RENCONTRES de QUY NHON III

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Networking and Collaboration for Young Biological Researchers

ABSTRACT PROCEEDINGS

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[K9] NAFOSTED: a good research funding agency for young Vietnamese scentists

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ABSTRACT

NAFOSTED was founded with a mission as "Towards creating a favorable research environment that meets the international standards in order to enhance the national S&T capacity, including improving the research quality and developing high-quality human resources in S&T".

With more than 10 years working with NAFOSTED in various roles, such as a PI of NAFOSTED-funded projects and a member of several committees including the Scientific Committee of Biology and Agriculture, the Joint Research Project Evaluation Committee, the Board of Trustees, and the Ta Quang Buu Prize Evaluation Committee, I believe that NAFOSTED has substantially contributed to the development of high standard scientific research in Vietnam and especially that it has become an invaluable research funding organization for young scientists. Nevertheless, I have also found issues that NAFOSTED has faced over the years and problems that some young scientists have encountered as applicant for and as PI of NAFOSTED-funded projects.

In this report, I wish to share my knowledge about NAFOSTED with young scientists and hope that it would be useful for those who are interested in the NAFOSTED funding programs and want to take advantage of this funding source and support for their scientific careers.

Keywords: *NAFOSTED*

[K10] Mitochondria and chloroplast preparation for two-dimensional electrophoresis (2DE) analysis of Ice plant (*Mesembryanthemum crystallinum*)

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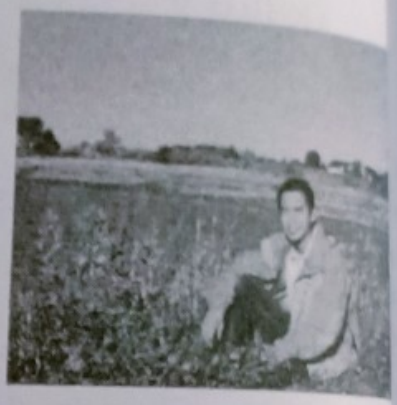
ABSTRACT

Although proteomic technologies have been applied to the study of chloroplast and mitochondrial proteins of many other C3 and C4 photosynthesis species, these techniques have rarely been conducted in mitochondria of CAM (crassulacean acid metabolism) plants. Among CAM plants, the Ice plant is the most comprehensively studied facultative specie, with more than 300 papers published with its name in the title since the first report of CAM in the species. Ice plant is a halophyte CAM plant with a relatively small genome (390 Mb) that is 2.5 times larger than the Arabidopsis genome (~145 Mb). It displays C3 photosynthesis when grown under non-stressed conditions and is capable of completing its life cycle in the C3 mode without ever exhibiting net nocturnal CO2 uptake. However, when Ice plants are grown under drought and salt stress treatment condition, they exhibit all of the physiological features of CAM plants. Though Ice plant is very popular in the world and it is well known as a model plant for CAM plants, it is a completely new plant species and is unavailable in Vietnam. In this research, we tried to produce Ice plant and develop them under nature condition. The mature leaves of plants were used for isolating and purifying the intact chloroplasts and mitochondria. The protein of mitochondria and chloroplast were determined by an EZQ protein quantitation kit. The results show that chloroplast and mitochondria isolated from Ice plant leaves via this protocol have pure and intact. The shape of chloroplast and mitochondria observed by microscopy were clear and

sharp. The proteins of mitochondria and chloroplast were high quality for 2DE assay. This procedure was employ for assessing the significant differences in mitochondrial and chloroplast protein expression patterns.

Keywords: *CAM plant, chloroplast protein, mitochondrial protein, Mesembryanthemum crystallinum, two dimentional electrophoresis.*

[K11] Engineering plant virus resistance using CRISPR/Cas systems: An example in tobacco



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ABSTRACT

Plant virus disease is one of the most severe factors causing crop yield and quality loss, thereby threatening global food security. Different strategies and approaches have been developed to improve plant virus resistance. Of which, genome editing has been seen as the most potential system with broad successes in different plant species. CRISPR are essential components of nucleic acid-based adaptive immune systems that are present in many bacteria and archaea. CRISPR/Cas genome editing systems consist of an endonuclease Cas protein and a single-guide RNA (sgRNA) which directs the cutting by Cas protein to the DNA or RNA targets. The specificity of CRISPR/Cas systems is gained from sgRNAs which contain a scaffold for Cas protein binding and a user-defined approximately 20-nt long spacer sequence for targeted genome. CRISPR/Cas systems were first utilized to combat geminivirus by induced targeting its DNA genome during viral replication processes. In addition, the wide range of plant viruses could be targeted as the development of more CRISPR/Cas systems from other bacterial strains such as FnCas9, Cas13a and LwaCas13a. These new Cas proteins have been reported to target RNA and open up the capabilities against RNA viruses. Moreover, to complete the infection and multiplication process, viruses need to employ different host factors to assist in replication, transcription and translation etc. Therefore, CRISPR/Cas9 systems have been developed to break the assistance of host elements and limit virus infection. In this talk, we will show our successes in induced mutation of the eukaryotic initiation factor (eIF4E) and its isoform (eIFiso4E) by CRISPR/Cas9 system for potato virus Y (PVY) resistance in tobacco. The information about gene sequence analysis, vector construction, mutant line generation and viral tests will be presented in detail as an example of the CRSIPR/Cas utilization for plant virus resistance.

Keywords: *CRISPR/Cas; eIF4E; eIFiso4E; tobacco; plant virus resistance*