

Biotechnology *in vitro* and Plant Biological Resources

Natalia ZAGOSKINA, Tatyana NECHAEVA, Evgenia GONCHARUK, Tatiana NIKOLAEVA,
Vera KATANSKAYA, Petr LAPSHIN

Timiryazev Institute of Plant Physiology Russian Academy of Sciences, Russia
biophenol@gmail.com

Aim of the study: Biotechnological methods are widely used in practice. Plant cell and tissue cultures are important as promising sources of various pharmacological compounds, including polyphenols. These substances of secondary metabolism exhibit antioxidant, strengthen, antitumor and other types of biological activity.

Material and Methods: Various phenylpropanoids (ferulic acid, caffeic acid, p-coumaric acid, vanillic acid and others), flavonoids (catechins, anthocyanins, isoflavones, flavonols, flavones, anthroquinones), as well as proanthocyanidins and lignin are synthesized in plant cell cultures. Sometimes in cell cultures were carried out by the biosynthesis of phenolic compounds is not specific to plants. There were changes in the content and composition of these substances compared with plant tissues. Suppose that these changes are attributable to cell dedifferentiation, in particular the absence of chloroplasts (when grown in the dark) or their low photosynthetic activity. Changing the composition of the nutrient medium (carbohydrates, hormones, macro- and microelements), as well as cultivation conditions (light, darkness), it was possible to obtain cell cultures where the content of specific phenolic compounds remained at the level of the intact plant or even exceeded it. The level of phenolic compounds is also associated with the growth of cell cultures.

Results: In this case, both a direct and an inverse correlation between the growth and formation of polyphenols are observed. All this testifies to the great specificity of individual strains of cell cultures and tissues of higher plants with respect to the synthesis of phenolic compounds. The use of various biotechnological approaches allows to regulate the accumulation of these biological active substances in plant cell cultures.

Keywords: Biotechnology, plant cell cultures, phenolics, regulation.