

SID



سرویس های ویژه



سرویس ترجمه تخصصی



کارگاه های آموزشی



بلاگ مرکز اطلاعات علمی



سامانه ویراستاری STES



فیلم های آموزشی

کارگاه های آموزشی مرکز اطلاعات علمی



مقاله نویسی علوم انسانی

مقاله نویسی علوم انسانی



اصول تنظیم قراردادها

اصول تنظیم قراردادها



آموزش مهارت های کاربردی در تدوین و چاپ مقاله

آموزش مهارت های کاربردی در تدوین و چاپ مقاله

Effect of Cold Pretreatment and Period of Preconditioning Inoculation on Transformation Frequency in Rapeseed (*Brassica napus* L.)

Kahrizi^{1*}, D., Zebarjadi¹, A. R. and Salmanian², A. H.

Abstract

Genetic engineering in rapeseed will lead to the generation of plant varieties possessing more agriculturally and economically viable genetic traits. The most gene transformations to rapeseed have been done through *Agrobacterium tumefaciens* method. *Agrobacterium* mediated transformation is depend on many parameters that must be optimized. The purpose of this study was to determine the effect of cold pretreatment (control and 12 h) among a 5 day old-plantlets with preconditioning period (0, 24 and 48 h) and inoculation period of explants in *Agrobacterium* solutions (2, 10, 20 and 40 s) on the *gus* reporter gene transformation frequency in Rapeseed. The experimental design was factorial on basis of completely randomized design (CRD) with four replications. The gene was transferred to a commercial cultivar rapeseed (PF-7045-91) via *A. tumefaciens* (LBA4404 strain) mediated transformation method. Moreover, using PCR technique and *gus* assay, the presence and expression of genes in plants were confirmed. Statistical analysis revealed that there was no significant difference between cold pretreatment and control group. Moreover, the all interaction effects were not significant. Results also demonstrated that there was a significant difference among preconditioning and inoculation period levels for transformation efficiency. The highest effect on transformation efficiency was observed through 24 and 48 h preconditioning periods (with same effects and means 24.21 and 23.55%) and 10, 20 and 40 s inoculation periods (with same effects and means 20.50, 20.63 and 20.54%) respectively.

Keywords: Rape, Cold pretreatment, *Agrobacterium tumefaciens*, Explants preconditioning

References

- Bhalla, P. L. and Smith, N. 1998. *Agrobacterium tumefaciens*-mediated transformation of cauliflower, *Brassica oleracea* var. botrytis. *Molecular breeding* 4: 531-541.
- Chen, P.Y., Wang, C. K., Soong, S. C. and To, K.Y. 2003. Complete sequence of the binary vector pBI121 and its application in cloning T-DNA insertion from transgenic plants. *Molecular Breeding* 11: 287-293.
- De Block M., De Brouwer, D. and Tenning, P. 1989. Transformation of *Brassica napus* and *Brassica oleracea* using *Agrobacterium tumefaciens* and the expression of bar and neo genes in transgenic plants. *Plant Physiology* 91: 694-701.
- Fry, J., Barnason, A. and Horsch, R. 1987. Transformation of *Brassica napus* with *Agrobacterium* based vectors. *Plant Cell Reports* 6: 321-325.
- Jefferson, R. A., Kavanagh, T. A. and Bevan, M. V. 1987. *Gus* fusions: β -glucuronidase as a sensitive and versatile gene fusion marker in higher plants. *EMBO Journal* 6: 3901-3907.
- Jonobi, P. 2003. In vitro optimization and transformation of EPSPS gene to rapeseed via *Agrobacterium*. Ph. D. Thesis. Tarbiat Moalem University, P 194.
- Kahrizi D., Arminian, A., and Masomi Asl A. 2007b. B. In Vitro Plant Breeding. Razi University Publications.
- Kahrizi, D. and Salmanian, A.H. 2008. Substitution of Ala183Thr in *aroA* Product of *E. coli* (k12) and Transformation of Rapeseed (*Brassica napus*) with Altered Gene Confers Tolerance to Roundup. *Transgenic Plant Journal* 2(2): 170-175.
- Kahrizi, D., Salmanian, A.H and Zebarjadi A. 2007a. A. Effect of plant genotype, explant and *Agrobacterium* strain on transformation efficiency in rapeseed (*Brassica napus* L.). *Modern Genetics Journal*. 2(3): 53-62.
- Kahrizi, D., Salmanian, A.H., Afshari, A., Moieni, A. and Mousavi, A. 2007c. Simultaneous substitution of Gly96 to Ala and Ala183 to Thr in 5-enolpyruvylshikimate-3-phosphate synthase gene of *E. coli* (k12) and transformation of rapeseed (*Brassica napus* L.) in order to make tolerance to glyphosate. *Plant Cell Rep* 26: 95-104.
- Moloney, M. M., Walker, J. M. and Sharma, K. K. 1989. High efficiency of *Brassica napus* using *Agrobacterium* vectors. *Plant Cell Reports* 8: 238-242.
- Murashige, T. and skoog, F. 1962. A revised medium for rapid growth and bioassays with tobacco tissue cultures. *Plant Physiology.*, 15: 473-497.
- Murray, M.G. and Thampson, W.F. 1980. Rapid isolation of high molecular weight plant DNA. *Nucleic Acid Research* 8: 4321-4325.
- Radke, S. E., Andrew, B. M., Moloney, M. M., Crouch, M. L., Kridl, J. C. and Knauf, V. C. 1988. Transformation of *Brassica napus* using *Agrobacterium tumefaciens*: development regulated expression of reintroduced napin gene. *Theoretical Applied Genetics* 75: 685-694.

1. Assistant Professors, Agronomy and Plant Breeding Department, Faculty of Agriculture, Razi University, Kermanshah

2. Associate Professor, National Institute for Genetic Engineering and Biotechnology, Tehran

*: Corresponding author

- Sambrook, J. and Russell, D. W. 2001. Molecular cloning, a laboratory manual. Cold Spring Harbor Laboratory Press. New York. Pp 12.1-12.114.
- Takasaki, T., Hatakeyama, K., Ojima, K., Watanabe, M., Toriama, K. and Hinata, K. 1997. Factors influencing *Agrobacterium* –mediated transformation of *Brassica napus* L. Breeding Sciences 47: 127-134.
- Zebarjadi, A. R., Jalali, J. M., Karimzadeh, Gh., Moeini, A., Mousavi, A. and Salmanian, A. H. 2006. Transformation of rapeseed (*Brassica napus* L.) plants. with sense and antisense constructs of the fatty acid elongase gene. Iranian. Journal of Biotechnology 4(2). 79-87.

To look at the figures and tables, please refer to the Persian text (pages: 27-34= ۳۷-۳۴).

Archive of SID

SID



سرویس های ویژه



سرویس ترجمه تخصصی



کارگاه های آموزشی



بلاگ مرکز اطلاعات علمی



سامانه ویراستاری STES



فیلم های آموزشی

کارگاه های آموزشی مرکز اطلاعات علمی



مقاله نویسی علوم انسانی



اصول تنظیم قراردادها



آموزش مهارت های کاربردی در تدوین و چاپ مقاله