SEED GERMINATION OF EPHEDRA EQUISETINA L.: PROBLEMS AND SOLUTIONS

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ABSTRACT

This article discusses the germination rate of seeds of Ephedra equisetina L., a medicinal plant found in Central Asia, factors affecting it, and methods for increasing germination. The results of the study are analyzed based on previous experiments and foreign literature.

Introduction

Ephedra equisetina L. is a semi-shrub plant belonging to the Ephedraceae family, rich in medicinal substances. It has been used in folk medicine and the pharmaceutical industry for a long time. Evergreen, branched semi-shrub.

Height: Grows up to 30–60 cm.

Stem: Green, jointed, photosynthetic, in the form of needle-like branches.

Leaves: Very small, attached to the stem, more rudimentary in appearance.

Flowers: Hermaphrodite (male and female plants separate).

Fruit: A covered, fleshy or dry achene; seeded, one, sometimes two. In Uzbekistan and other Central Asian countries, it is important as a source of alkaloids such as ephedrine and pseudoephedrine. However, its seed reproduction rate is very low, making it difficult to cultivate artificially.

Factors affecting seed germination

Under natural conditions, the germination of Ephedra equisetina seeds is around 20–40%. Low germination is explained by the following factors:

- Hardness of the seed coat: makes it difficult for water to pass through.
- Rapid death: seeds lose their germination ability within 6–12 months.
- Cold and dry climatic conditions: an environment unsuitable for germination in their natural habitat. [1]

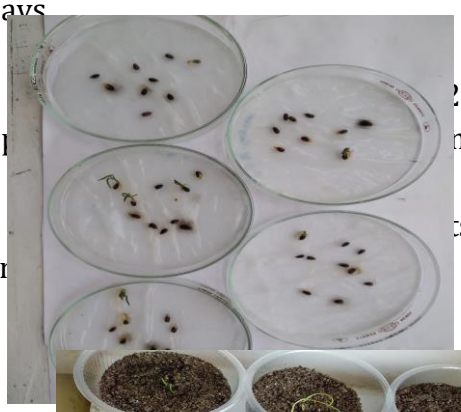
Increasing germination

Mechanical and chemical scarification

Viability is increased by mechanical scratching of the seed coat or by treating it with 50% sulfuric acid for 10–15 minutes.

Stratification

Germination is improved by storing the seeds in a humid environment at 4 °C for 30–60 days



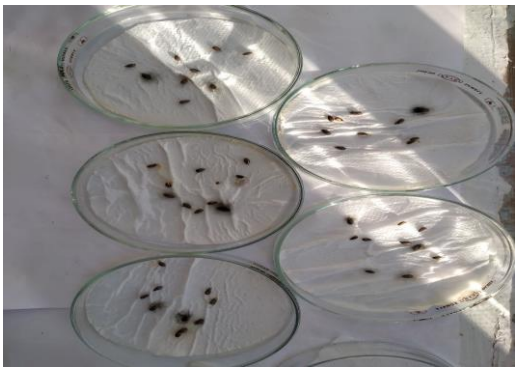
24-hour treatment with GA_3 at a concentration of 250–500 pp
n by up to 90% (in the case of Ephedra sinica).

ts have shown germination rates that are no less than those gr

Results of the experiment:

The washed petri dishes are taken out, wiped dry with a soft cloth. The mass and quantity of the collected seeds of Ephedra equisitina L. are gradually placed in petri dishes. Water is poured for germination and the process is observed by placing them in a place where sunlight does not fall directly. It is controlled that the seeds do not dry out or freeze due to excess water. The seeds begin to germinate within 5-7 days. Since 10 plant seeds are sown in each petri dish, we monitor and monitor them until they all germinate. After the seeds germinate, we carefully transplant them into the soil in the cups without damaging their roots and buds. The soil contains a mixture of humus and coconut chips. This mixture is necessary for the good development of the plant. The plant continues to grow in the cups. We observe how long its leaves grow and how long its stem develops. I took care of them in these pots until the root system developed and the plant reached a height of 12-15 cm. Then I planted them in soil so that the roots and stem of the plant could develop further.

Seeds planted in Petri dishes



Seeds that have begun to germinate.

Ephedra equisitina L. plant sprouts.

Seed germination is the process of the seed emerging from its dormant state and entering active growth. In this process, the embryo inside the seed awakens, the root (radicle) begins to emerge, and plant life begins.

The stages of seed germination are as follows:

Imbibition:

Water is absorbed through the seed coat. At this stage, the seed swells and metabolic processes begin.

Activity stage:

Enzymes are activated, and reserve nutrients (protein, starch, fat) begin to break down.

Root emergence:

The radicle (root) is the first to emerge from the seed coat and penetrate the soil.

Shoot and seedling emergence:

The shoot leaves or true leaves emerge from the soil surface.

Factors affecting germination:

Internal factors: seed age, shell thickness, physiological maturity.

External factors: water, temperature, light, oxygen, and soil conditions.

Embryo awakening

After the seed absorbs liquid, the embryo (seed bud) inside the seed enters a state of active metabolism. Energy production accelerates and cells begin to divide.

Development of the radicle

The radicle (root) located at the bottom of the embryo is the first to begin growing and penetrates the soil. Through this, the plant is provided with water and nutrients.

Stem and cotyledon movement

After the radicle, the hypocotyl (the part of the stem under the root) grows and breaks through the seed coat. Along with it, the cotyledons (cotyledons) emerge.

In monocots (monocots) - usually one cotyledon

In dicots (dicots) - two cotyledons develop

True leaves and the growth point enters an active state

After the cotyledons, true leaves (leaves outside the embryo) emerge. The growth point (meristem) becomes active, and the plant begins vegetative development.

The plant becomes independent

When the cotyledons have exhausted their reserves, they dry up. The plant now lives independently through photosynthesis and nutrition. [3].

Conclusion

Despite the low natural germination of Ephedra equisetina seeds, this indicator can be significantly increased with the use of appropriate processing technologies. This is of great importance for artificial propagation of the plant and stabilization of the source of medicinal raw materials.

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