ABSTRACT

Secondary metabolite production in explantate cultures of St. John's Wort

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Key words: St. John's Wort, elicitation, flavonoids, hydrogen peroxide, glutathion, neutral red.

The goal of the diploma thesis was to influence the production of secondary metabolites (flavonoids) in explantate cultures of St. John´s Wort. Method of elicitation was used. This method is based on adding of an elicitor (stressor) to the tissue culture. Suspensional and callus cultures of *Hypericum Perforatum* L. were used for experiments with potential elicitors: hydrogen peroxide, combination of hydrogen peroxide and Mg-ATP, glutathion and cellular pigment neutral red. Their effect to the production of flavonoids was evaluated after 4 and 24 hours. Cultures were cultivated on Murashige and Skoog medium with the addition of a growth hormone BAP and a growth stimulator α-NAO. HPLC method was used for analysis of the samples.

Hydrogen peroxide raised the production of flavonoids, especially in suspensional cultures, in callus cultures the highest influence had glutathion (reduced form) and neutral red. The highest production of flavonoids was reached after 24 hours by addition of hydrogen peroxide in concentration 100 mg/l, the level of hyperosid in suspensional culture had raised almost three times in comparison with the control cultures (from 0,024% to 0,071%). Hydrogen peroxide in a combination with Mg-ATP had also raised the production of quercetin. The highest increase of flavonoids in callus cultures was reached after 4 hours by addition of neutral red in concentration 0,1 mg/l. The level of hyperosid had increased more than two times in comparison with control cultures (from 0,015% to 0,032%).

Explantate cultures react to the addition of potentional elicitors by raising the production of flavonoids. It is the consequence of the defensive reaction of tissue culture to the stressful impulse.