Serbian Plant Physiology Society

Institute for Biological Research „Siniša Stanković", University of Belgrade

1st International Conference on Plant Biology

20th Symposium of the Serbian Plant Physiology Society

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results showed that all tested parameters have the lowest values in control medium that did not contain mineral elements: leaf area was 30 cm^2, leaf weight 0.1 g, leaf thickness 103 µm, mesophyll thickness 82 µm and nitrogen content was 2.3%. On the medium that it contained only nitrogen, values for all leaf parameters were significantly increased. So, leaf area of wheat was 49 cm^2, leaf weight was 0.2 g, leaf thickness 118 µm, mesophyll thickness 92 µm and nitrogen content of the leaf was 2. 9%. Adding phosphorus and potassium in the medium in combination with nitrogen had however, a positive effect on some parameters and some negative. In fact, on this medium obtained higher values of leaf area (51 cm^2), and nitrogen content (3%) compared to the medium with nitrogen. Values for leaf thickness and mesophyll were lower (108 µm and 80 µm), while the weight of the leaf remained the same as in medium with nitrogen (0.2 g).

The effects of atmospheric pressure plasma on somatic embryogenesis of carrot (*Daucus carrota*)

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The effects of atmospheric pressure plasmas on living cells and tissues have been studied on numerous occasions in recent literature. It appears that plasma treatment may find many biomedical applications. There are many types of plasmas that can be generated under ambient pressure and temperature conditions. Plasma needle is one of the atmospheric pressure devices that meet the requirements of precise and localized treatment necessary for treatment of plant cells.

We have investigated the effect of atmospheric pressure plasma generated by plasma needle device, under ambient pressure and temperature conditions, on carrot somatic embryogenesis. The embryogenic calli cultures of carrot (*Daucus carrota*) were established from storage root explants and maintained on Murashige and Skoog medium (MS) supplemented with 2,4-dichlorphenoxyacetic acid (2,4-D, 1.0 mg L^{-1}) and cultured in dark. Calli samples (10-30 mg) were placed in 96 wells micro-titer plate before the tip of the plasma needle was placed at the edge of the well when plasma was covering whole surface of the samples. The treatment times were 10, 30, 60 and 120 s at two powers, namely 0.4 W and 1.4 W. After plasma treatment, calli samples were cultured on basal MS medium without plant growth regulators or on MS medium supplemented with 2,4-D or 2,4-D and kinetin (1.0 mg L^{-1}, each) and cultured in dark for six weeks. Calli number, fresh weight increase and developmental stage of formed somatic embryos were estimated. It was shown that plasma treatment notably stimulated growth and somatic embryo formation of calli cultured on basal MS medium. The highest fresh weight increase (~40 fold) was observed after 30 s of plasma needle treatment at 0.4 W. The number and developmental stage of formed somatic embryos depended on duration and power of plasma treatment, as well as the type of culture media. The highest number of somatic embryos was observed when calli samples were grown on basal MS medium after 60 s of plasma treatment at 1.4 W. Furthermore, plasma treatment significantly increased the number of formed somatic embryos on MS media supplemented with plant growth regulators. Our results show that plasma strongly affects growth and somatic embryo formation and development of carrot calli.

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