American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Determination of Mixtures in Essential Oils in Laboratory Conditions (As Required By Df)

Mamadjanova M., Zahiriddinov I. I
Teacher, Department of Biotechnology, Namangan State University

Abdulatifova O. N
3rd year student, Faculty of Biotechnology, Namangan State University

Received: 2024, 15, Dec
Accepted: 2025, 21, Jan
Published: 2025, 11, Feb

Annotation: This study investigates the quality assessment of lemon essential oil through laboratory-based solubility and impurity tests, addressing the need for reliable methods in essential oil purity analysis. While essential oils are widely used in medicine and industry, limited research explores systematic approaches for detecting adulteration and ensuring quality. The study employs standardized experimental procedures, including solubility testing with distilled water and ethyl alcohol, to determine the presence of alcohol and mineral oils such as vaseline or paraffin. Findings indicate that lemon essential oil contains petroleum jelly or paraffin as impurities but no alcohol, highlighting the necessity for stringent quality control. The results underscore the importance of proper storage and handling to prevent oxidation and degradation. These findings have significant implications for the pharmaceutical and cosmetic industries, ensuring the safe and effective use of essential oils while reinforcing regulatory

standards in quality assurance.

Keywords: Lemon, essential oil, 70% alcohol, glassware, distilled water, mixtures, vaseline oil, paraffin, medicine, inhalation.

Introduction part

In recent years, our republic has developed a development strategy for the development of the New Republic of Uzbekistan in order to improve the lifestyle of the population, create a prosperous life, as well as a healthy life and a happy future. This development strategy pays special attention to providing the population with high-quality, high-nutritional and biologically valuable and affordable products as the population grows. Essential oil is a mixture of volatile organic substances with a specific smell and taste, which are extracted from plants using water vapor.

Essential oil is an organic bioactive substance that is stored in various parts of plants (stems, leaves, flowers, branches, fruits and above-ground organs). More than 2,500 species of plants in the Earth's flora contain essential oil.

Especially representatives of the families Lamiaceae (Labiatae), Apiaceae (Umbelliferae), Asteraceae (Compositae), Chenapodiaceae, Myrtaceae, Rutaceae, Rosaceae and others are rich in essential oils. The amount of essential oil in plants can be from 0.001-20%. The amount and composition of this oil varies depending on the place of growth, period of development, age and variety of plants.

LITERATURE ANALYSIS

1. "On the organization of cultural cultivation and processing of medicinal plants, support for the establishment of plantations of medicinal plants, as well as the widespread use of medicinal plants in the prevention and treatment of diseases," Resolution No. PQ-251 of the President of the Republic of Uzbekistan Sh. Mirziyoyev was adopted on May 20, 2022. In recent years, the republic has been implementing consistent reforms in the field of protection of medicinal plants, rational use of natural resources, organization of plantations where medicinal plants are grown and their processing.

2. M. Mamazhanova "Control of phytopreparations" (educational and methodological

complex) Namangan-2024 230 pages. This complex provides information on both theoretical and practical work on the types of phytopreparations obtained from medicinal plants and how to control their quality.

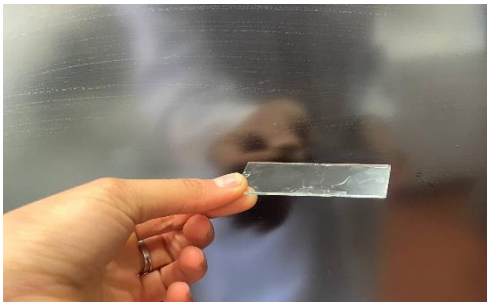
3. M. Mamajanova "Technology of phytopreparations" (textbook) Namangan-2024 224 pages. This textbook provides information on the technology of preparing phytopreparations from medicinal plants and the procedures for their storage. 4. R.H. Ayupov "Medicinal plants and their use" (3-part book). This book provides extensive information about medicinal plants. It also describes the methods of using them for diseases, that is, their use.

5. N.D. Kodirov, E.S. Baymuradov "Medicinal plants and products containing polysaccharides" Samarkand-2023. This textbook is about medicinal plants containing polysaccharide bioactive substances and their types, and provides detailed information about the products produced from them.

RESEARCH OBJECT AND METHODS

The methodology employed in this study involves a laboratory-based experimental approach to determine the quality and composition of essential oils, specifically lemon essential oil. The research was conducted at the training laboratory of Namangan State University, focusing on solubility tests and the presence of impurities in essential oils. The study follows standardized procedures to ensure accuracy and reliability in the assessment of essential oil purity. To analyze the presence of alcohol in lemon essential oil, a drop of distilled water was placed on a glass surface, followed by a drop of the essential oil. The reaction was observed under a black background, and the absence of mixing indicated the non-presence of alcohol. Another test involved shaking 1 ml of lemon essential oil with 10 ml of 70% ethyl alcohol in a dry test tube. The resulting cloudiness in the mixture signified the presence of mineral oils, such as vaseline oil or paraffin, which do not dissolve in alcohol. The study adheres to laboratory protocols to minimize contamination and ensure reproducibility. Essential oil quality control extends beyond laboratory testing to proper storage conditions, as exposure to oxygen, light, and moisture can lead to oxidation and degradation. Oils were stored in tightly sealed containers at temperatures not exceeding 15°C in dark and cool environments. This methodological approach provides a comprehensive evaluation of essential oil purity, aiding in quality assurance for medicinal and commercial applications.

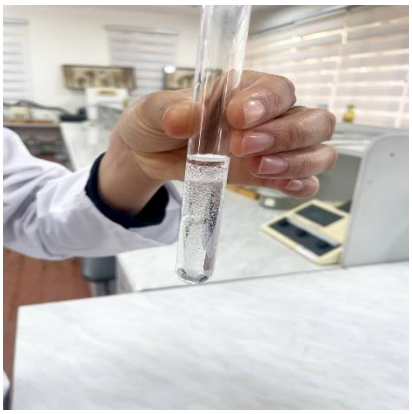
RESEARCH RESULTS



In the process of determining the compounds in lemon essential oil, the first step was preparation in accordance with laboratory rules. The accuracy and quality of the analysis during the examination are directly related to the work carried out in accordance with laboratory rules. Therefore, the preparation stage is important. In the process of determining the alcohol content of lemon essential oil, (as required by the DF), we dropped 1 drop of distilled water onto the glass of the product using a pipette, and in the same position, 1 drop of essential oil was dropped onto the dropped water and observed on a black background. When observed on a black background, the dropped water and essential oil did not mix with each other. This means that lemon essential oil does not contain alcohol. If this situation is the opposite, it is determined that the essential oil contains alcohol.

In the process of determining the oil and mineral oils in lemon essential oil, we poured 1 ml of essential oil into a dry test tube, shook it with 10 ml (70% ethyl alcohol). After shaking, when observed, the mixture in the test tube became cloudy. This situation (as required by the DF) indicated that the essential oil contained vaseline oil or paraffin. This is because oil and mineral oils do not dissolve in alcohol.

The experiments we conducted above showed that lemon essential oil contains petroleum jelly or paraffin as admixtures, but no alcohol. Essential oils play an important role in both traditional and modern medicine. In traditional medicine, essential oils are widely used in aromatherapy (treatment with aromas). This method is used because the origin of human diseases is often associated with the nervous system. The aroma of essential oils has a calming effect on the nervous system. In addition, it is also used for massage in young children for bone problems.



In controlling the quality of essential oils, the packaging and storage processes are also of great importance. Essential oils are damaged by exposure to atmospheric oxygen, light and moisture. Under these conditions, they oxidize and form tar-like substances. As a result, the color and smell of the oils change

and they thicken. When storing essential oils in warehouses and pharmacies, the above conditions must be taken into account. Essential oils are stored in tightly closed containers at a temperature not exceeding 15 degrees, in a cool and dark place. Failure to follow the above instructions will impair the quality and potency of the essential oil.

CONCLUSION

Essential oils extracted from medicinal plants are used in many areas in various directions. It is clear from this that essential oils are also important in human life. A single bioactive substance extracted from a plant covers various aspects of the life process, namely, medicine, food, pharmaceuticals, perfumery, cosmetics, technology and many other similar areas. Nowadays, synthetic drugs are becoming increasingly common. The process after consuming chemical drugs leads to negative consequences. Therefore, the population of the whole world is abandoning synthetic drugs and switching to taking drugs obtained from natural medicinal plants. The most visible areas of use of essential oils are folk medicine and modern medicine. Today, methods are being developed to obtain essential oils of higher quality, easier and more convenient. Examples of these are mastering, enfleurage, pressing and extraction methods. Determining their quality in laboratory conditions helps prevent negative consequences in cases where their composition is compromised or they contain a high amount of iodine.

REFERENCES USED

1. N.D.Kodirov, E.S.Baymuradov “Tarkibida polisaxarid saqlovchi dorivor o‘simliklar va mahsulotlar” Samarqand-2023
2. Zahriddinov I.I., G‘ulomova G. M. Abdubannayeva X. G‘ “Dorivor zubturum o‘simligining zamonaviy tabobatda qo‘llashning samarali usullari“
3. Abdulatifova O. N. et al. TUPROQ HOLATI VA UNDA BORADIGAN JARAYONLARNI YAXSHILASHDA MIKROSUVO ‘TLARINING O ‘RNI, BIOGEOTSENOZDAGI AHAMIYATI //Educational Research in Universal Sciences. – 2024. – T. 3. – №. 5. – C. 89-94.
4. Usmonov T. Z. et al. CULTIVATION OF MELISSA OFFICINALIS L. PLANT SEEDLINGS UNDER DIFFERENT CONDITIONS //Educational Research in Universal Sciences. – 2024. – T. 3. – №. 5. – C. 123-130.
5. Solijonov S. et al. НОРМ ФОСФОРНЫХ УДОБРЕНИЙ ПРИ ВОЗДЕЛЫВАНИИ КУКУРУЗЫ НА ЗЕРНО //IMRAS. – 2023. – T. 6. – №. 7. – C. 290-294.
6. Zokirjon o‘g‘li U. T., Ilhomjon o‘g‘li Z. I. ЛЕКАРСТВЕННЫЕ РАСТЕНИЯ СЕМЕЙСТВА ЯСНОТКОВЫЕ В НАМАНГАНСКОЙ ОБЛАСТИ Усманов Тахирджан Закирджан угли Наманганский Государственный Университет, Факультет Биотехнологии, магистрант 2 ступени технологии выращивания лекарственных растений //BARCHA SOHALAR BO’YICHA. – 2023. – C. 195.

INTERNET INFORMATION

7. https://new.tdpu.uz/
8. https://e-library.namdu.uz
9. www.ziyouz.com