NIGELLA DAMASCENA AS AN OBJECT OF BIOTECHNOLOGICAL RESEARCH

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Abstract. One of the biotechnology directions is in vitro culture, actively used in the area of medicine and pharmacy. As a result of the research, the peculiarities of Nigella damascena introduction into the culture in vitro have been studied. Also, the optimal conditions for cultivation were selected, and the callus-like biomass of the Nigella damascena was obtained.

Keywords: *Nigella damascena, in vitro,* medicinal plant raw material, callus-like biomass.

Introduction

Modern biotechnology is a combination of technologies, involving the use of biological processes of living cells in order to obtain valuable biologically active substances. Therefore, we have paid our attention to ***Nigella damascena***, which has a unique chemical composition and shows high pharmacological activity.

Studies in the 1990s of the 20th century have shown that plant oil greatly enhances human immunity and also has a strong antibacterial effect. The antibacterial property of ***Nigella damascena*** oil has shown high activity even against such bacteria as *V. cholera* and *E. coli*.

In addition, the seed contains an extremely important component - crystalline nigelone, as well as: 15 amino acids, 8 of which are essential; essential oils; alkaloids; saponin; proteins; cellulose; mineral salts (Ca, K, Fe, Mg, Se, Zn); vitamins A, B1, B2, C; about 45% of fatty oil, which contains 84% unsaturated fatty acids (of which 50-60% of linoleic acid and 20% of oleic acid) [2,3].

The aim of the research

Getting *Nigella damascena* callus-like biomass using the biotechnological method of tissues and cells culture *in vitro*.

Materials and methods of the research

The subject of the research was chosen the seeds of *Nigella damascena*.

For accelerated getting plants from seeds, the stratification with subsequent sterilization of seeds had been carried out. Stratification was carried out by soaking seeds in water for 24 hours. The sterilization was carried out with 70% ethanol for 10 minutes and 30% hydrogen peroxide for 10 minutes, followed by 3-time flushing of the seeds with sterile distilled water.

For cultivation of the plant seedling, we used the non-hormonal agar nutritional Murashige and Skoog medium and the hormone agar nutritional Murashige and Skoog medium to produce callus-like biomass [1,4].

Results of the research

The seeds, prepared with stratification and sterilization, were introduced into a sterile agar nutritional Murashige and Skoog medium.

The Petri dishes with seeds were placed into the thermostat at 23°C.

When using such a sterilization scheme: 70% ethanol - 10 minutes → 30% hydrogen peroxide - 10 minutes → 3-time washings with sterile distilled water → we received 99% sterile explants.

During 20 days, there were formed the plants of 5.0-7.0 cm, which we used as explants for further cultivation on agar nutrient Murashige and Skoog medium with growth regulators: 2.0 and 3.0 mg/L of IAA, 0.1; 0.5; 1.0 mg/L of NAA and 0.5 mg/L of kinetin.

The best results were obtained with a modified medium such as 3.0 mg/L of IAA, 1.0 mg/L of NAA and 0.5 mg/L of kinetin.

Cultivations were carried out: with photoperiod 16/8 h (light/ darkness), illumination 3000 lux, t 26°C (± 2-3°C), relative humidity 60-70%. After 60 days, the callus-like biomass of *Nigella damascena* was obtained.

Conclusions

The cultivation of ***Nigella damascena*** by tissue and cell culture ***in vitro*** had been carried out.

The optimal conditions for cultivation have been selected and it has been determined that explants form a callus on the Murashige and Skoog medium with the addition of growth regulators, namely: kinetin; benzylaminopurine; indoleacetic acid; 2,4-dichlorophenoxyacetic acid and 1-Naphthaleneacetic acid with a certain concentration and ratio.

In the future, the research and comparison of the obtained callus with the biomass of natural plant will be conducted.

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