



SCO-Young Scientist Profile

First Name: Natalia

Last Name: Semenova

Designation

& affiliation: Senior Researcher, Laboratory for Research of Technological Properties of Agricultural Materials of the Federal Scientific Agroengineering Center VIM, PhD in Agricultural Sciences (2016).

Phone Number: +79267830374

E-mail: natalia.86@inbox.ru



Details of research work carried out in S&T

The de-etiolation of plant is controlled by a complex system of light and hormonal signaling. This process is accompanied by the development of chloroplasts and the initiation of chlorophyll biosynthesis, which leads to greening of the leaf apparatus. Ambient light has profound effects on plant de-etiolation through red and far-red light-absorbing phytochromes and blue and UV-A light-absorbing cryptochromes.

In The Agroengineering Centre VIM has developed LED lamps with an adjustable spectral composition of light. The use of such lamps will make it possible to regulate the illumination spectrum by phase depending on the stage of clonal micropropagation, will allow to influence the hormonal composition of plants and their photosynthetic activity, will make it possible to use the effect of etiolation and leveling its negative effect.

We plan to create a universal light room with separate shelves for the phased cultivation of honeysuckle plants with controlled light conditions that will be able to change depending on the needs of microplants (etiolation, de-etiolation, restoration and enhancement of photosynthetic activity). As a result, we plan to get a smart accelerated technology for blue honeysuckle growing.

Associated SCO-YSC Theme: Biotechnology and bioengineering

Statement of Innovation

According to the reported data, blue honeysuckle berries are rich in phenolic compounds, among phenolics acting as antioxidants, anthocyanins are particularly important. Their antimicrobial, anti-inflammatory, anti-atherosclerotic, and anticarcinogenic activities, demonstrated in in vitro and some in vivo tests. Due to the high content of bioactive substances and their health-promoting properties, blue honeysuckle berries can be regarded and recommended as a valuable component of a modern functional diet.

Shanghai Cooperation Organization- 1st Young Scientists Conclave (SCO-YSC 2020)
A virtual event organised in India at CSIR-IICT, Hyderabad
Theme: Shaping SCO-STI Partnership: Young Scientists Perspectives

However, the blue honeysuckle culture is not widely popular due to the limited cultivation area and the unsuitability of most varieties for mechanized harvesting. The improved varieties that have appeared that meet modern requirements require accelerated distribution and the development of technologies for their in vitro cultivation.

The development of lighting systems using LEDs is quite popular today. The ability to control the spectrum allows to regulate the state of plants and their development. Such technologies for honeysuckle tissue culture don't exist yet, so we decided to start developing it.

Major awards/ Achievements

1. International scientific conference "Biologically active substances of plants -study and use", Minsk, Belarus, May 29-31, 2013;
2. II International Symposium "Innovations in Life Sciences", May 9-20, 2020, Belgorod State National Research University (NRU "BelGU"), Belgorod;
3. XVII-th International Youth Scientific and Environmental Forum of Baltic Region Countries «ECOBALTICA». 16-17 July 2020, St. Petersburg

Possible collaboration with SCO countries

We plan to establish cooperation with scientific institutions of Kazakhstan, Tajikistan, Uzbekistan and China to popularize the culture of honeysuckle and conduct joint research to obtain automated complexes for growing planting material of this valuable crop.

We plan to cooperate with our Chinese colleagues to resolve issues related to expanding the technical spectral capabilities of our luminaire (regulation of the ultraviolet range, the use of laser LEDs).

We also plan to adopt the experience of our Indian colleagues in the field of improving technologies for clonal propagation of berry crops and look forward to conducting joint projects.

Key words

Honeysuckle, etiolation, multiplication, rooting, introduction into in vitro culture, illumination spectra, LED irradiators, de-etiolation