China Produces Virus-Resistant Chilli Pepper Plants

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The chilli pepper is a spicy food seasoning favorite in many Asian countries and also in many other parts of the world. Unfortunately, chilli pepper plants are very susceptible to viral diseases. In China, only a few commercial varieties of chilli pepper plants have genetic resistance to diseases. Infection by the tobacco mosaic virus and the cucumber mosaic virus is quite common in the field, resulting in severe yield losses. Recently, researchers at the Plant Biotechnology Laboratory at the Institute of Microbiology of the Chinese Academy of Sciences have co-expressed the coat proteins of these two viruses in transgenic chilli pepper plants, rendering them resistant to the two viruses. Several transgenic lines that displayed high resistance to viral infection in the laboratory have been selected and field tested in Daxing County of Beijing (北京大興縣) and Yangling County of the Shanxi Province (山西省楊陵縣). The transgenic progeny plants showed a significant level of protection against viral diseases under field conditions, and the pepper fruit yield was much higher than that of the control plants. Cooperation between scientists from the Chinese Academy of Sciences, Hong Kong Transgenic Ltd., Luckmate Group (Hong Kong), (立美集團) and Beijing Da-Dong Company (大東農工商總公司) is being established to further develop and commercialize the transgenic pepper.

China Produces ‘rhG-CSF’ using Genetic Engineering Techniques

The drug ‘rhG-CSF’, which was developed by the Hangzhou Jiuyuan Engineering Co. Ltd. (杭州九源基因工程有限公司) using genetic engineering techniques, has been approved for production by the Chinese Ministry of Health. ‘rhG-CSF’ is a drug which, when injected into a person, increases the number of white blood cells in the body. It is prepared by separating the relevant genes from white blood cells, restructuring, developing engineered bacteria, fermentation, bacteria breaking, property restoration and purification.

The drug was tested by a panel of experts from the State Drug Administration Board led by Professor Tan Jiazhen, a well-known scientist from the Chinese Academy of Sciences, prior to its approval. The testing has proved that the drug is comparable to imported ones, although it costs only two thirds of the price. The drug has also been clinically tested, and is effective in treating neutropenia. It is believed that the technology involved in its production is unique, and is a major breakthrough in terms of the structure of the high expression engineered bacteria, high-density fermentation, large-scale property restoration, and purification of restructured proteins.

The ‘rhG-CSF’ developed by Hangzhou Jiuyuan Engineering Co. will be able to replace the imported one. The company has the capacity to meet national demand, and China is expected to benefit from this. Currently, only the US and Japan mass produce the drug.
New Research may Revolutionize Organ Transplantation

Experts from China and the US are collaborating to research the practical applications of recent achievements in growing a human ear on the side of a white mouse. Dr. Cao Yilin, surgeon of the Shanghai Ninth People’s Hospital, was the first person to successfully reproduce a human ear on an animal body by *ex vivo* cell proliferation. At this time, Dr. Cao was completing his post doctorate degree at Harvard University, under the supervision of Professor Kanti of the Tissue Engineering Laboratory, Harvard University Medical Center.

Dr. Cao was accepted for the post-doctoral course with the Tissue Engineering Laboratory of the Children’s Hospital at Harvard Medical University on the grounds of his impressive academic background. In 1978, he graduated from Shanghai Second Medical University, and took up a postgraduate course in orthopedics in 1984. Because of his excellent results, he was permitted to advance into the doctoral degree course ahead of the stipulated time. In 1991, immediately prior to his time at Harvard, he worked as a visiting scholar to the University of California and the Michigan Surgical Research Center.

At this time, Professor Kanti and his team had already achieved significant progress in the replanting of cells into the human body, and they had been successful in producing cartilage. However, experimenting on the structurally complicated human ear was Dr. Cao’s achievement. Professor Kanti commented that, if not for Dr. Cao’s assistance, the research may have continued for as long as five years. As it was, the project was completed within two.

As one of the world’s leaders in producing a human organ using the technique of extra-corporeal cell reproduction, Dr. Cao felt that the growing of the human ear on a white mouse represented a great leap forward in the development of orthopedics. He predicts that a clinical breakthrough may begin with cartilage.

Dr. Cao has now been appointed as the Director of the newly established Tissue Engineering Research Center of the Shanghai Second Hospital. He wishes to apply his techniques to suitable patients in the near future.

DHA as New Anti-Cancer Substance

Scientists from Kyoto-Phu Medical University and Sagami Central Institute for Chemical Research have successfully extracted a substance from fish oil found to be effective against cancer cells. The substance, known as 26-carbon enoic acid (DHA), can cause the death of cancer cells.

In an experiment, human lung cancer cells were transplanted into the legs of mice. After one week, ‘artificial cells’ containing DHA were injected into the arteries of the mice. The results showed that the majority of the cancer cells in the mice were killed off. Scientists have found this novel form of therapy — mixing artificial cells with anti-cancer drugs — to be effective in treating liver cancer. Moreover, the use of artificial cells did not cause any harmful side-effects.
China’s Breakthrough in Research on Seed Coating Agents

Seed coating agents are essential for the proper growth of plants, the strengthening of growing plants, and the prevention of insect infestation. They are made up of a mixture of pesticides, disinfecting chemicals, compound fertilizers, micronutrients, plant regulators and slow-releasing agents. Seed coating agents help to reduce the amount of capital spent on fertilizers, pesticides and seed costs.

Jiangshu Huanong Seed Coating Agent Pte. Ltd. (江蘇華農種衣劑有限公司), the largest research and production base for seed coating agents in China, has invested two million yuan (US$0.2 million) to set up a R&D center. It will pool together specialists in the study of pesticides, chemistry and plant protection from Beijing, Changchun, Nanjing and other research institutes, to study the main problem currently facing the industry: how to improve the emulsification of chemicals making up seed coating agents, thus improving their film-forming ability. Poor emulsification of the chemicals cause layering and precipitation to occur.

After two years of research, the company has successfully developed a highly efficient film-forming agent, a chaining agent and a number of other important agents for seed coating. A compound seed coating agent containing a mixture of chemical fertilizers and hormones has also been developed. A comparison with conventional seed coating agents showed that the new products had several advantages: the coats were both air-permeable and drug-permeable, required a shorter time for coating, had a better developed coat, good water-absorbing ability, and were less likely to fall off. Most importantly, they did not have any of the problems mentioned above. Altogether, the company has already produced a total of 15 seed coating agents for barley, bean, cotton, corn, sorghum, rice, peanut, watermelon, wheat, vegetables, etc., at an annual production volume of 3000 tonnes. China’s State Economic Trade Committee and the agricultural department of Jiangshu Province, have included the production of seed coating agents as the key development project for agriculture.

Chinese Scientist Pursues Research in Purple-Spotted Peony

The Peony is a plant native to China. Traditional breeding methods, used as far back as the Tang and Song Dynasties, are still being practiced in modern China. In order to cultivate new varieties of peony, scientists are studying the breeding methods of the plants.

Between 1993 and 1996, Dr. Cheng Fangyun (成仿雲) from Lanzhou City, Gansu Province (甘肅省蘭州市), pursued his PhD at the Beijing Forestry University under the supervision of Chen Junyu (陳俊榆) and Li Jiayu (李嘉彧). The topic selected for his thesis was the systematic study of the process of generative propagation of the purple-spotted peony. He made a systemic study of the plant at the cellular level, thereby providing insights into the reproductive biology of the plant, and a theoretical basis for its cross-breeding and for variety improvement using biotechnological techniques.