

Rutin production in hairy root cultures of buckwheat (*Fagopyrum esculentum* Moench)

Sang-Un Park^{1,*}, Yeon-Bok Kim² and Cheol-Ho Park²

¹Department of Biological Sciences, University of Calgary, Calgary, Alberta T2N 1N4, Canada,
²College of Agriculture and Life Sciences, Kangwon National University, Chunchon, 200-701, Korea

We established hairy root cultures of *F. esculentum* transformed with *A. rhizogenes* for in vitro rutin production. Additionally, we describe the effects of different media and plant growth regulators on growth and rutin biosynthesis in buckwheat hairy root cultures.

Excised leaves of *P. tinctorium* from 10-day-old seedlings were used as the explant material for co-cultivation with *A. rhizogenes* 15834.

The hairy culture of *Fagopyrum esculentum* Moench. was established by infecting leaf explants with *Agrobacterium rhizogenes* 15834. About four to five weeks after co-cultivation with *A. rhizogenes*, 10 hairy roots were excised from the necrotic explant tissues. After repeated transfer to fresh medium for three months, ten clones were transferred to MS liquid culture medium. The growth and rutin production of each clone differently response to the MS liquid medium. Among these clones, H8, which had exhibited good growth rate and one of the highest rutin productivity, was selected for the following experiment.

In a further experiment, the time-course of growth and rutin production in MS medium was studied. During a 40 day culture period, the dry weight of the hairy root clone H8 increased from the original inoculum of 12mg to reach 312mg. The maximum growth was already reached by 30 days of culture with highest content of rutin (1.4 mg).

The hairy root clone H8 were cultured in different growth media for 30 days, and examined for the growth and rutin production. The media tested were MS and B 5 basal medium at half and full strength. Hairy roots grown in half strength MS medium had the highest levels of growth (378 mg dry wt / 30 ml) and rutin production (1.6 mg). The half and full strength B5 medium was less effective on the growth and rutin production, as was MS medium.

Auxin treatments increased the growth rate of hairy roots but had no significant effect on rutin production in these experiments. Overall, these results show that the optimum producing condition of rutin in hairy root cultures of *Fagopyrum esculentum* by flask culture system.