Tolerance of Norway spruce (Picea abies [L.] Karst.) embryogenic tissue to penicillin, carbapenem and aminoglycoside antibiotics

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Somatic embryogenesis is conveniently utilized for the preparation of Norway spruce (Picea abies [L.] Karst.) transgenic clones by means of Agrobacterium. The establishment of successful transformation protocol requires to determine the tolerance of growing embryogenic tissue to antibiotics in culture and selective media. In 5 Norway spruce lines (genotypes) differences in the tolerance of embryogenic tissues to penicillin antibiotics (amoxicillin, carbenicillin, and ticarcillin), carbapenem antibiotic (meropenem) used for the Agrobacterium growth prevention, and aminoglycoside antibiotic (kanamycin) used in selective media were determined. Of the penicillin derivatives, amoxicillin was optimally tolerated in all lines and, in addition, its highest concentration accelerated growth in more rapidly growing lines. Ticarcillin was similarly tolerated but no growth acceleration was observed in any line. As regards carbenicillin, only the lowest concentration was observed to be well tolerated by all lines whereas all concentrations of meropenem were well tolerated in all lines except for slowly growing line 28, the growth of which was retarded by the concentration of 20 mg/l. The aminoglycoside antibiotic kanamycin was well tolerated by the embryonic tissue of all lines in the concentration of 10 mg/l and less in the concentration of 25 mg/l. The concentrations of 50 mg/l and 100 mg/l appeared as intolerable in all lines. Toxicity of kanamycin manifested at first in the browning and later in the growth cessation of embryogenic tissue.

Keywords:

somatic embryogenesis; transformation; penicillin antibiotics; carbapenem antibiotics; aminoglycoside antibiotics; Norway spruce; Agrobacterium tumefaciens

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