QUARTERLY RESEARCH PROGRESS REPORT
QUARTER: 4th
(October-December 2022)

Research Title: CHARACTERIZATION AND QUALITY ASSESSMENT OF LOCALLY MADE BIOFERTILIZERS: Microbial and Molecular Analysis of Biofertilizers Developed at VSU

I. Program/Project/Study Objectives

Project Objectives:

General Objective:

To evaluate the quality, characteristics, and effectiveness of different biofertilizer products developed at VSU

Specific objectives:

1. To determine the temporal variation in microbial population density in biofertilizers developed at VSU.
2. To characterize the microbial isolates obtained from the biofertilizer products of VSU.
3. To profile the microbial species richness of the biofertilizer products of VSU using molecular approach.

II. Relevance to VSU & College's Thrust and Priorities: Relevant

III. Highlights of accomplishments within the quarter

Study 1: *Microbial and Molecular Analysis of Biofertilizers Developed at VSU*

A. Targets for the quarter
- Order reagents for DNA extraction and PCR-Assays.
- Re-isolate and re-purify bacterial cutures/isolates.
- Extraction of DNA from bacterial cultures/isolates of LABS, EM, IMO2, and VSU Vermicast for molecular identification.
- Perform DNA Check from the bacterial isolates thru Gel Electrophoresis for possible bands using Gel Electrophoresis prior to conduct PCR to ensure DNA product quality.
- Perform PCR-Based DNA Analysis from extracted bacterial isolates.
- Analyze PCR results thru Gel Electrophoresis.

- Maintaining of pure cultures and sub-cultures of beneficial microorganisms.

A. Highlights of accomplishments
   - Received reagents for DNA extraction and PCR-Assays.
   - Re-isolated and re-purified bacterial cultures/isolates (36 isolates replicated twice)
   - Bacterial DNA was extracted from 1-day old culture of LABS, EM, IMO2, and VSU Vermicast isolates (12 isolates).
   - Viewed and confirmed positive DNA bands from the DNA Check result of the extracted bacterial isolates thru Gel Electrophoresis (14 isolates).
   - Conducted and performed PCR-Based DNA Analysis using specific primers from the extracted isolates (26 isolates).
   - Analyzed the PCR products thru Gel Electrophoresis and viewed gel under UV trans-illuminator to see positive bands (26 isolates).
   - Maintained pure cultures and sub-cultures of beneficial microorganisms.

IV. Physical Report of Operation

A. Research Program

	Particulars/Name and Brief Description of Utilized/ Commercialized Technologies	Number
Outcome Indicator		
1. Number of research outputs utilized by the industry or by other beneficiaries	N/A	
Output Indicator		
1. Number of research outputs completed within the year	N/A	
2. Percentage of research outputs published in internationally-referred or CHED recognized journal within the year	N/A	

B. Technologies/Information patented and commercialized

Technology Invention(s) New Information	Invention Patent Number	Date of Issue	Utilization of Invention		Name of Commercial Product
			Development	Service	
A. Technology Invention(s)	NONE				
B. New Information	NONE				

C. Research papers published *(Identify if articles were for Research, Extension, Innovation or MSc/ PhD Studies)*

	Title	Author (s)	Date/Year/Publication/ Publisher	Remarks *(if Research, Extension, Innovation, Thesis, MSc/PhD*
a. Refereed Journal				
Institutional	NONE			
National	NONE			
International	NONE			
b. Semi-popular publ'n (newsletter, etc.)	NONE			
c. Popularized pub'ln (technoguides, etc.)	NONE			
d. Book Chapter/s	NONE			
e. Books	NONE			

D. Citation

Research Output as Cited by Other Researcher(s) in Journal Activities									
Title of Research Output/ Published Journal Articles/ Book	Title of Journal & Vol. Issue/ Year	Keywords	Researcher (s)	Citation Details					
				Author(s) Who Cited the Research Output	Title of Article Where the Research Output Was Cited	Title of Journal	Vol. / Issue / Page No.	City/ Year Published	Publi sher
NONE									

V. Issues, Problems, and Recommendations

- Due to electrical outage of the entire NARC Diagnostic Laboratory since October, most of the activities were hindered especially that all molecular procedures require stable and constant electrical power supply. For instance, the use of laboratory equipment (PCR/Thermal Cycler, Micro-centrifuge, Gel Electrophoresis, UV trans-illuminator, Vortex, Ovens, and Water bath) that all need a stable main power source and also to prevent from equipment damage whenever there are episodes of sudden power outage and electrical trip-offs while using the equipment (which may be possible to happen since the immediate electrical source of the lab as of the moment is coming from the old NARC building thru the use of extension wires). In addition, the extreme need of electrical power for the freezer and fridge to operate (for storing temperature-sensitive molecular laboratory reagents and working stocks, for immediate source of ice which is highly vital during DNA extraction and PCR procedures, and for storing of pure cultures and other chemicals). Consequently, the unavailability of power supply has led the stock pure culture isolates vulnerable and even worse, has been succumbed to a variety of lab contaminants which in response, the affected isolates need to get re-isolated and re-purified. Although, job request regarding to this circumstance has been made and has successfully forwarded it to the electrical department.

- Part of the bacterial DNA extraction procedure is the need for the extracted DNA samples to be boiled. The unavailability of a stove or a burner in the laboratory makes the mentioned procedure difficult and inconvenient to perform, hence the purchase of a stove and an LPG tank will hasten the DNA extraction activities in the laboratory.

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Date Submitted : December 21, 2022

Received by OVPREI-RPO: _____

Date Received : _____