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SPECIAL ISSUES

Sharing Experimental and Standard Materials

China' s national S&T infrastructure platform has so far collected, consolidated, and digitized the information on 4,090 standard materials, with 3,500 of them being made available on e-platform. The website （www.ncrm.org.cn）has covered all certified standard materials in the county, with an English version in operation at the same time. The keyword search of 'standard materials' ranks first place in the Chinese Google website. As of the end of December 2007, the website has attracted 57,849 visits, with its users being the departments of entry-exit inspection and quarantine, environment monitoring, diseases control, veterinary drugs, coal quality control, agrifoods quality control, geological test, and food processing, and universities in 25 provinces and regions, including Hong Kong and Macao. The website allows online order and a real-time update between the physical storehouse and information platform.

The experimental cell platform has stored 1,150 consolidated standard cells lines. As of November 2007, it has fed the e-platform with common descriptions and 150 pictures of 1,000 cell lines, allowing online sharing. Research institutes involved in the project have established their own experimental cell databases to provide online information service as required. The lead institution has established a national platform for experimental cell resources, connecting to the e-platform, to provide the information on individual cell lines, including culture base, generation passing, frozen storing, cells' fingerprints, the name of research institutes storing the cell lines, and reference.

Researchers have so far completed the test and evaluation of special properties of 55 experimental animal species, with 6,500 pieces of information in store. The experimental animal website has attracted 72,800 visits in 2005, 98,300 visits in 2006, and 55,000 visits in January-July 2007.

Advanced Tools for Animals and Plant Quarantine

With the support of National 863 Program, Chinese scientists have landed breakthroughs in developing molecular test techniques for animals and plant diseases, harvested with an array of fast, specific, and sensible test techniques and products for port quarantine and field diagnosis.

Researchers have rolled out highly specific and sensitive test kits for identifying BTV, VSV, EHDV, and AKV, applicable to different tissues and organs. Tests show that RT-LAMP is a simple, sensitive, and highly specific test procedure, with great potentials for testing BTV, VSV, EHDV, and AKV viruses. Researchers are currently working on the assemble part of KAMP kits.

Employing a range of molecular biological means, including AFLP, RFLP, RT-PCR, and PCR, researchers have screened out some ten immune targets for plants, including Phytophthora sojae, Tilletia controversa Kühu (TCK), Xanthomonas oryzae pv.oryzicola, Acidovorax avenae subsp.Citrulli, and Erwinia amylovora, and developed associated PCR test kits.

Largest Biodiversity Specimen Site

China has recently turned a tropical rainforest area in the Menla County, Xishuangbanna in Yunnan into the largest biodiversity specimen site in the country. Covering an area of 20 hectares, the specimen site will be mainly used to study the biodiversity mechanism of tropical forests. It will also be an evidence for studying the response of forest

ecosystems to environmental changes. CAO Min, head of the specimen site, told reporters that since 2006, Xishuangbanna Tropical Botanical Garden and Xishuangbanna Nature Conservation Administration have worked hard to establish the specimen site, including site selection, measurement, specimen identification, tree labeling, sign hanging, tree caliber measurement, and tree positioning. Field survey has shown that there are 95,834 trees with a caliber ≥1cm on the site, with 95,498 of them having been identified. 468 tree species belong to 70 families under 213 genera. Only 336 individual trees (0.35%) have not been identified. Researchers are currently working on tree species distribution map. According to the plan, a general survey will be made to the specimen site every 5 years. The site will also be used to collect samples for other studies than pure forest ecology, including animals, insects, atmosphere, and soil.

At present, China has four large forest biodiversity specimen sites, including Changbaishan in Jilin, Gutianshan in Zhejiang, Dinghushan in Guangdong, and Xishuangbanna, with an area ranging from 20 to 25 hectares, representing different forest covers.

INTERNATIONAL COOPERATION

New Discoveries for Marine Drug Development

Not long ago, a study team led by GUO Yuewei, a research fellow at CAS Shanghai Institute of Materia Medica, and their Italian co-workers have jointly completed an international cooperation project to discover drug precursors in marine organisms, and optimize their structures. Having passed the approval check organized by the Shanghai Municipal S&T Committee, the phase results have produced a range of proprietary precursor compounds that may lead to effective drugs for treating tumors, diabetes, inflammations, and even AIDS disease. Up to date, researchers have screened out a dozen of live precursor compounds from some 1,000 natural marine compounds, and applied for patents for them.

In the past two years, researchers have collected diverse invertebrate specimens from the sea floors with a depth ranging from 30m to 70m. They separated numerous precursor compounds that are potentially able to treat human diseases, including type 2 diabetes, lung cancer, liver cancer, and leukemia.

RESEARCH AND DEVELOPMENT

Rat Hospital

A rat hospital was officially put into operation on March 29, 2008 in Shanghai. The hospital is designed with a range of functionalities, including operation, delivering (3969 "beds"), patient ward (15183 "beds"), test, pathology, radiology, and neurosciences, and equipped with an array of modern test instruments for automatic blood cell analysis, live rat imaging, CT, and bone density scanning. Here researchers can perform diverse operations on rats, including grafting a human gene to a rat, or cutting off a specific gene from more than 20,000 genes possessed by a rat. Of course, the operation is not meant to be a treatment, but to let rats be affected with human diseases, or let them lose their memory or become addicted to drugs. Even hepatitis B viruses that only travel between humans and chimpanzees can be passed to rats.

As a project under the financing of National S&T Infrastructure Program for the 11th Five-year period, the rat hospital is established to produce 150 rat models bearing conditional genes that may produce human diseases for genetic function studies, new drug development, and pathogenesis studies.

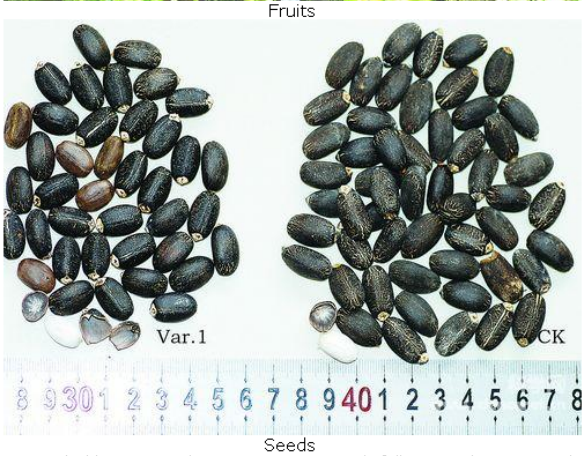
Nanodrug for Foot-and-mouth Disease

China Agriculture University announced on March 26, 2008 that it has developed a dry acid disinfection powder at nanoscale to effectively prevent pig's foot-and-mouth disease. Field tests have shown that an hour after spray of the dry disinfection powder, the number of Escherichia coli in the air was slightly higher than the liquid disinfection group, with the number of same bacteria in the plate being at 13. However, the follow-up results show that the number of Escherichia coli in the pen and air has been kept at a low level, with the minimum value appeared 12 hours after the spray, casting a stark contrast to the disinfection liquid that would leave countless bacteria 12 hours after the spray. Under the traditional approach, disinfection liquid would usually be applied both in and outside animal pens. The old approach has numerous inherent disadvantages, including short time duration, being easily affected by humid environment and pH balance, and contamination by wastes and feeds, which would enhance the number of diseases causing microbes. The new approach produces no aforesaid disadvantages. Made up of toxicant and pollution free nanomaterials, the dry disinfection powder is safe to both humans and animals.

Trial applications on several hundred thousand pigs in some ten pig farms in Guangdong, Jiangxi, Hunan, and Shandong, have confirmed its noticeable effect in treating foot-and-mouth disease. Tests also show that the dry powder is able to absorb water and viruses in the environment, and facilitate the healing of pigs' external wounds. For example, a pig farm in Shandong reported that the application of dry disinfection powder has noticeably improved pigs' breeding environment, and removed the strong odor of ammonia, allowing piglets to live in a dry and comfortable environment, with a significantly reduced occurrence of diseases, and a raised survival rate of piglets to 95%.

New plants for biofuel

Fruits



Seeds

A research team, led by YANG Chengyuan, a research fellow at Chinese Academy of Sciences Xishuangbanna Tropical Botanical Garden, has recently bred out an Aleurites species with wrinkled leaves and dark seeds. The team first discovered the species in 2005. The mutated species has completed its growing process, and become a tree producing its own seeds. Researchers have so far produced some 600 plants of the species. A range of biological analysis, sexual reproduction, asexual reproduction, and hybridizing, has confirmed the fact that the species has made itself a novel species. Researchers have named it "an Aleurites species with wrinkled leaves and dark seeds' for the time being. A report shows that the novel species is the result of artificial breeding. A test conducted by the Ministry of Agriculture Center for Agrifoods Quality Control on the seeds has revealed an oil content (34.5%) that is equal to old species (35.0%). However, hybridizing has raised the oil content by 6.4%, reaching 41.4%.

Green Pesticides

Thanks to their 10-odd-year painstaking efforts, a study team, headed by Prof. XU Yuquan at Shanghai Jiaotong University Institute of Life Sciences, have screened out a bacteria strain called M18 from plant root soils. The metabolites the strain produced can effectively inhibit the spread of wilt diseases caused by the bacteria in soil, and facilitate the growth of plants. Researchers produced the metabolites, or Phenazine-1-carboxylic acid (PCA), in a lab environment, and further made them into high yield strains for mass-production, using optimized traditional fermenting technique. Not long ago, researchers sorted out another active strain from M18, an only incidence in the world featured with two different anti-bacterial strains derived from the same bacteria strain.

In collaboration with Shanghai Nongle Bioproducts, the study team has placed the novel pesticide on the market, which led to the application in six provinces and one city, including Shanghai, Jiangsu, and Zhejiang, over an area of 16.1 million mu(1 mu= 0.0667 hectare) on a combined basis. Calculating on a reduced loss worth RMB 200 per mu, the pesticide has produced a benefit worth RMB 3.2 billion. Experimental data has shown that the new bacteria killer is particularly good for pepper and water melon wilt disease, with an effective rate as high as 75% or above.

NEWS BRIEFS

More Key Research Facilities

Chinese Ministry of Finance and Chinese Academy of Sciences jointly announced on March 28 that they would finance the proprietary development of eight key research facilities.

The eight key research facilities are: equipment for producing deep ultraviolet all-solid-state laser source, a pulse wind-tunnel that is able to imitate supersonic flying condition, a comprehensive experimental system for extreme conditions, a mobile seafloor seismological observation array, a superconducting imaging spectrometer, a digital VLBI base band converter, a nanometer based synchrotron radiation imaging equipment, and an intermediate energy heavy ion micro irradiation unit. Experts believe that the planned development will raise China' s research capability on the one hand, and gather more experience for developing proprietary research facilities on the other.

Diseases Watch Enhanced

A meeting was held on March 15, 2008 to launch a major diseases watch and pre-warning system. As part of the National 863 Program in the 11th Five-year period (2006-2010), the system will track down a range of major diseases, including cardiovascular diseases, malignant tumors, diabetes, hepatitis, and AIDS in residential communities, rural areas, and households, using biochemical analyzing systems with high performance and low cost, quick test and analyzing systems for emergency purpose, compact molecular diagnosing systems, multi-parameter cardiovascular disease monitors, and fast test systems for coronary heart disease. The project is supposed to develop novel products with strong market competitiveness, integrated functionalities, and low cost, for limited production and demonstration. Other key technologies, including biological compatibility/processing/packaging/integration, information processing, clinical application, mass production, and low cost manufacture, are also the targets to be worked on.

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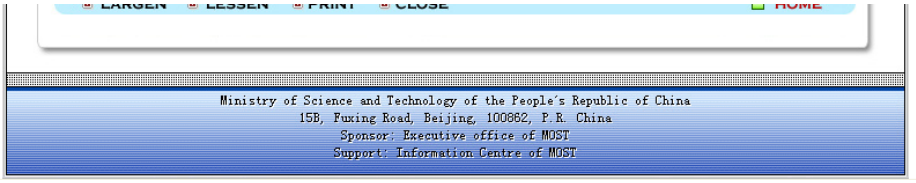

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