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Application of nanoformulation of agrochemical in crops production in China: Progress and prospects

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Agrochemicals, including chemical fertilizers and pesticides, are very important inputs for enhancing crop productivity and preventing it from biological disasters. The annual amounts of fertilizers and pesticides have respectively reached to 170 million tons and 3.5 million tons worldwide. However, more than 70% of fertilizers and 90% of pesticides run off into the environment and residue in agricultural products in process of application. Inefficient use of agrochemicals caused a series of ecological environment problems, such as non-point pollution, water eutrophication, soil deterioration and loss of biodiversity, etc. In recent years, using nanotechnology to create novel formulations of pesticides and fertilizers has shown great potential for alleviation of these problems by virtue of nanomaterials' special properties. Agrochemical nanoformulations may be developed by two pathways, directly processed into nanoparticles and using nanomaterials as carriers to formulate smart delivery systems. Currently, most researches on agrochemical nanoformulations in China mainly aims at enhancing the efficacy and safety through improving physicochemical properties, targeted delivery or controlled release mechanisms. Furthermore, the development of nanoformulation for pesticides focuses on enhancing efficacy and reducing spray drift, while fertilizers focuses on problems of bioavailability due to soil chelation, overuse and runoffs.

Biography

Haixin Cui has completed his PhD from Osaka Prefecture University in 1996. He is the Chief Scientist of National 973 Project; Director of Nanotechnology Research Center of Agriculture, Chinese Academy of Agricultural Sciences; Research Fellow and PhD Supervisor of Institute of Environment and Sustainable Development in Agriculture, CAAS; academic leader of Biological Physics, CAAS. He served as professional committee member of China Medicinal Biotechnology Association, evaluation expert of the award of National Science and Technology Conference, evaluation expert of 863 Program. His main research areas are agricultural chemicals precisely controlled-release technology, nano-biotechnology, and the application of nanomaterials in agriculture.

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