Conclusion and Recommendation
FNCA Biofertilizer Project Workshop

Malaysia, Nov. 24-17, 2014

1. The meeting reiterated the importance of the biofertilizer application to reduce chemical fertilizer input in order to protect environment.
2. The meeting noted that progress has been achieved to prove the longer shelf life and better quality of biofertilizer produced by using carrier sterilized by radiation than those sterilized by autoclaving with high temperature steam, in member countries, such as Malaysia, the Philippines, Indonesia, Thailand, China and Vietnam.
3. The meeting recognized that Nuclear Malaysia has success story of commercial production of biofertilizer using radiation technology to sterilize carrier in collaboration with a biofertilizer manufacturer and tested in plots under the management of Muda Agricultural Development Authority (MADA) under the Ministry of Agriculture and Agro-based Industry.
4. The meeting noted that the BIOTECH, UPLB in the Philippines is successful to use radiation sterilization of carrier to produce Bio-N in commercial scale, and encouraged other member countries to follow these two success cases in terms of strategy how to extend the irradiation of carrier to commercial application.
5. The meeting agreed that Project Leaders will take strategic actions described in **attachment-1** in order to achieve the use of irradiated carrier instead of the autoclaved carrier for commercial production of biofertilizer.
6. The meeting took note that some of member countries have found the synergetic effects of biofertilizer and oligo-chitosan for yield increase of rice and tomato.
7. The meeting recognized that oligo-chitosan has elicitor effect to give plants to be disease resistant and therefore the synergetic effects of biofertilizer and oligo-chitosan can be expected to achieve higher yield and disease resistance.
8. The meeting requested that FNCA Project of Radiation Processing of Natural Polymers provides information on the specific protocol of using oligo-chitosan for different crops.
9. The meeting agreed that it is worthwhile to study development of new varieties of rice of which yield could be increased by using biofertilizer, such as PGPR, and suggested that the FNCA Mutation Breeding Project should take this comment into consideration of the future project plan.
10. The meeting agreed that the R&D of multifunctional biofertilizer should be

continued by exploring new indigenous multifunctional strain and/or by developing new strain by mutagenesis of existing microorganisms.

11. The meeting agreed that the guideline Vol. 2 should include the selection and characterization of carrier, determination of optimum irradiation dose depending on carrier, and the list of available radiation facilities which provides radiation service, and its publication should be before the end of March 2015.
12. The meeting recommends that the Project of Biofertilizer should be extended to next phase for 3 years from 2015 to achieve following 3 major goals;
    (1) To extend the application of radiation sterilization of carriers to produce better quality assured biofertilizer in commercial basis
    (2) To develop new multifunctional biofertilizer (single strain)
    (3) To further study the synergetic effect of biofertilizer and radiation processed oligo-chitosan

Attachment 1

The strategy for enhancement of application of radiation sterilization of carries for commercial scale production of biofertilizer

Actions by Project Leaders

1. Project leader establishes cooperation linkage with biofertilizer producer and explain advantages of irradiated carrier in terms of quality assurance and shelf life.
2. Project leader contacts with national nuclear center and/or radiation service company where the biofertilizer producer can irradiate carrier in commercial scale.
3. The biofertilizer produced by using the irradiated carrier should be tested by the biofertilizer producer to prove better quality assurance and long shelf life.
4. Biofertilizer producer demonstrates the better quality in the field for farmers.