



International Agrophysics

publisher: Institute of Agrophysics  
Polish Academy of Sciences  
Lublin, Poland

ISSN: 0236-8722

vol. 22, nr. 3 (2008)

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Concentration of free radicals in faba bean seeds after the pre-sowing treatment of the seeds with laser light

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vol. 15 (2001), nr. 3, pp. 185-189

abstract Science and Plant Cultivation in Puławy, the Agricultural University and University of Maria Curie-Skłodowska in Lublin. The first row factor were three morphologically differentiated white lupine varieties: Nadwiślański (traditional form) and Tim (determined form), and the second one doses of laser irradiation: D0 without irradiation, D1 single fold irradiation, D2 double irradiation, D3 three fold irradiation, D4 four fold irradiation, D5 five fold irradiation. Single exposition was equal to  $4 \cdot 10^{-3} \text{ J cm}^{-2} \text{ s}^{-1}$ . Irradiation of double have been carried out at the Physics Department of the Agricultural University in Lublin, using a device for the laser irradiation of seed prior to sowing. The irradiated seeds of both faba bean forms gave a faster uptake of water and achieved a larger mass during seed imbibing in comparison to seeds without irradiation. It was found that the earlier and steadier emergence of these plants was a consequence of this process. Faba bean seedlings which were grown from irradiated seeds achieved, in the succeeding measurement dates, significantly larger coleoptile and root length in comparison to those seedlings which had not been so irradiated by laser light. A significant increase was observed in the concentration of free radicals in those seeds which were treated, before sowing, with laser light. The largest increase in the number of free radicals in the seed of both faba bean varieties was found after three and four fold seed irradiation. There was no significant effect of examined varieties in seed irradiation on free radical concentration in the young faba bean plant organs. The number of free radicals in the leaves, stems and roots did not differ significantly from that found in the particular organs of plant grown from non-irradiated seeds. Laboratory research did not show any increase in the number of free radicals in seeds harvested from plants grown from irradiated seeds.

keywords laser bio-stimulation of seeds, faba bean, free radicals, Electron Paramagnetic Resonance