

ECOLOGICAL CHARACTERISTICS AND EDICINAL APPLICATIONS OF (ROSA CANINA_ L.) ROSEHIP AND (CRATAEGUS SPP.) HAWTHORN PLANT SPECIES DISTRIBUTED IN UZBEKISTAN

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ABSTRACT: This study investigates the ecological characteristics and medicinal applications of *Rosa canina* L. and *Crataegus* spp plant species indigenous to Uzbekistan. The research aims to elucidate the species' distribution patterns, habitat preferences, and the influence of environmental factors on their bioactive compound profiles. Plant materials were collected from diverse ecological zones across Uzbekistan and subjected to phytochemical analysis using chromatographic and spectroscopic techniques to quantify key secondary metabolites, including flavonoids, phenolic acids, and ascorbic acid. Furthermore, the study explores the ethnomedicinal uses and documented pharmacological activities of these species, focusing on their antioxidant, cardioprotective, and anti-inflammatory properties. The findings provide a scientific basis for the sustainable utilization, conservation, and potential cultivation of *Rosa canina* L and *Crataegus* spp. as valuable sources of medicinal compounds in Uzbekistan. This research contributes to the understanding of the species' ecological adaptability and provides insights for optimizing their use in pharmaceutical and nutraceutical applications.

KEYWORDS: *Rosa canina* L., *Crataegus* spp, medicinal plants, bioecology, phytocoenosis, geobotany, distribution range, habitat, ecological factors, abiotic factors, biotic factors, chemical composition, phytochemical screening, flavonoids, polyphenols, terpenoids, alkaloids, ascorbic acid, antioxidant activity, cardiogenic effect, pharmacological effect, ethnobotany, pharmacognosy, cultivation, introduction.

INTRODUCTION

Rosa canina L. and *Crataegus* spp have been widely used in traditional medicine since ancient times as valuable medicinal plants [1]. Due to the richness of bioactive compounds found in their fruits, leaves, and flowers, these species are considered effective agents in treating cardiovascular diseases, inflammatory processes, and strengthening the immune system [2].

In recent years, the increasing demand for medicinal plants has intensified anthropogenic pressure on their natural resources. This poses a risk of depletion of medicinal plant populations, making their conservation and sustainable utilization a critical issue [3]. The flora of Uzbekistan is distinguished by its richness in medicinal plants. In particular, various species of rosehip and hawthorn are widespread in different ecological regions of our republic. However, the bioecological characteristics, chemical composition, and medicinal properties of these species have not been sufficiently studied [4]. Therefore, the aim of this study is to comprehensively investigate the ecological characteristics, chemical composition, and medicinal properties of *Rosa canina* L. and *Crataegus* spp plant species distributed in Uzbekistan. The research will address the following tasks:

1. Determine the distribution ranges and growing conditions of the plants.



2. Analyze the chemical composition of the plants using modern analytical methods.
3. Evaluate the antioxidant and cardiogenic activity of the plants.
4. Develop recommendations for the conservation and sustainable utilization of medicinal plants based on the obtained results.

The results of this study will contribute to the conservation of medicinal plant resources in the flora of Uzbekistan, the development of the pharmaceutical industry, and the improvement of public health.

MATERIALS AND METHODS

The study was conducted in various geographical regions of Uzbekistan, including mountainous, foothill, and desert areas, where *Rosa canina* L. (rosehip) and *Crataegus* spp. (hawthorn) are naturally distributed. Field expeditions were carried out during the period of 2023-2024 to collect plant samples at different phenological stages (flowering, fruiting). The geographical coordinates (latitude, longitude) of each sampling location were recorded using a GPS device (Garmin eTrex 30x). Voucher specimens were prepared and deposited in the herbarium of the Department of Botany, Termez State Pedagogical Institute.

RESULTS AND DISCUSSIONS

As a result of conducted research, the distribution areas of *Rosa canina* L. (rosehip) and *Crataegus* spp. (hawthorn) plants in various geographical regions of Uzbekistan were identified. It was observed that these plants are mainly distributed in mountainous areas (at altitudes of 1500–2500 m above sea level), foothill zones (700–1500 m), and partly in desert regions (200–500 m). Rosehip prefers well-drained, sunny, and slightly acidic soils, while hawthorn was found to grow in various soil types in both sunny and partially shaded locations. [5].

During the vegetation period, the average air temperature was 15–25°C in mountainous regions and 25–35°C in desert regions.

Phytochemical analyses revealed that rosehip and hawthorn contain biologically active compounds such as flavonoids, polyphenols, terpenoids, and ascorbic acid. It was found that rosehip fruits growing in mountainous areas have a higher content of ascorbic acid, whereas hawthorn leaves from foothill areas showed a high amount of total flavonoids.

Using HPLC analysis, phenolic compounds such as quercetin, rutin, and chlorogenic acid were identified in these plants, and their concentrations were observed to vary depending on geographic location and plant part.

These research results indicate that rosehip and hawthorn have a high adaptability to the diverse ecological conditions of Uzbekistan. The differences in chemical composition and antioxidant activity of the plants reflect the influence of ecological factors (altitude, soil type, light intensity) on the accumulation of biologically active substances.

CONCLUSION

The research conducted in various geographical regions of Uzbekistan has shown that *Rosa canina* (rosehip) and *Crataegus* spp. (hawthorn) possess a high degree of adaptability to diverse ecological conditions. These species thrive in mountainous, foothill, and partially desert zones,



producing phytochemically rich biomass under varying environmental factors. Factors such as altitude, soil composition, and light availability significantly influence the accumulation and distribution of biologically active compounds in these plants. Research conducted in various geographical regions of Uzbekistan has shown that *Rosa canina* (rosehip) and *Crataegus* spp. (hawthorn) possess a high degree of adaptability to diverse ecological conditions. These species thrive in mountainous, foothill, and partially desert zones, producing phytochemically rich biomass under varying environmental factors. Factors such as altitude, soil composition, and light availability significantly influence the accumulation and distribution of biologically active compounds in these plants.

The presence of flavonoids, polyphenols, terpenoids, and ascorbic acid in rosehip and hawthorn highlights their strong pharmacological and therapeutic potential. It was observed that rosehip fruits growing in mountainous areas contain higher levels of ascorbic acid, while hawthorn leaves from foothill zones are richer in flavonoids. This variation indicates that ecological conditions (e.g., elevation, soil type, microclimate) play a key role in shaping the phytochemical profiles of these plants.

Both rosehip and hawthorn have long-standing applications in traditional medicine. Rosehip is commonly used for treating colds, strengthening the immune system, and promoting wound healing, whereas hawthorn is traditionally applied to support cardiovascular health, regulate blood pressure, and calm the nervous system. Their use in folk medicine is closely linked to their phytochemical composition, which is increasingly being supported by modern scientific studies.

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