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TECHNOLOGY OF PREPARATION OF AQUEOUS-ALCOHOL OINTMENT FROM CLIMACOPTERA TURCOMANICA MEDICINAL PLANT

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Abstract

This article discusses the preparation of an aqueous-alcohol ointment derived from the medicinal plant *Climacoptera turcomanica*, which is widely found in Turkmenistan. The study explores the technology behind the extraction of active ingredients from the plant, their formulation into a therapeutic ointment, and the assessment of the ointment's efficacy for treating a variety of skin conditions. By using both scientific and traditional knowledge, the research provides insight into the potential applications of *Climacoptera turcomanica* in modern medicine. The findings demonstrate that the developed ointment has significant medicinal properties, offering a natural alternative to pharmaceutical products.

Keywords

Climacoptera turcomanica, medicinal plant, aqueous-alcohol ointment, extraction technology, therapeutic properties, natural medicine, skin care.

1. Introduction

The use of medicinal plants has long been an integral part of traditional medicine, especially in regions with rich biodiversity like Turkmenistan. One such plant, *Climacoptera turcomanica*, native to the region, has shown promise in treating various skin conditions.

The primary goal of this research is to explore the preparation of an aqueous-alcohol ointment from *Climacoptera turcomanica*, focusing on the extraction of bioactive compounds and their formulation into an effective medicinal product. This study aims to demonstrate the feasibility of using this plant in modern pharmaceutical practices, offering an alternative to synthetic ointments.

2. Materials and Methods

The study was conducted using fresh *Climacoptera turcomanica* leaves, which were harvested in the summer months to ensure the maximum concentration of active compounds. The leaves were washed thoroughly and dried at room temperature before extraction. Two primary solvents were used for the extraction process: ethanol (95%) for alcohol-based extraction and distilled water for aqueous extraction. The extraction was performed using a maceration method, where the plant material was soaked in the solvents for 48 hours, followed by filtration. The resulting extracts were then concentrated to the desired consistency for use in the ointment formulation.

The preparation of the ointment involved mixing the active plant extracts with a base made of petroleum jelly and a small amount of emulsifying wax to ensure proper consistency and stability. The proportions of water, alcohol, and plant extract were carefully adjusted to ensure a balanced formulation that would be easy to apply while maintaining the therapeutic properties of the plant.

3. Extraction of Active Components

The extraction process aimed to isolate the key bioactive compounds responsible for the medicinal properties of *Climacoptera turcomanica*. Preliminary phytochemical analysis showed that the plant contains a variety of alkaloids, flavonoids, and glycosides, which are known for their anti-inflammatory, antimicrobial, and antioxidant properties. Ethanol was found to be the most effective solvent for extracting these compounds, although water also contributed to the extraction of water-soluble elements.

The extraction yields were evaluated based on the concentration of bioactive compounds in the final extract. The ethanol extract had the highest concentration of flavonoids and alkaloids, while the aqueous extract was richer in polysaccharides and phenolic compounds. These findings were crucial in determining the final proportions of the extracts used in the ointment formulation.

4. Formulation of Aqueous-Alcohol Ointment

The next step was the preparation of the aqueous-alcohol ointment. The base of the ointment was created by combining purified petroleum jelly with emulsifying wax, which was then heated until the wax melted and the base became homogeneous. Once the base was prepared, the active extracts from *Climacoptera turcomanica* were slowly incorporated into the mixture. The ethanol extract was added first, followed by the aqueous extract, ensuring a smooth integration of all components.

The ointment was then allowed to cool at room temperature before being packaged in sterilized containers.

The final ointment had a thick but spreadable consistency, making it easy to apply to affected areas. The choice of solvents ensured that the active ingredients were effectively incorporated into the ointment while maintaining their stability and potency over time.

5. Evaluation of the Ointment's Therapeutic Properties

The effectiveness of the aqueous-alcohol ointment was evaluated through in vitro and in vivo studies. In vitro tests were conducted to assess the antimicrobial properties of the ointment, including its ability to inhibit the growth of common skin pathogens such as *Staphylococcus aureus* and *Escherichia coli*. The results showed significant antimicrobial activity, especially in the ethanol-based formulation.

In vivo testing was performed on animal models with skin wounds and inflammation. The ointment was applied topically to the affected areas, and the healing process was monitored over a period of two weeks. The ointment demonstrated notable anti-inflammatory effects, significantly accelerating the healing process compared to untreated controls. Histological analysis of the skin samples revealed enhanced collagen synthesis and faster tissue regeneration.

6. Results and Discussion

The results of this study indicate that the aqueous-alcohol ointment derived from *Climacoptera turcomanica* possesses significant therapeutic properties. The ointment was found to have both antimicrobial and anti-inflammatory effects, which are crucial for treating skin conditions such as wounds, burns, and dermatitis. The ethanol extract, in particular, contributed to the ointment's antimicrobial action, while the aqueous extract provided additional antioxidant and anti-inflammatory benefits.

These findings are consistent with traditional uses of the plant in folk medicine, where *Climacoptera turcomanica* has been used to treat various skin ailments. This research demonstrates that modern scientific techniques can validate and enhance the therapeutic potential of medicinal plants, bridging the gap between traditional knowledge and contemporary pharmaceutical practices.

7. Conclusion

In conclusion, the study successfully developed an aqueous-alcohol ointment from *Climacoptera turcomanica*, demonstrating its potential as an effective treatment for skin conditions. The research highlights the importance of integrating traditional knowledge with modern scientific techniques to create new, natural medicinal products. Future studies should explore the long-term stability of the ointment, as well as its potential for commercial production and wider therapeutic use.

References

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