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Expression of potato virus X coat protein gene in transgenic potato

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ABSTRACT

The gene for the coat protein (CP) of potato virus X (PVX) was obtained from purified virus genom by RT-PCR. The CP gene was cloned between the cauliflower mosaic virus (CaMV) 35s promoter and the transcription termination signal of the nopaline synthase (nos) gene. The chimeric gene was placed into a binary vector and used to transform two cultivars of potato by *Agerobacterium tumefacience.* All transgenic plants that showed Kanamycin resistant phenotype were analysed for presence of the coat protein gene transcript by RT-PCR. The goal of this study is to obtain potato virus resistant plant against PVX. In this paper extraction of viral RNA, transformation, cloning and coat protein gene expresion is disccused.

References

ADERSON, J. M., PALUKAITIS and P., ZAITLIN, M. 1992. A defective replicase gene induces resistance to cucumber mosaic virus in transgenic potato plants. Proc. Natl. Acad. Sci USA 89: 5829-5833.

CARRINGTON, J. C. 1990. Cap independent enhancement translation by a plant potyvirus 5 nontranslated region. J. Virol. 64, 1590-1597.

EHSANI, P., MEDVEDEVA, T. and DOMANSKY, N. 1995. Expression of hepatitis B surface antigen in transgenic potato plants. Iran. J. Med Sci. 20: 42-46.

FEIGLESTOCK, D. A. TOZZINI, A. A., HOPP, H. E. 1995. Coat protein sequence of a resistance-breaking strain of potato virus X isolated in Argentina. Virus

Genes. 10: 289-292.

GERLACH, W. L., LIEWELLYN, D., HASELHOFF, J., 1987. Construction of a plant disease resistance gene from satellite RNA of tobacco ring spot virus. Nature: 328: 802-805.

HARRISON, B. C., MAYO, M. A. BAULCOMBE, D. C. 1987. Virus resistance in transgenic plants that express cucumber mosaic virus satellite RNA of tobacco ring spot virus. Nature. 328: 799-802.

HEMENWAY, C. FANG. R. X., KANIEWSKI, W. K., CHUA, N. H., TUMER, N. W. 1988. Analysis of the mechanism of the protection in transgenic plants expressing the potato virus X coat protein or its antisense RNA. EMBO. j. 7: 1273-1280.

HIDE, G. A. and LAPWOOD, D. H. 1992. Disease aspects of potato production. In The potato crop, The scientific basis for improvment (E. D. P. M. Harris) 2nd ed. Chapman & hall. London. pp 403-437.

HOEKEMA, A., HUISMAN, M. MOLENDIJK, L. VAN DEN ELSEN, P. J. CORENLISSEN, B. J. C. 1989. The genetic engineering of two commercial potato cultivars for resistance to potato virus X. Bio/ Technology 7: 273-278.

HUISMAN, M. J. LINTHORST, H. J. M., BOL. J. F. and CORRENLISSEN, B. J. C. 1988. The complet nuclotide sequence of potato virus X and its homologies at the aminoacid level with various plus stranded RNA viruses. J. Gen. Virol. 69: 1789-1798.

KANIEWSKI, W., LAWSON, C., SAMMONS, B., HALEY, L., HART, L., DELANNY, X., TUMER, N. E. 1990. Field resistance of transgenic Russet Burbank potato to effects of infection by potato virus X.

LAWSON, C. KANIEWSKI, W. 1990. Engineering resistance to mixed virus infection in a commercial potato cultivar:resistance to potato virus X and potato virus Y in transgenic potato Russet Burban. Bio/Technology 8: 127-134.

MACFARLANE, S. A., DAVIS, J. W. 1992. Plant transformed with a region 201-kilodalton replicase gene from pea early browing virus RNA 1 are resistance to virus infection. Proc. Natl. Acad. Sci. USA 89: 8759-8763.

MOROZOV, S. YU., L. LUKASHEVAL, L. I., CHEMOV, B. K., SKRYABIN, K. G., ATABEKOV, J. G. 1987. Nuclotide sequence of the open reading frames

adjacent to the coat protein cistron in the potato virus X genome. FEBS Lett. 213: 438-4426.

POWELL, P. A., STARK, D. M., SANDERS, P. R., BEACHY, R. N. 1989. Protection against tobacco mosaic virus in transgenic plants that express tobacco mosaic virus antisense RNA. Prov. Natl. Acad. Sci. USA, 86, 6949-6952.

SAMBROOK, J., FRITSCH, E. F. MANITAIS, T. 1989. Molecular cloning. A laboratory manual. Cold spring harbor laboratory, Cold spring Harbour, Newyork.

SANGER, F., NICKLEN, S., COULSON, A. R., 1977. DNA sequencing with chain terminating inhibitores. Proc. Natl. Acad. Sci. USA 74: 5463-5467.

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