunflower oil regulates cholesterol levels in the blood. Sunflower oil contains a large amount of vitamin E, A and fatty acids, which have a good effect on the body, strengthening the structure of nails and hair. Vitamin A has antioxidant properties and protects cells from free radical damage.

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