

# Bag Culture: A Method for Root-Root Co-Culture

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A method named “bag culture” was developed for co-culturing of *Linum persicum* (section *Syllinum*) and *L. austriacum* (section *Linum*) hairy roots. For this propose *L. austriacum* and *L. persicum* hairy root cultures were established using *Agrobacterium rhizogenes* in McCown medium. *L. persicum* hairy roots in bags (1 mm<sup>2</sup> mesh) were successfully grown together with *L. austriacum* hairy roots. The amounts of podophyllotoxin (PTOX) and 6-methoxypodophyllotoxin (MPTOX) produced by *L. persicum* hairy root cultures were detected using HPLC. The results indicated that the amounts of both lignans and growth indexes of the two hairy roots decreased, that may be partly due to a competition between the two types of culture in using precursors of biosynthetic metabolites and the amount of culture medium which is available for each hairy root. However, MPTOX (0.17 g/100 g DW) and PTOX (0.02 g/100 g DW) levels of the *L. persicum* single culture in bag were significantly higher than of the other cultures which may be due to the immobilization effect of the bag.

**Key words:** Co-Culture, *Linum persicum*, *Linum austriacum*, Hairy Root Cultures