



Focus

Award-winning projects and experts are role models for learning

The 2018 national science and technology award conference was held at the Great Hall of the People in Beijing on Jan. 8, 2019. The winning projects of the national science and technology award once a year reflect the outstanding achievements in the national science and technology field. From the published winning projects, we can see that there are three winning projects in the field of TCM research. On behalf of the CHM editorial board, I would like to extend our sincere congratulations to the award winners.

1. “Key Technology and Application of Invention and Preparation of Ginkgo diterpene lactones Strong Effect Composition” won the second prize of National Science and Technology Invention Award jointly contributed by Wei Xiao, Feng-chang Lou, Ya Ling, Ji-ye Aa, Gang Hu, and Shu-wei Ma.

Ginkgo biloba extract has a variety of pharmacological activities, and has been extensively studied in China and abroad. Dozens of ginkgo preparations have already been commercially available, with the primary components containing flavonoids, lactones, etc. Ginkgo diterpene lactones is a naturally potent PAF receptor antagonist of pharmacological activities in anticoagulation and prevention of stroke. Before this dosage form of Injection of two terpene lactones from *Ginkgo biloba* was approved for marketing, no product with ginkgolides diterpenoid as the primary components has been approved and commercially available worldwide. The main innovations of this project are as follows: (1) The specific efficacy of each lactone component and the optimal combination of the components was not clear, and the preparation of the diterpene lactone was not so effective to remove the main toxic component of ginkgolic acid contained in diterpene lactone. To go through the puzzles above, the research team underwent a systematic study and finally completed a series of technological innovations and inventions, so that the extract of two terpene lactones from *Ginkgo biloba* achieved a rather high purity of ginkgo diterpene lactone more than 98%, with the content of toxic ginkgolic acid much lower than the international standard. For the first time, Ginkgolide two ginkgolide Injection was successfully developed and approved for the market. (2) The injection has obtained 11 Chinese invention patents authorization, and finally acquired new drug certificates and production approvals in 2012, which provided an innovative drug with antiplatelet and neuroprotective effects for the treatment of ischemic stroke without the risk of bleeding. It entered the national medical insurance catalogue for the treatment of stroke.

2. “The establishment and application of key technology of the modern research on Traditional Chinese Medicine based on a holistic view” won the second prize of National Science and

Technology advance Award jointly contributed by Wei-dong Zhang, Jun-jie Zhou, Hai-ming Shi, Run-hui Liu, Chang-sen Zhan, Yong Li, Peng Jiang, Xin-ping Luo, Ning Xie and Yan-he Lin.

Researchers established the identification method and technology of the active ingredients of TCM formulas to clarify the pharmacodynamic substances; They established a technical analytical method combining system biology and network biology to solve the problem of unclear mechanism of action, and established the whole process of production chain automation technology to ensure the quality of TCM formulas; They carried out the international standards of evidence-based medical research to clear clinical positioning. The main innovations of this project are as follows: (1) For the first time, based on the holistic view, it constructed a modern research system of TCM formulas and published the first Chinese and English monograph on the modern study of TCM formulas and first proposed the overall research strategy of TCM formulas. (2) The method of rapid identification of active ingredients of TCM formulas was established to solve the problems of many kinds of chemical components in TCM formulas and large differences in physical and chemical properties. (3) Aiming at the characteristics of the overall pharmacodynamic effect of TCM formulas, the association technology of metabolomics, network biology, chemical biology and connectivity map was established. (4) An overall quality control system was established to ensure the product quality of modern TCM formulas to be uniform and stable. (5) A large-scale evidence-based medicine study of TCM formulas was carried out, which provided full and accurate evidence for excavating the clinical characteristics and application of TCM formulas.

Shexiang Baoxin Pill has achieved an annual growth of more than 30% through technological innovation. The industrial scale ranks first in the national TCM microparticle industry. It has a good demonstration effect on improving the development of TCM industry and promoting the development of large variety of TCM. This project was first time to propose the research strategy of TCM formulas based on the holistic view. It also developed a number of core technologies for the study of TCM formulas and comprehensively explained the scientific connotations of TCM formulas. It promoted the development of the TCM industry and innovated a modern research model of TCM formulas.

3. “Establishment of the mode and technical system for resource recycling utilization during industrialization process of Chinese Medicinal Materials and their applications” won the second prize of National Science and Technology advance Award jointly contributed by Jin-ao Duan, Zhi-shu Tang, Ming-geng Wang, Qin-an Wu, Wen-jie Quan, Shu-lan Su, Qi-ming Liu, Sheng Guo, Hao Ji and Peng Xiong.

The project belongs to the basic and applied research field of traditional Chinese medicine. This project focuses on the CMM recycling utilization, developing the key technologies and promoting their transformation application, which has made a pioneering contribution to the quality and efficiency, the resource conservation, and the green development of the whole industrial chain of the traditional Chinese medicine. The main innovations are described as follows: (1) The theoretical foundation of recycling utilization of CMM resources is put forward and constructed innovatively to lead the green development of CMM. Five kinds of recycling patterns of CMM resources have been established based on the characteristics of the waste and by-products of traditional Chinese medicine. The comprehensive benefits of their popularization and application have been significantly increased. The “one increase and one decrease” green development model, which has significantly reduced the waste of resources and environmental pressure, has explored a replicable model easy to popularize the effective way for promoting the improvement of quality and efficiency, the sustainable development of Chinese traditional medicine industry, and the transformation of production mode and development mode. (2) Three sets of recycling technology systems suitable for biotransformation, chemical transformation, and physical transformation of CMM wastes and by-products have been constructed innovatively. A biotransformation system and equipment based on bioengineering and enzyme engineering technology was established, which was used to screen resistant microorganism, construct engineering bacteria, produce enzyme fermentation-enzymatic hydrolysis and saccharification, and realize industrialization. The establishment, popularization, and application of the technical system of recycling utilization of CMM resources have provided strong support for the green development

of Chinese traditional medicine industry. (3) As practices, some non-medicinal parts, wastes and by-products have been innovatively transformed into new pharmaceutical and health products, new resource of medicinal materials, cellulase, oligosaccharides, bioethanol, biochar, and carbon-based compound fertilizer, etc. The circular economy concept of “being from and returning to farmland, improving the quality and efficiency, and green development” has been realized. These research results have been popularized and applied in more than 20 medicinal materials production and deep processing enterprises in more than 10 provinces of China. The project leads to the improvement of quality and green development of the industrialization of CMM resources, and possesses unique advantages and important influence in related fields nationally and even internationally.

As premier Ke-qiang Li pointed out in his speech at the awards conference, “in the past year, faced with the complex and severe international situation and arduous tasks of reform, development and stability, China’s economy and society maintained sound development, actively promoted the strategy of innovation-driven development, and made new achievements in scientific and technological innovation. A number of major achievements have been made in basic research, cutting-edge technology, high-end equipment, and major projects”.

At present, we must seize the new round of scientific and technological revolution and industrial transformation in the world. These achievements of modern research on traditional Chinese medicine will also strongly encourage scientists and technicians across the country to carry out more extensive research and development, create more safe, effective and quality-controllable new traditional Chinese medicine drugs, and make more new products serving the cause of people’s health.



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