SHORT COMMUNICATIONS

IN VITRO PROPAGATION OF OIL PALM (*ELAEIS GUINEENSIS* JACQ VAR TENERA) THROUGH SOMATIC EMBRYOGENESIS IN LEAF-DERIVED CALLUS

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THE African oil palm *Elaeis guineensis* Jacq. Var. 'tenera' is one of the most productive oil crops of commerce. The plants are conventionally propagated by seeds; vegetative multiplication is not possible. Micropropagation of oil palm using tissue culture techniques would be of tremendous advantage for raising clones of elite individuals[1–7]. Work on oil palm was taken up to study the morphogenetic potential of 'tenera' hybrids which are under plantation trials in India and to evolve a suitable method for its clonal multiplication. This communication deals with the success obtained in this direction after a good deal of experimentation. Induction of somatic embryogenesis in the leaf-derived callus cultures and their development into whole plantlets are reported here.

Young leaves were excised from 6-month old plants. Meristematic portions of the leaf base were cut into rectangular explants measuring (10 × 15 mm). After surface-sterilization the explants were cultured on a modified MS basal medium[8] with modified vitamins and supplemented with growth regulators. Best callus response was obtained on MS basal medium supplemented with 50 to 70 mg/l of 2,4-D. About 50% of cultured explants produced a subculturable callus tissue within 6–8 weeks. The freshly initiated callus tissues were periodically transferred to basal medium with sequentially reduced levels of 2,4-D. After several such subcultures, the original callus formed fresh mounds of nodular callus masses at several loci. These cultures were maintained as a continuous source for induction of embryogenesis on an optimal medium containing half-strength micro and macro elements of MS with additional sodium dihydrogen phosphate ($NaH_2PO_4 \cdot H_2O$, 170 mg/l), 2,4-D (10 mg/l), 2, iP (0.01 mg/l), casein hydrolysate (1.0 g/l) and activated charcoal (0.5 g/l).

Somatic embryogenesis occurred after one week in most of the stock cultures when transferred to MS medium containing only 2iP (0.01–0.5 mg/l) and followed by transfer to the basal medium. The embryogenic mass produced 50–60 embryos per culture which gradually developed into shoots (figure 1). Embryogenesis occurred in liquid as well as on solid medium. Vigorous growth of shoots was observed in agitated liquid cultures (figure 2). Well-developed shoots (10–12 cm in size) bearing two to four small leaves were isolated individually and planted into tubes on filter paper bridges and containing half strength MS liquid medium supplemented with 1 mg/l NAA and 1 mg/l GA_3 to initiate rooting (figure 3). The resulting plantlets were further grown on half strength basal medium. Addition of adenine sulphate (25 mg/l)

Figures 1–4. 1. 1. Somatic embryos and young plantlets in the leaf-derived callus. **2.** Vigorous growth of shoots from somatic embryos in agitated liquid cultures. **3.** Formation of roots in isolated shoot on liquid medium with filter paper support. **4.** A plantlet raised in a paper cup.

to the medium improved the growth of the plantlets. Three or four-leaved plantlets with a good root systems were transferred to small paper cups with pre-sterilized soil compost (figure 4). The procedure of transferring plantlets to soil conditions is being improved to obtain sustained growth and survival of transplants.

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1. Staritsky, G., *Euphytica*, 1970, **19**, 288.
2. Smith, W. K. and Thomas, J. A., *Oleagineux*, 1973, **28**, 123.
3. Jones, L. H., *Oil Palm News*, 1974, **17**, 1.
4. Ahee, J., Arthus, P., Cas, G., Duval, Y., Guenin, G., Hanower, J., Hanower, P., Lievoux, D., Lioret, C., Malaurie, B., Pannetier, C., Raillot, D., Varechon, C. and Zuckerman, L., *Oleagineux*, 1981, **36**, 113.
5. Nwanko, B. A., and Krikorian, A. D., *Ann. Bot.*, 1983, **51**, 65.
6. Rabechault, H. and Martin, J. P., *C. R. Acad. Sci.*, Paris Se'r D, 1976, **283**, 1735.
7. Choo, W. K., Yew, W. C. and Corley, R. H. V. *Proc. COSTED. Symp. on Tissue Culture of Economically Important Plants*. Singapore (Ed. A. N. Rao) 1981, 138.
8. Murashige, T. and Skoog, F., *Physiol. Plant*, 1962, **15**, 473.

INTERACTION OF PLATELETS AND PLASMA PROTEINS WITH HEMA GRAFTED POLYURETHANES

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THROMBUS formation induced by blood polymer interaction is of key concern in the area of medical implants. Although several investigators[1,2] have looked into the nature of various polymer surfaces for developing a non-thrombogenic surface, the exact mechanism of thrombus formation still remains a mystery. Adsorption of proteins is considered as the primary process to occur upon contact with blood and subsequent interactions with blood cells leading to thrombus formation. We have attempted to study the compatitive adsorption of proteins from the protein mixture 25 mg% albumin, 15 mg% γ-globulin and 7.5 mg% fibrinogen on various surfaces. The relative preference for albumin with an interrelation to platelet adhesion has been examined in this report. The information may help in making the selection of a surface towards its biomedical use.

Fabrication of the vascular grafts[3] and their treatment with HEMA for different periods of time were reported earlier[4]. Parts of the samples were irradiated in air and the remaining under N_2 atmosphere at a dose of ~ 0.275 M Rads (^{60}Co source). Platelet adhesion and protein adsorption on these surfaces were studied as described earlier[2,5] using isolated platelets in Tyrode solution from citrated calf blood.

Albumin, fibrinogen and γ-globulin (Human, Sigma Co., USA) were taken in the ratio 25 mg%, 7.5 mg% and 15 mg% respectively in a phosphate buffer of pH 7.4. Labelled proteins albumin (Amersham

Table 1 *Platelet adhesion study*

Time of exposure to HEMA	Irradiated in air platelet count/mm^2 ± s.d.	Irradiation under N_2 atm. platelet count/mm^2 ± s.d.
Bare Irradiated	8.7 ± 2.0	6.7 ± 1 8
5′	7.5 ± 1.5	7.0 ± 2.0
10′	—	7.5 ± 1.5
15′	5.0 ± 2.5	5.0 ± 2.2
20′	—	6.5 ± 2.2
Bare (non-irradiated)	9.5 ± 2.7	....