

Annex 3. Summary of Session 2 Country Report

Summary of Session 2 Country Report FNCA 2015 Workshop on Biofertilizer Project

Eight countries reported research progress for 2015 and plan for 2016-2017 respectively. The summaries of reports are as follows:

Bangladesh (Dr. Muhammad Monowar Karim Khan, BINA)

Biofertilizer plays a vital role on nutrient uptake/availability particularly, nitrogen and phosphorus uptake/ availability and crop yield. Different microorganisms like *Bradyrhizobium*, PSB, PGPR etc have been isolated for biofertilizer production in Bangladesh. Yield of various legumes and oilseed crops as well as rice and wheat could be increased by about 20% with the use of Biofertilizer. For sterilizing carrier material (Peat), irradiation with 15-20 kGy seems very suitable.

Indonesia (Dr. Iswandi Anas, Bogor University)

Indonesian Government strongly support the use of biofertilizer as well as bio-organic fertilizer to reduce the amount of chemical fertilizers by Indonesian farmers. We obtain some multifunctional microbial strains isolated from Indonesian soils. Sterilization of some microbial carriers using gamma irradiation in relation to the improvement of biofertilizer quality will be continued, as well as the synergistic effect of biofertilizer with oligochitosan in improving the growth and yield of crop will be continued in 2016.

Japan (Dr. Shotaro Ando, JIRCAS)

Bacillus biofertilizer is a PGPR and it can increase absorption of nutrients from soil by enhancing the growth of root. Suitable combination of *Bacillus* biofertilizer and different levels of nitrogen application in nursery tray of rice was studied. Two ways of spore inoculation, spore suspension and spore formulation, of *Bacillus* biofertilizer was examined at the paddy field. The preventive effect of rice blast disease was evaluated in the field and spore formulation inoculation decreased occurrence of disease significantly. Entomopathogenic fungi are important agents for the biological control of insect pests. Mutation breeding using ion beams irradiation generated benomyl-resistant mutants of *Beauveria bassiana*.

Malaysia (Ms. Rosnani Binti Abdul Rashid, Nuclear Malaysia)

The FNCA Biofertilizer project, with the intent of ensuring quality products, has made radiation processing central to the programme, where carrier materials for biofertilizer microorganisms were subjected to ionising radiation for sterilisation. Several carriers, including agricultural compost and fibres from oil palm were sterilised using gamma irradiation and autoclaving for comparison, in terms of effectiveness, efficiency, quality

and cost. Studies in Malaysian Nuclear Agency (Nuclear Malaysia) has consistently shown the superiority of gamma sterilised carriers over steam or thermal sterilised carriers. Currently there are several companies utilising the gamma sterilisation services. Our team also is continuing to enhance our standing in the biofertilizer community, by working on single strain multi-functional biofertilizer microorganisms, contributing to N, P and K nutrition and plant growth promoting activities, through radiation mutagenesis, and currently with promising results. In the Eleventh Malaysia Plan (RMK-11) we will focus on integrated projects in the food crop production sector, where biofertilizer is one of the critical component, along with plant growth promoting agent from irradiated oligochitosan on advanced mutant lines of rice, addressing productivity and climate change. Several multi-location trials have been conducted, involving research stations and farmers field, with evidence of increased productivity.

Mongolia (Dr. Delgermaa Bongosuren, IPAS)

In 2015 we conducted 2 experiments including: 1) Biofertilizer produced by using beneficial microorganisms have a positive economic impact in terms of nitrogen fertilizer saving and increasing the crop yield. 2) The experiment on the “Study on plant pathogen suppression tomatoes” have some positive effects, such as a promoter of plant growth and pathogen suppression in tomato yields pot experiment in green house.

The Philippines (Ms. Juliet A. Anarna, UPLB)

Biofertilizer can improve the yield of rice and corn by 11 % and at the same time reduce the chemical nitrogen input by 30 to 50%. Promotion and extension of the technology enhanced acceptance of the farmer and commercialization of the technology. Bio N carrier (soil and charcoal) was sterile at the dose of 20kGY and sterilization through nuclear techniques enhanced large scale production of Bio N technology. Based on the data obtained no synergistic effect of biofertilizer and irradiated oligochitosan was observed conducted during WS 2015.

Thailand (Dr. Phatchayaphon Meunchang, DOA)

Thailand showed results of experiment in gamma irradiation sterile carrier biofertilizer and field test experiment. The results are ready to publish. In Thailand, produced 4 types of biofertilizer for farmers such as Rhizobium, PGPR, Mycorrhiza and Phosphate solubilizing, which 2015 produced each type are 37, 5, 3 and 2 tons, respectively.

Vietnam (Dr. Pham Van Toan, MARD)

The study was conducted to evaluate the effects of N-fixing bacteria, P-solubilizing bacteria, silicate bacteria and polysaccharide synthesizing yeast on the nutrition uptake and yield of groundnut in sandy soil under green house and field conditions. The experiments showed the significant different in N, P and K uptake of groundnut between control and inoculations. Mixculture from N fixing and P, K solubilizing microbes have positive effect

on the greenbiomass as well as pod yield of groundnut. Inoculation can save 30% of chemical NPK and bring the benefit for farmers.

Field experiment to evaluating the synergy effect of oligochitosan and biofertilizer on growth, yield of tomato and cabbage showed, that oligochitosan and biofertilizer have the synergy effect on growth of tested crops. Application of biofertilizer and oligochitosan also increased the control effect of bacterial wilt caused by *R.Solanacearum*.