J. Natn. Sci. Coun. Sri Lanka 1994 22 (Suppl. A):S77-S79

BIOTECHNOLOGY ACTIVITIES AT THE CEYLON TOBACCO COMPANY

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Introduction

The aim of the private sector is to make use of existing opportunities to produce goods and services required by the country. The experience world over has shown that the private sector is a very effective agent of production to meet nearly all the material requirements of society.

In Sri Lanka, agriculture has been the predominant form of production. From its inception in Sri Lanka, the Ceylon Tobacco Company or CTC has been primarily an agricultural producer. It is therefore natural for a company like CTC to introduce and develop the most recent technologies like plant biotechnology, specifically plant tissue culture, to meet both the company's and the country's needs and objectives.

The plant tissue culture laboratory at Kalagedihena was set up in 1980, initially as a research & development laboratory to explore possibilities for commercial application of tissue culture to economically important plants. With the interest in commercial cut flower for export at the time, the company started on tissue culture of orchids.

CTC's Present Activities in Biotechnology

(a) Utilisation of Rapid Clonal Multiplication to Propagate Ornamental Plants for Export & Local Market

In view of the demand for ornamental foliage plants internationally, the Company embarked on a project to use tissue culture to develop an export market for high value ornamentals. This was a major opportunity to bring in valuable foreign exchange to the country. To date, ornamentals like *Syngonium, Spathiphyllum, Ficus, Zantadeschia* and ferns have been produced and exported to Europe, Japan and Australia, while tissue culture systems have now been successfully developed for species of *Draceana, Cordyline, Anthurium andreanum, Pleomele* and *Aglaonema*, the latter two systems being developed by original research. Flowering was tested with *Anthurium* and its commercial production commenced. Novel foliage plant types have been created by mutation breeding.

Lately, the company has been thinking of ways to maximise utilisation of the laboratory, since it is unique in being the only large scale commercial laboratory in Sri Lanka, with a production capacity of 1.6 million plants per year. At present, the laboratory produces over one million plants annually.

(b) Production of High Quality Disease Free Elite Planting Material for the Fruit Industry

The tissue culture laboratory is now being looked at as a service centre to produce plants for domestic use, by the company as well as the broader needs of the agricultural sector. In this respect, we now produce high quality disease free elite planting material of fruit crops to help in achieving national targets of fruit production. Tissue culturing was successful and fruiting tested with banana, strawberry and passion fruit, while field evaluations are under way for tissue cultured grapes and pineapple. Tissue cultures have also been established with papaya. Commercial quantities of strawberry plants have been exported to Holland. Tissue cultured banana gave better yields and more sucker formation compared with conventionally grown plants. The varieties tested were ambul, kolikuttu, anamalu and williams. As such we are now producing large numbers of banana plantlets for sale to interested growers. 22,000 plants have already been sold out of 200,000 planned for the year. Plantlets of pineapple too have been established to serve as a source of mother plants for our pineapple programme. A proud achievement for us is the success we had in developing the rapid *in vitro* propagation for passion fruit by original research, since this technology was not available. This can be utilised in the future to produce planting material. While this approach is commercially attractive to us it can fulfil the needs of large scale growers who need large quantities of planting material that should be genetically uniform.

(c) Developing Tissue Culture & Micro Propagation for the Purpose of Producing Seed Material of Potato

Considering the company's requirements, the tissue culture lab has been producing *in vitro* plants of disease indexed potato, which serves as starter material for the seed potato farm at Ambewela. *In vitro* micro-tubers too have been produced and its performance tested and commercial quantities released.

The micro-tuber production was very much influenced by the variety. However, the system has yet to be perfected in order to get more micro-tubers per plant to get economical benefits.

Problems Encountered

1. With anthuriums and grapes, some loss of plants in the hardening phase.

2. The uncertainty of a profitable marketability for tissue cultured pineapple plants because of the ready availability of pineapple suckers (particularly Mauritius) at a low price.

Future Developments

Our future developments would be directed towards genetic improvement of crops via plant tissue culture, like development of drought and disease tolerant varieties, improving the nutritional quality of certain crops and production of useful hybrid varieties of plants.

Research & Training Needs

A training in *in vitro* micro-tuber production of potato and techniques of gene transfer via potoplast fusion and plasmid vectors would be desirable. Finally, I would like to say that CTC has incurred heavy expenditure for the research & development work in biotechnology. As finances are now becoming a limitation, for us to progress further in this modern field, external funding to purchase equipment for protoplast culture work is required.