The effect of magnetic field strength on shoot regeneration and *Agrobacteium tumefaciens*-mediated gene transfer in flax (*Linum usitatissimum* L.)

Murat Aycan, Mustafa Kayan*, Fatma Eda Vuran, Ramazan Beyaz, Mustafa Yildiz

Ankara University, School of Natural and Applied Sciences, Department of Field Crops, Ankara, Turkey

E-mail address: drmurataycan@hotmail.com (M. Kayan).

This study was conducted to determine the effects of magnetic field strength on shoot regeneration and *Agrobacterium tumefaciens*-mediated gene transfer in flax (*Linum usitatissimum* L.). Seeds of flax cv. 'Madaras' were obtained from "Northern Crop Science Laboratories", North Dakota, U.S.A. Firstly, seeds were exposed to different magnetic field strengths (0-control, 75, 150 and 300 mT) for 24 h. Then, they were surface sterilized with 40% commercial bleach containing 5% sodium hypochlorite at 10 °C for 12 min with continuous stirring and they were washed three times with sterile distilled water at the same temperature. Sterilized seeds were germinated on MS medium in Magenta vessels. Hypocotyl explants excised from 7-day-old seedlings were used for regeneration. GV2260 line of *Agrobacterium tumefaciens* having 'pBIN 19' plasmid containing GUS reporter gene and *npt-II* gene which determines kanamycin resistance was used in transformation studies. Hypocotyls were kept in petri dishes containing 50 ml steril water with 500 μl bacterial solution during 20 min for inoculation. Inoculated hypocotyls were then cultured on MS medium containing 50 mg/l kanamycin and 500 mg/l duocid. The presence of the npt-II gene was verified by PCR analysis in candidate plants. The highest results with respect to shoot regeneration and gene transformation frequency were obtained from 75 mT magnetic field strength.

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The effect of magnetic field strength on *Agrobacterium tumefaciens*-mediated gene transfer in Rapeseed (*Brassica napus* L.)

Mustafa Kayan*, Murat Aycan, Fatma Eda Vuran, Emine Selcen Darcin, Semra Mirici, Mustafa Yildiz

Ankara University, School of Natural and Applied Sciences, Department of Field Crops, Ankara, Turkey

E-mail address: mstfkyn26@gmail.com (M. Kayan).

This research was conducted to determine the effects of magnetic field strength on *Agrobacterium tumefaciens*-mediated gene transfer in rapeseed (*Brassica napus* L.). Seeds of rapeseed cv. 'Elvis' were exposed to different magnetic field strengths (0-control, 75, 150 and 300 mT) for 24 h. Then, they were surface sterilized with 40% commercial bleach containing 5% sodium hypochlorite for 12 min with continuous stirring and then were washed three times with sterile distilled water. GV2260 line of *Agrobacterium tumefaciens* having 'pBIN 19' plasmid containing GUS reporter gene and npt-II gene which determines kanamycin resistance was used in transformation studies. After sterilization, seeds were imbibed in 50 ml sterile water containing 500 μl bacterial solution and they were placed in a rotary shaker (180 rpm) for 72 h at 28 °C for inoculation. Inoculated seeds were sown in MS medium containing 50 mg/l kanamycin and 500 mg/l duocid in Magenta vessels for germination and further seedling growth. The presence of the *npt-II* gene was verified by PCR analysis in candidate plants. The results showed that magnetic field strength increased transformation efficiency significantly compared to control application in which no magnetic field strength was applied.

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The effect of cryopreservation on seed germination of the endangered, rare, endemic and medicinal plant *Ferula iliensis* Krasn. ex Korov

Shyryn Almerekova[1], Zinat Mukhitdinova[2], Alibek Ydyrys[1,*], Nashtay Mukhitdinov[1], Meruyert Kurmanbayeva[1], Bekzat Tynybekov[1], Zarina Inelova[1], Aigul Akhmetova[1]

[1] *Al-Farabi Kazakh National University, Faculty of Biology and Biotechnology, Almaty, Kazakhstan*
[2] *Institute of Plant Biology and Biotechnology, Almaty, Kazakhstan*

E-mail address: Ydyrys.alibek@gmail.com (A. Ydyrys).

Cryopreservation is the only technique ensuring the safe and cost-effective long-term conservation of a wide range of plant species. Slow growth storage is routinely used in many laboratories for medium-conservation of numerous plant species. Significant progress has been made for conserving endangered, rare, medicinal species. Seed survival after storage in liquid nitrogen (−196 °C) was examined in endangered medicinal plant *Ferula iliensis* grown in Kazakhstan. The experiment was performed on seed *F.iliensis* collected different populations to compare germination in two variants: (1) control; (2) liquid nitrogen (−196 °C). The results of 7 days showed the seeds germination in liquid nitrogen (24–26%) was higher than compare with control (16–18%). As well as 15 days' cryopreservation this indicator was reached up to 42–48%, were in control variant (28–30%). 60 day frozen seeds germinate good in temperature of 21–230 °C during 40–50 days of germination reached up to 80–90%. The true leaves were appeared after 30 days. The overall conclusion is to initiate and support for conservation, sustainable utilization of medicinal plants. It also promotes the conservation of threatened species of medicinal plants and their habitats for livelihood security through conservation of wild medicinal plants based on sustainable harvesting and by implementing various conservation techniques.

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Experimental study of nanostructured sorption capacity of the sorbent as adsorbent in dressings

Aikerim Yeralkhanova[1], Nurzhanat Ablaikhanova[1], Gulziya Sraylova[2], Zura Esimsiitova[1], Nurzat Ablaikhanova[1,*], Sultan Tuleukhanov[1], Zyfa Askarova[2]

[1] *Al-Farabi Kazakh National University, Almaty, Kazakhstan*
[2] *Institute of Combustion Problems, Almaty, Kazakhstan*

E-mail address: nurzhanat75@mail.ru (N. Ablaikhanova).

The conducted experiments on treatment of wounds on laboratory animals confirmed that the separated liquid of a wound is firmly