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## Drought and salt tolerance by expression of *AtGSK1* gene in poplar

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### Objectives

To determine drought and salt tolerance of transgenic poplars carrying 35S-*AtGSK1*

### Materials and Methods

#### 1. Material

Plant : Five lines of transgenic and one untransformed poplars (*Populus alba* x *P. glandulosa*)

#### 2. Methods:

• Salt tolerance assay: Stem and leaf fragments were cultured on rooting and callus inducing media containing various concentrations (0, 50, 100, 150mM) of NaCl. Cell growth, rooting rate and fresh weight were measured after 4 week growth.

• Drought tolerance assay: One transgenic line (KN8) and untransformed control plants were subjected to drought treatment by withholding irrigation for 13 days. Reference plants were irrigated at 3 to 4 day interval. SOD activity, photosynthesis rate and Dry weight growth at the end of 13 day were measured.

### Results and Discussion

#### Salt resistance test

Two transgenic lines (KN 5 and 6) rooted well in the presence of 150mM NaCl. In contrast, two transgenic lines (KN8 and KN 14) and non-transformed control plants did not root at the same conditions. As for callus growth in the presence of 100mM NaCl, the lines KN5, 6 and 8 showed about 30% growth reduction when compared with the callus grown in the absence of NaCl. At the same level of NaCl, both non-transformed control and transgenic line (KN 14) showed 78 and 75.2% growth reduction, respectively.

#### Drought tolerance test

After 13 day drought treatment, control plants severely wilted. In contrast, transgenic line (KN 8) did not show wilting symptoms. SOD activity showed that transgenic line had higher enzyme activity than did control (516 unit/g vs. 551 unit/g). Whereas the photosynthesis rate in non-transformed plants were reduced to 58.4% level when compared with untreated plants, that in transgenic line was reduced to 87.4%, suggesting that the transgenic line was affected much less by drought condition than did control plants. However, there was no significant difference in dry weight growth between transgenic and non-transgenic plants, possibly due to short experimental period.

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