American Journal Of Biomedical Science & Pharmaceutical Innovation

VOLUME Vol.05 Issue02 2025
PAGE NO. 34-36
DOI 10.37547/ajbspi/Volume05Issue02-09

Germination characteristics of greater celandine (CHELIDONIUM MAJUS L.) Seeds

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Received: 24 December 2024; **Accepted:** 26 January 2025; **Published:** 28 February 2025

Abstract: This article presents the results of research conducted on the germination of Greater Celandine (Chelidonium majus L.), one of the valuable medicinal plant species. It was found that under laboratory conditions, seed germination was high (91.4-93%) with an optimal germination temperature of 25-30°C. Field germination, however, was relatively low (17.7-24.5%), influenced by the seeds' anatomical structure and variable environmental conditions.

Keywords: Seed, germination, embryo, seed coat, germination temperature, dicotyledonous nutlet, environmental factors, sowing periods.

Introduction: Developing the pharmaceutical industry is one of Uzbekistan's priorities. This development requires establishing industrial plantations of medicinal plants and expanding their assortment. Many medicinal plant species are representatives of wild flora, with relatively little known about their ecological and biological characteristics. This lack of knowledge hinders their cultivation and plantation development. Thus, the study of biological features is necessary for scientifically based cultivation.

Greater Celandine is a valuable medicinal plant not recorded in Uzbekistan's natural flora. Its extracts are used to treat liver, gallbladder, and skin diseases (Kholmatov, Qosimov, 1994). This study used seed samples of Greater Celandine from Germany (first-generation reproduction in Samarkand). The article presents findings on the seed quality of this plant.

Research Objective

The study aimed to develop a scientific basis for cultivating Greater Celandine in the Samarkand region by studying its biological, morphological, and physiological characteristics.

METHODS

The germination of Greater Celandine seeds was studied under laboratory and field conditions. Laboratory germination was evaluated using standard seed science methods (Kuleshov, 1963; Leurda & Belskykh, 1974; International Seed Testing Rules, 1984). Seeds were germinated in Petri dishes at different temperatures (20-22°C and 25-30°C) on filter paper or river sand. Field germination was assessed by sowing 100 seeds in January, February, and March, and counting emerged seedlings. Data were statistically analyzed using the methods of B.A. Dospekhov (1979).

RESULTS

Laboratory Germination

The fruit of Greater Celandine is a multi-seeded, elongated capsule. Seeds are very small, smooth, and shiny black. The weight of 1,000 seeds was found to be 5.71 mg. The embryo is dicotyledonous and enclosed in

a hard, smooth seed coat, which delays water and oxygen absorption, slowing germination.

Table 1. Laboratory Germination of Greater Celandine Seeds (20-22°C)

#	Seeds Sown	Sowing Date	Germination Date	Germinated Seeds	Duration (days)	Germination (%), M±m
1	50	07.12.2024	15.01.2025	46	39	91.4
2	50	07.12.2024	15.01.2025	48	39	91.4
3	50	07.12.2024	15.01.2025	47	39	91.4
4	50	07.12.2024	15.01.2025	42	39	91.4
					Average: 45.7±1.3	

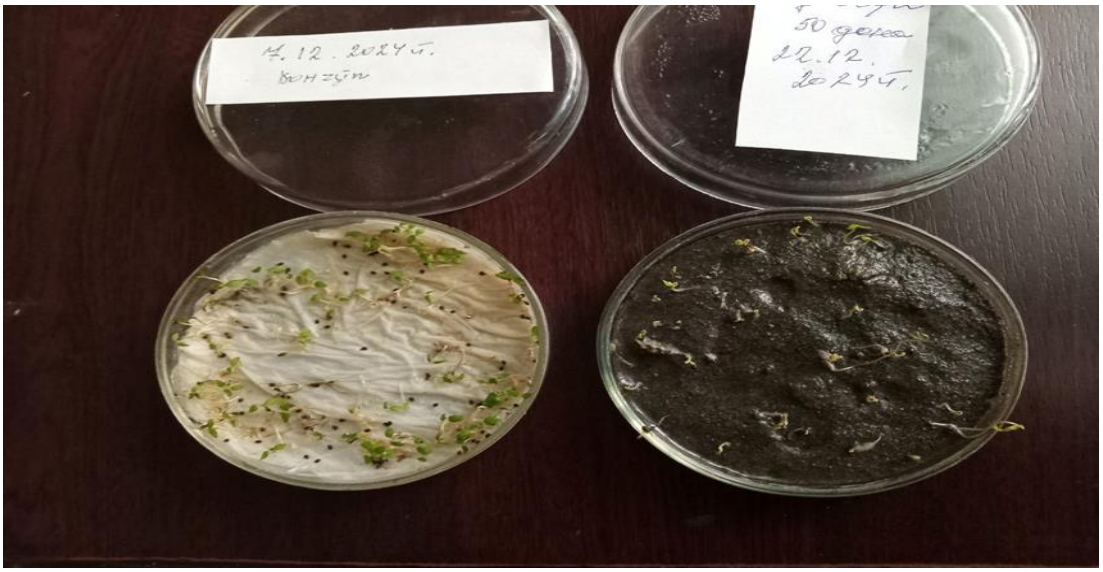

Figure 1. Seed germination under laboratory conditions.

Initial data showed 60% germination within 12 days at 23°C. Total germination reached 70% after 30 days. Seeds germinated slowly at 20-22°C, requiring 39 days for completion, but achieved a high germination rate (91.4%).

In the second variant, seeds were germinated at 25-30°C on river sand. Germination started on January 12, 2025, and by January 15, 2025, most seeds had germinated, with an average germination rate of 93%.

Table 2. Laboratory Germination of Greater Celandine Seeds (25-30°C)

#	Seeds Sown	Sowing Date	Germination Date	Germinated Seeds	Duration (days)	Germination (%), M±m
1	50	22.12.2024	15.01.2025	48	24	93.0
2	50	22.12.2024	15.01.2025	42	24	93.0
3	50	22.12.2024	15.01.2025	46	24	93.0
4	50	22.12.2024	15.01.2025	50	24	93.0
					Average: 46.5±1.7	

Figure 2. Seed germination under different laboratory conditions.

River sand provided better conditions for germination due to stable moisture and temperature.

Field Germination

Field germination was studied by sowing seeds in January, February, and March. Seedlings emerged in mid-April, regardless of the sowing date, and were counted by the end of April.

Table 3. Field Germination of Greater Celandine Seeds

Sowing Date	Seeds Sown	Seedlings Emerged	Germination (%)
January	100	24.5±3.2	24.5
February	100	19.2±1.4	19.2
March	100	17.7±0.9	17.7

Figure 3. Field germination progress until August.

Field germination was relatively low (17.7-24.5%), influenced by the seeds' anatomical structure and variable environmental factors.

CONCLUSION

Greater Celandine can produce high-quality seeds under Samarkand's soil and climatic conditions. Laboratory germination reached 91-93%, while field germination ranged from 17-24%, depending on environmental factors. The optimal germination temperature in laboratory conditions is 25-30°C, and January is the most suitable sowing month.

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