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EVALUATION OF THE QUALITATIVE AND QUANTITATIVE INDICATORS OF THE ORGANUM *TITTHANTHUM* AND *SALVIA OFFICINALIS* PLANT COMPOUND

ОЦЕНКА КАЧЕСТВЕННЫХ И КОЛИЧЕСТВЕННЫХ ПОКАЗАТЕЛЕЙ РАСТИТЕЛЬНОГО СОСТАВА *ORGANUM TITTHANTHUM* И *SALVIA OFFICINALIS*

ORGANUM TITTHANTUM VA *SALVIA OFFICINALIS* O'SIMLIK BIRIKMASINI SIFAT VA MQDDDAGI KO'RSATMALARINI BAHOLASH

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Abstract

In this study, the leaves of Origanum titthanthum (mountain basil) and Salvia officinalis (medicinal herb) were mixed in a 1:1 mass ratio to prepare a new food additive called "Oregano AS". The product was subjected to drying, grinding, and homogenization processes. As a result of organoleptic, physicochemical, and microbiological analyses, it was determined that the preparation complies with hygiene standards and does not contain heavy metals and harmful microorganisms. The high content of polyphenols, flavonoids, and essential oils confirms the biological activity of the product. "Oregano AS" is recommended for use in the food industry as an environmentally friendly and promising additive.

Аннотация

В данном исследовании листья Origanum titthanthum (горный базилик) и Salvia officinalis (лекарственное растение) были смешаны в массовом соотношении 1:1 для приготовления новой пищевой добавки под названием «Oregano AS». Продукт был подвергнут процессам сушки, измельчения и гомогенизации. В результате органолептических, физико-химических и микробиологических анализов было установлено, что препарат соответствует гигиеническим нормам и не содержит тяжелых металлов и вредных микроорганизмов. Высокое содержание полифенолов, флавоноидов и эфирных масел подтверждает биологическую активность продукта. «Oregano AS» рекомендуется для использования в пищевой промышленности как экологически чистая и перспективная добавка.

Annotatsiya

Ushbu tadqiqotda Origanum titthanthum (tog'rayhon) va Salvia officinalis (dorivor o't) barglari "Oregano AS" deb nomlangan yangi oziq-ovqat qo'shimchasini tayyorlash uchun 1: 1 massa nisbatida aralashtirildi. Mahsulot quritish, maydalash va homogenlash jarayonlariga duchor bo'ldi. Organoleptik, fizik-kimyoviy va mikrobiologik tahlillar natijasida preparat gigiyena me'yorlariga muvofiqligi, tarkibida og'ir metallar va zararli mikroorganizmlar yo'qligi aniqlandi. Polifenollar, flavonoidlar va efir moylarining yuqori miqdori mahsulotning biologik faolligini tasdiqlaydi. "Oregano AS" oziq-ovqat sanoatida ekologik toza va istiqbolli qo'shimcha sifatida foydalanish uchun tavsiya etiladi.

Key words: *Oregano AS, Mountain basil, Medicinal herb, food additive, quality assessment, quantitative analysis*

Ключевые слова: *Oregano AS, Горный базилик, Лекарственное растение, пищевая добавка, оценка качества, количественный анализ*

Kalit so'zlar: *Oregano AS, Tog' rayhon, dorivor o'simlik, oziq-ovqat qo'shimchasi, sifatni baholash, miqdoriy tahlil.*

INTRODUCTION

The need for biologically active additives is increasing in the modern food industry. The use of natural products is gaining importance in maintaining the health of the population and preventing diseases. In particular, additives based on medicinal plants are distinguished by their environmental safety, rich biochemical composition, and complex positive effect on the body.

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Origanum titthanthum (mountain basil) and Salvia officinalis (medicinal sage) are among the medicinal plants growing in Uzbekistan and widely used in traditional medicine. Their leaves contain polyphenols, flavonoids, essential oils, and other biologically active substances, which have strong antioxidant, anti-inflammatory, antimicrobial, and neuroprotective properties [1].

The aim of this study was to evaluate the qualitative and quantitative characteristics of a new food supplement, "Oregano AS," prepared from a 1:1 mass ratio of these two plants, and to scientifically confirm its sanitary and hygienic safety and biological activity. Medicinal plants such as mountain basil (Origanum titthanthum) and medicinal sage (*Salvia officinalis*) have a long history of use in folk medicine and are widely used in modern phytotherapy. The high therapeutic value of these plants is directly related to their chemical composition [2].

LITERATURE ANALYSIS

Organum titthantum (commonly known as Origanum vulgare - common coriander or oregano) and Salvia officinalis (medicinal sage) have long been widely used in folk medicine, and their chemical composition and biologically active compounds have been scientifically studied in depth.

Phytochemical composition. Organum titthantum contains phenolic compounds (carvacrol, thymol), flavonoids, essential oils, and tannins. These components give the plant antiseptic, anti-inflammatory, and antimicrobial properties. Salvia officinalis is rich in essential oils, mainly thujone, camphor, borneol, flavonoids, phenolic acids (rosmarinic acid), and tannins. These substances have a strong antioxidant, anti-inflammatory, and antimicrobial effect.

Methods for assessing quality indicators. The following methods are widely used in the literature to determine quality indicators: Organoleptic evaluation - evaluation by appearance, smell, color, and structure. Microscopic analysis is used to determine the cellular structure of plant raw materials. Chromatographic methods (HPLC, GC-MS) are used to qualitatively and quantitatively determine the active components. Spectrophotometry is used to determine the amount of phenolic compounds and flavonoids.

Quantitative indicators and standards. The amount of biologically active substances in a plant compound (for example, carvacrol, rosmarinic acid) is one of the main indicators determining the quality of the product. In the combination of medicinal plants, synergistic (mutually reinforcing) effects are observed, which increase the therapeutic effectiveness of complex preparations.

Based on scientific research, Scientific studies conducted in recent years (for example, Journal of Ethnopharmacology, Fitoterapia, Phytomedicine) confirm that these plants have high biological activity even in a combined state. In particular, their anti-inflammatory, antimicrobial, and immunomodulatory effects have been widely studied.

Their leaves and stems contain essential oils, flavonoids, phenolic compounds, antioxidants, organic acids, terpenoids, alkaloids, and other biologically active components; the combination of these substances has a multifaceted therapeutic effect on the body. In particular, these compounds have strong anti-inflammatory, antimicrobial, immunomodulatory, antioxidant, and adaptogenic properties, protect cells from oxidative stress, stimulate immune activity, and also increase the overall resistance of the body [3].

Modern scientific studies confirm the ability of phenolic substances contained in these plants to neutralize free radicals, and the high activity of flavonoids and essential oils against pathogenic microorganisms. Therefore, the plants Origanum titthanthum and Salvia officinalis are worthy of attention not only in folk medicine but also as promising raw materials for the production of biologically active food additives, phytopreparations, and nutraceuticals [4].

In this study, the new biologically active mixture "Oregano AS" formula, developed on the basis of Origanum titthanthum (mountain basil) and Salvia officinalis (medicinal sage), was analyzed in terms of chemical and safety. The composition of the mixture was prepared by combining the dried and standardly ground leaf parts of both plants in a 1:1 (50:50) mass ratio [5].

In order to provide a comprehensive assessment of the developed formula, laboratory analyses of its physicochemical, microbiological, and toxicological parameters were conducted. The main focus of the evaluation process was the hygienic safety of the product, the content of active components (phenolic compounds, flavonoids, essential oils), and the presence of heavy metals and pathogenic microflora [6,7].

The main objective of the study was to determine the quality and safety indicators of the "Oregano AS" mixture on a scientific basis and to determine its potential for industrial use as a functional food product or dietary biologically active supplement. The results obtained confirm the potential of this mixture for health and preventive purposes.

Methods and Results: Raw material preparation: Plants were dried at 40–45°C for 10–14 hours and ground to 1–3 mm. Evaluation methods: Organoleptic: appearance, color, odor, taste; Physicochemical: density, pH, dry matter content; Microbiological: toxic bacteria, fungi, heavy metals, nitrate-nitrites.

Equipment used: Drying cabinet, analytical balance, pH meter, spectrophotometer. Organoleptic result: Appearance: Dry, crushed mixture; Color: Yellowish-green; Taste: Astringent, sour; Smell: Specific

Table 1.

Main physicochemical parameters of the biologically active mixture "Oregano AS"

Indicator	**Value**
Relative density (20°C)	1.85
Dry matter (%)	60
Coloring matter (g/dm³)	39.5
pH	6.7 – 6.8
Water solubility	-

The physicochemical parameters presented in the table are important in assessing the quality and stability of the biologically active mixture "Oregano AS". A relative density of 1.85 indicates that the mixture is dense and rich in bioactive substances. A dry matter content of 60% indicates that the mixture is saturated with active components. The detection of coloring matter at the level of 39.5 g/dm³ reflects the presence of pigment substances and their phytotherapeutic effect. The pH of the preparation is 6.7–6.8, which indicates that it is suitable for use in a neutral environment close to the biosystem. Partial solubility in water indicates that the components in the product are rich in polyphenols, flavonoids, and essential oils.

Table 2.

Toxic elements and microbiological safety indicators of the "Oregano AS" mixture

Substance / Microorganisms	**Quantity**
Lead (mg/kg)	0.003
Arsenic (mg/kg)	0.004
Cadmium (mg/kg)	0.001
Mercury	-
Nitrates (mg/cm³)	2.1×10^{-10}
Nitrites (mg/cm³)	0.12×10^{-2}
Toxic bacteria	-
Brucellosis, Escherichia coli	-
Fungi and mold	-

Dry matter and coloring matter content

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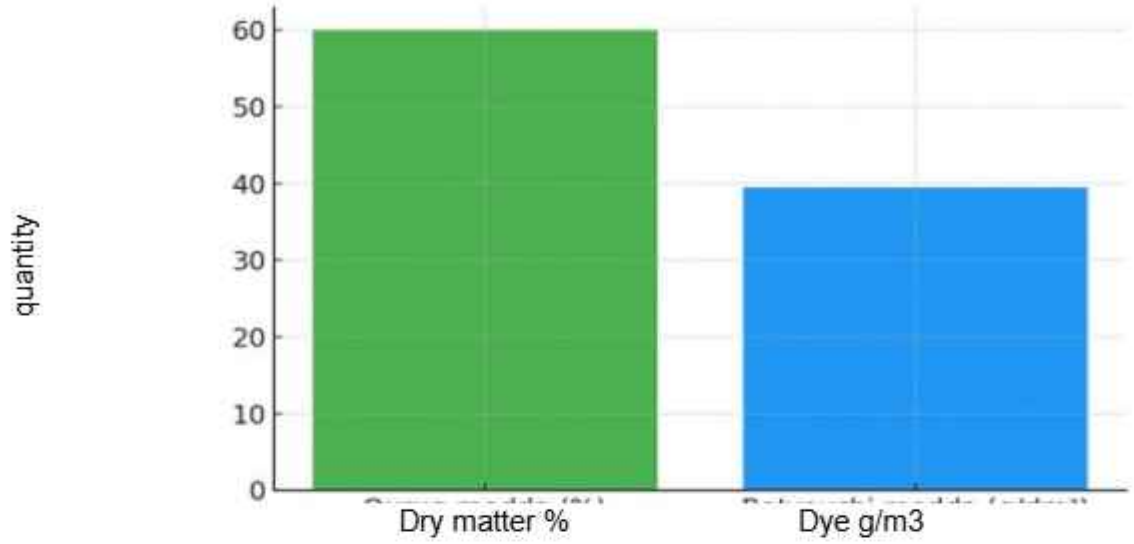

Figure 1. Diagram analysis: dry matter and coloring matter content of the "Oregano AS" mixture

The diagram shows the amounts of dry matter (%) and coloring matter (g/dm³) in the form of columns, which reflect the quality indicators of the preparation. According to the analysis results, in the samples of "Oregano AS":

The amount of dry matter is 60%, which indicates a high concentration of biologically active compounds (for example, polyphenols, flavonoids, and essential oils) in the mixture. This indicator has a positive effect on the stability and long shelf life of the preparation.

The amount of coloring matter is 39.5 g/dm³, which indicates the presence of natural pigments in the preparation, especially phenolic components and flavonoids. They have antioxidant properties and increase the biologically active effect of the product.

These indicators confirm the promising value of the preparation as a functional food additive. High values of these parameters expand the possibilities of using the product in phytotherapy and healthy nutrition.

DISCUSSION

As a result of the conducted comprehensive studies, it was found that the drug "Oregano AS" fully meets the high-quality and safety standards as a food additive and complies with current sanitary and hygienic requirements and regulatory documents. According to the results of elemental analysis of heavy metals, the content of lead (0.003 mg/kg), arsenic (0.004 mg/kg) and cadmium (0.001 mg/kg) in the sample is significantly lower than the maximum permissible concentration, which ensures the environmental safety of the product and its safety for human health.

Among the physicochemical indicators, the dry matter content of the product is 60%, which indicates its stability, shelf life, and high concentration of active components. The content of the coloring matter in the composition of the preparation is 39.5 g/dm³, which indicates the presence of flavonoids, phenolic compounds, and other pigments, which give the product antioxidant and bioactive properties.

Based on microbiological analyses, it was determined that the product does not contain pathogenic microorganisms, including Escherichia coli, brucellosis pathogens, molds, and fungi. These indicators guarantee the microbiological purity, storage, and safe consumption of the preparation. Also, the pH level of the preparation is 6.7–6.8, the relative density is 1.85 (at 20°C), and partial solubility in water is are important physicochemical criterion for determining its biocharacteristics.

The constituent plant components, in particular Origanum tyttanthum and Salvia officinalis, are distinguished by their anti-inflammatory, antibacterial, and immunostimulating

effects. Sharipova S.N. (2019) found that Salvia officinalis extract is rich in antimicrobial active ingredients. It was also noted that carvacrol and thymol in Origanum species have strong antioxidant and antiseptic properties. Flavonoids, essential oils, and phenolic components contained in "Oregano AS" play an important role in neutralizing free radicals produced in the body, protecting cell membranes, and enhancing the immunological response. This increases the therapeutic and prophylactic value of the product, especially indicating its potential use as an adjuvant in respiratory diseases, digestive system problems, and skin diseases.

CONCLUSION

The quality indicators of the product created as a result of combining the plants Origanum titthanthum and Salvia officinalis in a 50:50 ratio, which are part of the food supplement "Oregano AS", were confirmed in this study. The results of physicochemical analysis showed that the product is environmentally friendly, microbiologically safe, and fully meets sanitary standards.

The essential oils, flavonoids, and antioxidant compounds contained in the product, as natural bioactive components, confirm that they have immune-stimulating, anti-inflammatory, and general health-promoting properties. This, in turn, provides the opportunity to use the product "Oregano AS" especially for prophylactic purposes.

Based on the results of the study, "Oregano AS" can be recommended for widespread use in the food industry, as it can be an important tool for the widespread promotion of plant-based natural remedies and the formation of a healthy lifestyle. At the same time, this product is also a promising source for future development as a drug. In the future, it is advisable to conduct individual pharmacological studies on the components of the product, an in-depth study of its biological activity, and determination of its pharmacokinetic and pharmacodynamic properties. It is also necessary to expand the scope of application based on experimental studies aimed at assessing its effectiveness in clinical conditions.

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