Current Topics in Biophysics (Zagadnienia Biofizyki Współczesnej) vol. 22 (2), 1998, 49-56

The effect of selected chemical factors that influence the ability of wheat callus to differentiation on physico-chemical properties of cell membranes. I. Changes in the composition of lipids and their fatty acids

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Interaction between factors, modifying basic Murashige and Skoog nutrient (2,4-D, Ca^{2+}, sucrose and inositol) – and their influence on lipids and fatty acids composition during callus growth process was investigated. Examined modificators influenced the process of callus differentiation: calcium ions stimulated callus differentiation, 2,4-D radically prevented it, inositol increased it to a little extent and the optimal sucrose concentration was about 200% of control content. Gradual process of tissue differentiation was accompanied with almost 2 times drop in total lipid content. Contrary to 2,4-D that radically prevented the drop in lipid content (so characteristic for control) during callus differentiation, Ca^{2+} ions did not cause any significant changes. Inositol addition slowed down the decrease in lipid amount in the case of older tissues, which similar in case of sucrose. Phospholipid (PL) and galactolipid (MGDG) fraction content was increasing in older (more differentiated) callus. During callus growth, we observed unsaturated fatty acids increase in both PL and MGDG fractions, specifically 18:3. In fact, it was the reason for 18:3/18:2 ratio increase of value. This ratio seems to have a positive correlation with morphogenetic tissues abilities. Fatty acids content in summary PL and MGDG fractions was investigated in two callus tissues types, after 6 weeks culture: gelateous, undifferentiated and differentiated with green centres. The second type of callus (containing green centres of differentiation) always exhibited bigger fatty acids unsaturation measured by 18:3/18:2 ratio. We can confirm the fact that biochemical callus content may be an indicator of its ability to differentiate but can only be used as a comparative indicator.