# Research Activity Plan in 2023

| Research subjects | Bgd | Chn | Idn | Kaz | Jpn | Mys | Mng | Phl | Tha | Vnm |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Degraded Chitosan for Animal Feed | ✓ | | ✓ | | | ✓ | | | ✓ | ✓ |
| 2. Hydrogel for Medical Application | ✓ | | ✓ | | ✓ | | ✓ | ✓ | | ✓ |
| 3. Environmental Remediation | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | | ✓ |
| 4. Synergistic Effect among PGP, SWA and BF | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | |
| 5. PGP and SWA, inclusive Process development | ✓ | | | | | ✓ | | ✓ | ✓ | |
| 6. Mutation Breeding of Microbe using radiation | | ✓ | ✓ | | | ✓ | | | | ✓ |
| 7. Sterilization and sanitization using radiation | | | | | | ✓ | ✓ | ✓ | ✓ | |
| 8. Recycle plastic | | | ✓ | | | | | ✓ | ✓ | ✓ |

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| 1. Degraded Chitosan for Animal Feed | ➢ Variation of chicken variety, functionalization of the end product, development of a standardized in-premise poultry facility<br>➢ Make collaboration with the proper Institute to carry out an experiment<br>➢ Conduct experiments with private companies or farmers and get specific data for growth and performance of poultry<br>➢ Collaboration with other institution which has expertise on animal study and study on the immuno-stimulant and growth performance effect of o-chitosan on other animals such as broiler chicken, pig, cow etc. |
| 2. Hydrogel for Medical Application | ➢ Hydrogel hemostats in commercialize-able form<br>➢ Incorporation of chitosan-based hydrogel to investigate its physicochemical properties<br>➢ Initiate technology transfer process<br>➢ Continuation of the toxicity tests<br>➢ Hydrogels for regenerative medicine, and drug discovery<br>➢ Nanoparticles and microfluidics for diagnostics |
| 3. Environmental Remediation | ➢ Based on industrial consultation, optimization of the cement-to-PET ratio, the binding materials, the radiation dose, reduce the amount of sand for the maximum strength and minimum brittleness of the concrete-blocks.<br>➢ Isolation and evaluation of new local PGPR for bioremediation of heavy metal contaminated agricultural soil<br>➢ Re-greening of mine tailing area using BF<br>➢ Improve collaboration with local government and industry to implement the technology. Finding a suitable method for mass production of a bioremediating agent. Monitoring and continuing assessment of the polluted environment before and after bioremediation.<br>➢ Study on the elucidating of the Cs-accumulating mechanisms in useful microorganisms by the comparative genome analysis.<br>➢ Study on the treatment of dioxin, pesticides and organic pollutants from wastewater hospital by electron beam method. Synthesis of Cu nanoparticles/$TiO_2$ and Cu-Ag nanoparticles/$TiO_2$ by electron beam irradiation for photodegradation of organic pollutants in water |

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| 4. Synergistic Effect among PGP, SWA and BF | ➢ Metagenomic, meta-transcriptomic, and metabolomic study of the identified microbes<br>➢ Search for a suitable carrier for a different types of biofertilizers (a consortium of bacteria, fungi, etc.)<br>➢ Optimization of the production on the large scale<br>➢ Improvement of equipment/techniques for biofertilizer production.<br>➢ Promotion and extension of PGP, SWA and Biofertilizer |
| 5. PGP and SWA, inclusive Process development | ➢ To approach farmers and industry, submit a proposal for fund application for field test and market study.<br>➢ To complete the storage study, conduct a stability test focused on type of preservative and concentration<br>➢ Up-scaling process will be carried out after getting the optimized property of CarraPGP which is able to sustain its quality for a long storage period<br>➢ Establish and make a protocol for the PGP application<br>➢ Develop further modifications of biofertilizer<br>➢ Investigate impact of bacterial fertilizer on soil fertility<br>➢ Submit a proposal for the continuation of project and conduct new studies on CMC SWA incorporated with fertilizer and nematicide as a delivery system. |

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| 6. Mutation Breeding of Microbe using radiation | ➢ Looking for financial support for further studies<br>➢ Improved microbial strains<br>➢ Large scale application of the obtained mutants<br>➢ Make a guideline for mutagenesis |
| 7. Sterilization and sanitization using radiation | ➢ Optimize the carrier size for sterilization (reduce the cost of sterilization)<br>➢ Post-harvest treatment of basic vegetables with irradiation to reduce losses during preservation<br>➢ Promote and educate farmers and small businesses, provide nuclear technological information to the public as a safe<br>➢ Use of lower doses of Gamma irradiation for sterilization |
| 8. Recycle plastic | ➢ The collaboration with private company and university to carry out the research and development on recycle plastic by radiation processing in order to have the starting material and facility for polymer processing and mechanical testing machine.<br>➢ Submitted proposal for project funding<br>➢ R&D collaboration with ITDI-DOST and ENVIROTECH Philippines |