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Specific action of bacterial lipopolysaccharide on the embryogenic ability of wheat calli in in vitro culture.

A comparative study on the effect of lipopolysaccharide (LPS) of the associative, plant-growth-promoting bacterial strains *Azospirillum brasilense* Sp245 and enterobacteria *Escherichia coli* K12 on the morphology of somatic calli of spring wheat was conducted *in vitro*. For this purpose, we used a genetic model including two near-isogenic lines of the wheat cultivar Saratovskaya 29 that differed in the *RhtB1c* gene and had contrasting embryogenic capacity. Calli were obtained on Linsmaier-Skoog medium with 2 mg/L of 2,4-dichlorophenoxyacetic acid (2,4-D) from immature (14-day old) wheat germ. In the experimental treatments, the standard medium, after being autoclaved, received 10 μg/mL of LPS, isolated from the bacterial outer membrane. The resulting calli were transplanted on a regeneration medium of the same composition without 2,4-D, but containing kinetin and indoleacetic acid in the amount 0.5 mg/L.

In preliminary studies, we found that LPS bacteria *A. brasilense* Sp245 in a concentration of 10 μg/mL stimulated the secondary processes of differentiation and regeneration capacity of wheat callus cells, thus increasing the efficiency of this genotype's low embryogenic potential (Tkachenko et al. 2012; 2013). We confirmed that the introduction of LPS *A. brasilense* Sp245 in to the medium increased calli formation with effecting meristematic activity and the regenerative capacity of cultured tissues. The introduction of bacterial LPS *E. coli* K12 to the nutrient medium did not cause similar effects. Yield of morphogenic calli and regenerated plants in the presence of the LPS did not differ from those of the control.

Based on our data, the LPS of the associative bacterium *A. brasilense* Sp245 has physiological activity against wheat callus cells unlike the LPS from *E. coli* K12. We note that these results are consistent with those obtained earlier when LPS and the bacteria *A. brasilense* Sp245 and *E. coli* K12 were exposed to the root system of wheat seedlings in *in vivo* experiments (Evseeva et al. 2011). Perhaps this difference is determined by the specificity of the mechanisms of action of LPS associative bacteria.

References.

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