FFTC Research Highlights

March 2003
RH2003-3

Chromosomal and extrachromosomal integration

of the green fluorescent protein (GFP) coding region in *Rhizobium*

TWO VARIANTS of the green fluorescent protein (GFP) coding regions were introduced into *Rhizobium* and *Bradyrhizobium* cells. The first variant, *gfpuv* with a hybrid promoter harboured in pBBR-GFPUV, was introduced into *Rhizobium* by means of electrophoration. The second variant, *egfp* containing Ser65-Thr and Phe64-→Leu double mutation, was transferred into the rhizobial genome by transposomal conjugation of pUT-Tn5 *egfp-accCi*-KmF (Ap^R) in *E. coli* S-17 λ-pir as donor. The best result was obtained from *Rhizobium* DBM-53 under the following electrophoration condition: voltage, 2.5 kV; capacitance, 25 μF; resistance, 360-720Ω; and pulse for 30 msec. Integration of Tn5 *egfp-acc*Cl-KmF resulted in Nx^R, Km^R, and Gm^R transconjugants which expressed the GFP from their own promoters. The integration stability of the two variants of GFP in *Rhizobium* DBM-53 will be studied under laboratory and greenhouse conditions.

News source: **Center Research for Biotechnology, Indonesian Institute of Science**

For further information, contact Nurwantara, S.K., Sukiman H.I., and Ariani, D. Center Research for Biotechnology, Jalan Raya Bogor Km.46, Cibinong 16911, Indonesia.
Phone: +62-21-8754587, Fax: +62-21-8754588
Email: witarto@biotek-indonesia.net

Crop wastes as potential sources of natural medicine,

cosmetic products, pesticides, insecticides, and paper products

PLANT WASTES may be utilized for beneficial purposes such as medicine, cosmetic products, pesticides, or paper. Bioactive substances were extracted from parts of different plants, such as: *Momordica charantia* Linn., *Lycopersicon esculentum* Mill, *Dolicos lablab* Linn., *Solanum melongena* Linn., *Allium sativum* Linn., *Allium ascalonicum*, *Corchorus olitorius* Linn., *Pachyrrhizus erosus* Linn., *Vigna sesquipedalis* Linn., *Allium astowskianum* Linn., and *Oryza sativa.* The extracts were processed and evaluated for their potential uses as insecticides, medicine, or as source of pulp for papermaking.

Results revealed the following:

- Alkaloids, flavonoids, and saponins were the common bioactive substances extracted from any one or all of the plant parts (seeds, leaves, stems, roots, or fruits) of the crops tested. These phytochemicals exhibited antitumor, antimutagenic, antibacterial, antifungal, antipyretic, analgesic, and cytotoxic activities.
- Plant extracts from the different crops showed specific insecticidal or medicinal properties. For instance, extracts from the seeds of *M. charantia* showed insecticidal property against housefly. The stems, roots, and leaves of tomato cv. Apollo (*L. esculentum*) showed insecticidal property against brown plant hopper.
- Extracts from different crops also showed different bioactivity or properties. The saponins extracted from the leaves, stems, and roots of tomato cv. Apollo were found to contain antitumor agents.
- Paper may be produced from rice straw and vines from *M. charantia.*

News source: **Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

For further information, see Torres, L. D., Ortinero, C.V., and Monserate, J.J. Investigation of selected agricultural products and wastes in Region III as sources of natural products and pulp. Nueva Ecija: CLSU, 2001.

FFTC: An international information center for small-scale farmers in the Asian and Pacific region

Food and Fertilizer Technology Center (FFTC)
14 Wenchow St., Taipei, Taiwan ROC
Tel.: (886 2) 2362 6239 Fax: (886 2) 2362 0478
E-mail: fftc@agnet.org Website: www.fftc.agnet.org

Determination of coconut viroid contamination in unprocessed coconut export products

'CADANG-CADANG', a serious viroid disease of coconut, is prevalent in some parts of the Philippines, particularly in the Bicol region. The disease has been causing major problems in the international trade of coconut products. Specifically, the pathogen coconut cadang-cadang viroid (CCCVd) was found to be present in different parts of coconuts at varied concentration levels. Researchers studied the possible CCCVd contamination of some coconut export products.

An improved molecular hybridization assay (MHA) was used to detect CCCVd. In the samples studied, the viroid was not detected in the meat and water of young and mature coconuts from diseased palms. This means that products derived from coconut endosperm, such as, desiccated coconut, coconut in powder or sliced form, 'makapuno', 'nata de coco', vinegar, and wine are free of CCVD. The viroid, however, was present in the husk (pericarp).

The study confirmed that by-products from mature coconut husks like coco peat and coir fiber may be considered free of CCCVd as the husks are composed of dead tissues and the viroid could not survive additional exposure to processing conditions.

The study revealed that CCCVd could be inactivated or degraded by incubation at 100°C for 45 minutes; autoclaving at 118°C for 15-30 minutes; and treating with enzyme RNAse, alkali solution (e.g. 10% KOH), and at least 11% formalin.

News source: **Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

For further information, see Rodriguez, M.J.B. and I.P. Estioko. Determination of CCCVd contamination in unprocessed coconut export products. Albay: Philipine Coconut Authority, 2001.

New bivoltine purelines for better cocoon production

A **STUDY** was conducted to enrich the existing gene pool of bivoltine silkworm strain in the Philippines. Researchers attempted to evolve, evaluate, characterize, utilize, and maintain genetic resources of bivoltine silkworm.

Eleven silkworm hybrids were collected from India, South Korea, Japan, and other sericulture agencies in the Philippines. The silkworms were mass produced. Important qualitative characteristics of the hybrids were isolated. At the fifth generation stage, the qualitative expression of the silkworm lines being purified was fixed by cellular rearing. During cellular rearing, 300 larvae were selected from each line and were arranged in complete randomized design with three replications to evaluate the quantitative characters.

Among the 11 hybrids collected, 13 lines were evolved. These lines surpassed the standard norms in important economic characteristics of silkworms. Of the 13 evolved lines, four were found to be promising. These four lines surpassed the check variety in terms of hatching, cocoon shell percentage, single cocoon weight, cocoon yield box, and effective rearing rate.

News source: **Philippine Council for Agriculture, Forestry and Natural Resources Research and Development**

For further information, see Supsup, G. E. and J.P. Abuan. New bivoltine purelines for better cocoon production. SRDI, 2001.