

7. SUMMARY

This doctoral thesis is concerned with the affection of flavonoid production in explantate cultures of *Scutellaria baicalensis* Georgii. Results can be resumed in the following way:

- pharmacological-toxicological studies of this drug and its flavonoids were reported in theoretical part of this work. The results confirm the validity of traditional use and at the same time indicate that some flavonoids have got more utilizable therapeutic effects. Mainly the baicalein seems to be perspective medicine for treatment some kinds of cancer.
- The callus culture of *S. baicalensis* was established and suspension and root cultures were derived from this culture.
- New HPLC method for quantification of baicalin and baicalein was developed.
- The effect of four phytohormones (kinetin, BAP, NAA and 2,4-D) on the growth and flavonoid content in *S. baicalensis* Georgii callus culture was studied. Addition of NAA has the highest positive effect. On the other side, BAP and kinetin decelerate growth, decrease the flavonoid content and at the same time induce formation of roots.
- The influence of irradiation length on the accumulation of baicalein and baicalin by *S. baicalensis* Georgii callus and root cultures was studied. The maximum of flavonoid content was accomplished in continuous darkness, but the growth was decelerated. We also reported micro- and macroscopic changes of callus cultures exposed

to continuous light caused by anthocyanin biosynthesis in superficial cells.

- The amount of baicalin and baicalein after feeding of five potential biosynthetic precursors (L-phenylalanine, cinnamic acid, cinnamic acid sodium salt, malonic acid and malonic acid sodium salt) was measured. Flavonoid biosynthesis was most stimulated by the addition of cinnamic acid sodium salt (5 mg.l⁻¹). Feeding with malonic acid, malonic acid sodium salt and L-phenylalanine did not caused changes in amounts of flavonoids in cell cultures as well as biomass production was not affected.
- Elicitation with methylene blue, hydrogen peroxide and copper acetate caused the changes in the amounts of baicalin and baicalein. Maximum increase of baicalin content was observed after application of methylene blue in concentration 10 mg.l⁻¹ (0.1 mg.l⁻¹ in the case of baicalein).
- Mixing and aeration were recognized as key factors for cultivation of *S. baicalensis* suspension cultures in bioreactor. Maximum biomass production was achieved at 150 rpm and 0.6 l.min⁻¹ (air). Also the addition of Pluronic F68 in concentration of 2 g.l⁻¹ showed positive effect on the biomass production.
- In conjunction with department of biochemistry was found that baicalin and baicalein rapidly decreased activity of aspartate aminotransferase in all concentrations used.¹⁷⁾