

Annex 3. Summary of Session 1 Country Report

Summary of Session 1 Country Report FNCA 2013 Workshop on Biofertilizer Project

7 countries presented their country reports. The brief summary of each country report is as follows:

China (Dr. Fan Bingquan, CAAS)

1. We have conducted studies on isolation of phosphate-solubilizing fungus. They showed high capacity to solubilize rock phosphate, $C_3(PO_4)_2$, $FePO_4$, $Zn_3(PO_4)_2$ and $AlPO_4$.
2. We have done some experiments of phosphate-solubilizing biofertilizer in pot and field conditions. The results showed that phosphate-solubilizing fungi can increase soil available phosphorous level and corn and peanut biomass.
3. We have measured the effect of oligochitosan on plant growth. The highest concentration of irradiated oligochitosan at a rate of $1000\mu\text{g/ml}$ can inhibit the growth of *Fusarium oxysporium* on PDA plate, and lower than that had no inhibitory effect. Spray of oligochitosan can increase peanut yield by 37.5% over control.
4. We conducted studies on multifunctional biofertilizer. The phosphate-solubilizing fungus combined with antagonistic fungus can prevented from development of soil-born disease. The corn yield increased by more than 10%, vegetable biomass by over 50%, and reduce soil-born disease by 70%.

Japan (Dr. Shotaro Ando, JIRCAS)

In order to develop tracing method of inoculated strain, PCR primer set was designed based on the sequence data of 16S-23S rDNA ITS and this primer set could detect *Bacillus* biofertilizer from DNA extracted from soil of field, to where *Bacillus* biofertilizer was applied. Paddy rice growing in pot and field was inoculated with *Bacillus* biofertilizer TUAT1 at sowing and transplanting. Inoculation gave a significant increase over the uninoculated control for shoot weight and tiller number in both experiments. In order to evaluate the synergy effect between biofertilizer and irradiated oligochitosan on plant pathogen suppression, tomato seedlings, which were inoculated by *Pseudomonas fluorescens* strain FPH9601, were transplanted to the infected field by tomato bacterial wilt and irradiated oligochitosan solution was sprayed. By the application of irradiated oligochitosan, suppression effect against the pathogen by *Pseudomonas fluorescens* strain FPH9601 was enhanced, but it became lower in higher infected field..

Malaysia (Ms. Phua Choo Kwai Hoe, Nuclear Malaysia)

Nuclear Malaysia's biofertilizer projects had been supported with two research grants from government since 2007. Year 2013, there were series of bioorganic fertilizer and biofertilizers had been produced. Gamma irradiation for carrier sterilisation was used to

produce high quality biofertilizers. Efforts to promote and commercialise biofertilizer through exhibition are carried out frequently. R,D&C funding support from government can enhance biofertilizer industry in the country's bioeconomy. There is great potential to commercialise biofertilizer in Malaysia and its neighbours.

Mongolia (Dr. Delgermaa Bongosuren, PSARI)

The biofertilizer project in Mongolia is continuous work were developed multi-functional Biofertilizer, they are N-fixing Azospirillum and Azotobacter, P-solubilizing Azoarcus sp microbial strain and their combination Rhizobacterial biofertilizer. Biofertilizer produced by using beneficial microorganisms have a positive economic impact in terms of nitrogen fertilizer saving and increasing the crop yield. 6 tons of biofertilizer is produced and distributed to farmers in this year. Effect of irradiated oligochitisan on Rhizobacterial biofertilizer and pathogen inhibition had been some positive effect.

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

Bio N is a biofertilizer/ microbial inoculant in powder form that contains 2 species of nitrogen-fixing bacteria, that enhance the nitrogen users and improve the yield by 11 % and at the same time reduce the chemical nitrogen input by 30 to 50% for rice and corn.

The irradiation sterilization dose of *Bio N* carrier was sterile at 20 kGy. Gamma irradiation sterilization is more efficient in *Bio N* biofertilizer r production and prolong lifespan.

Promotion and extension of through establishment of techno demo farms and briefing on the technology.

Effects of *Bio N* inoculants and oligochitosan (from Japan) on growth and productivity of rice was investigated under the field and screen house condition using rice as the host plant.

Thailand (Dr. Phatchayaphon Meunchang, DOA)

The biofertilizer project in Thailand is continuous work for search the way to use biological resource as fertilizer. We work on the rhizobium, plan growth promoting rhizobacteria (PGPR), phosphate and potassium solubilizer, free living blue green algae and symbiosis blue green algae with azolla.

The utilization biofertilizer integrated with chemical and organic fertilizer searched to find the technology to transfer biofertilizer utilization technology into the farmer field.

In Thailand, government political supported to extend biofertilizer use integrated within crops fertilization in agricultural system.

The progress of biofertilizer activity in Thailand in 2013 related on research, development, extension and demonstration sectors. Field test experiment showed that PGPRs biofertilizer application can reduce chemical fertilization and still increase crops yield. Novel carrier for irradiation are investigating.

Effect of chitisan on promotes growth of rice and pathogen inhibition did not clear. Other experiment will be continuous on 2014. Biofertilizer extensions in commercial are

continuous extended in Thailand.

Vietnam (Dr. Pham Van Toan, MARD)

Multi-functional biofertilizer containing N-fixer, P-solubilizer, Silicate solubilizer and polysaccharid producer for sandy soil is developed and tested on growth, yield of peanut, Lablab leguminose and cashew in Binhdin province. The biofertilizer can increase the growth and yield of tested crops and also improve the fertility of sandy soil. Intercropping system of cashew and peanut applied multi-functional Biofertilizer increased the yield of cashew 23% and bring the profit of more than 10 million VND/ha/year in comparison to the control.

To study the effect of irradiated oligochitosan on the growth of bacteria, oligochitosan is added to broth medium for P-solubilizer Bacillus and tomato root pathogen *R.solanacearum* with concentration of 50, 100, 150 and 200 ppm. The results showed no effect of oligochitosan on growth of Bacillus in all concentration of 50, 100, 150 and 200 ppm. The concentration of 200 ppm oligochitosan inhibited the growth of *R.solanacearum*. Field experiment to evaluating the synergy effect of oligochitosan and biofertilizer on growth of tomato showed, that oligochitosan and biofertilizer have the synergy effect on growth of tomato. The disease control effect was better when oligochitosan applied to the soil before transplanting. The combination of oligochitosan soil treatment and spraying in every 7 days had the disease control effect of more than 68%. The same tendence can be see in the field experiment with cabbage.