

## Growth regulators effect on SOD isoenzymes of narrow-leaved lupin (*Lupinus angustifolius L.*) *in vitro*

© Anastasia A. Balakina,<sup>1</sup> Alexey A. Terentiev,<sup>1</sup>

Elena A. Kalashnikova,<sup>2+</sup> and Sergey L. Belopukhov<sup>2\*</sup>

<sup>1</sup>Laboratory of Molecular Biology. Institute of Problems of Chemical Physics RAS.

Prospect Ak. Semenova, 1. Chernogolovka, 142432. MD. Russia.

Phone: +7 (496) 522-77-79. E-mail: stasya.balakina@gmail.com

<sup>2</sup>Department of Genetics and Biotechnology. Russian State Agrarian University – MTAA named after K.A. Timiryazev. Timiryazevskaya St., 49. Moscow, 127550. Russia.

Phone: +7 (495) 976-40-72. E-mail: kalashnikova@timacad.ru

\*Supervising author; +Corresponding author

**Keywords:** narrow-leaved lupin, growth regulators, superoxide dismutase (SOD), *in vitro*.

### Abstract

The effect of growth regulators on SOD isoenzymes of narrow-leaved lupin *in vitro* is discussed. Some differences of isoenzymes and SOD activity in microshoots cultured with 6-BAP and IBA were shown by electrophoretic analysis. Three SOD isoenzymes were revealed to be active only in the case of IBA application. The high Mn-SOD activity was observed under stress conditions *in vitro* in conjunction with the presence of growth regulators. The differences in SOD isoenzymes activity are likely to depend on morphogenesis processes and photosynthesis activity in plants exposed to growth regulators.