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RECENT PESTICIDE RESEARCH IN CHINA

ANALYTICAL METHODS

BIOACTIVE CONSTITUENTS

BIOFUELS AND BIOPRODUCTS CHEMISTRY

CHEMICAL ASPECTS OF BIOTECHNOLOGY/MOLECULAR BIOLOGY

CHEMICAL CHANGES INDUCED BY PROCESSING/STORAGE

CHEMICAL COMPOSITION OF FOODS/FEEDS

CROP AND ANIMAL PROTECTION CHEMISTRY

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SYMPOSIUM INTRODUCTION

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China: Forward to the Green Pesticides via a Basic Research Program†

The 973 Program is China's keystone national research program established to support basic research in natural and physical sciences. In addition to promoting the development of core technology and scientific infrastructure needed to enable China to meet the social and economic challenges of the 21st century, the training and mentoring of the new generation of China's young scientists are also important objectives of this national program. The green chemical pesticide research program is a part of the 973 Program. The main objectives of stage 1 of the green chemical pesticide research program (2003−2008) are to establish China's capability to conduct basic research in the discovery of "green" crop protection chemicals that are not only novel in mode of action and highly selective to pest species that are unique to China's agricultural situation but also possess favorable environmental and human hazard and risk potentials. The target-based discovery strategy was selected as the main discovery platform. This strategy not only provided this research program the best chance to discover new products but also provided members of this research team opportunities to establish core technologies in chemoinformatics/computation-aided pesticide design using QSAR, QAAR, sensitive and selective bioassay methodology, combinatorial synthesis, hit to lead optimization, and biological targets that were derived from resistance-AChE, IGR, nAChR, etc. On the basis of the learning from stage 1, stage 2 (2010−2014) of this program will focus on the molecular target-oriented innovation of green chemical pesticides. This commentary presents key learnings and accomplishments from the stage 1 of China's green chemical pesticide research program. It is hoped that this information will stimulate further constructive collaborations between pesticide scientists from China and abroad.

KEYWORDS: Green chemistry; pesticides; crop protection; molecular design; hit to lead optimization

1. PREFACE: ORIGIN OF THE CHINESE BASIC RESEARCH (973) PROGRAM AND STRATEGIC SIGNIFICANCE

The first stage of China's National 973 Basic Research Program, green pesticide research project, was recently completed. To celebrate this project milestone, we are pleased to present some of the significant scientific findings in this special issue of the *Journal of Agricultural and Food Chemistry* (*JAFC*). We wish to use this opportunity to stimulate scientific collaboration with the international pesticide research community. The purpose of this commentary is to introduce the Chinese 973 Green Pesticide Research Program and to highlight some of the key research projects and significant findings.

Since the early 1980s, China's new economic reform policy had promoted a rapid expansion of social and economic growth. This progress was fueled, in part, by unprecedented changes in China's educational and research systems. To stimulate the advancement of innovative basic and applied research, China implemented three major national science and technology plans: (1) 973, Key Basic Research; (2) 863, High Technology Development; and (3) R&D Support for Industrialization. The 973 Program is designed to build long-term (10+ years) discovery capability, whereas the 863 Program supports ongoing invention and R&D. These national research programs provided the Chinese scientific community a stable research funding system to promote scientific innovation across the vast natural and physical scientific disciplines.

The strategic objectives of the 973 Program are (1) to strengthen China's capabilities in independent and original innovations, (2) to address important scientific issues critical to national economic and social development, and (3) to establish scientific research infrastructure, training, and management and support systems for the future development of the country. One of the top research priorities of the 973 Program is to transform strategic basic research into industrial application in the future, thus overcoming the traditional bias of "emphasizing research while ignoring application". The 973 Program improved research focus on the importance of intellectual property rights and its social or economic effects/impacts. To be more specific, this program has four main tasks: (1) to prioritize and conduct multidisciplinary basic research to address fundamental scientific issues that are critical to the sustainable development of China's economical and social strategic plans; (2) to stimulate relevant frontier research with transparent and effective grant authorization, evaluation, and administrative systems; (3) to educate and mentor outstanding Chinese scientists to meet the challenges of the 21st century; and (4) to establish world-class scientific research centers in the different regions of China to promote and support basic research and development.

The implementation of strong financial support from the 973 Program stabilized China's scientific research community and the training of young scientists and midcareer professionals. This program also provided outstanding Chinese scientists living abroad the opportunity to return and conduct research in China.

† Part of the ECUST-Qiao Pesticide Cluster.

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