

TECHNOLOGY: *BioMeg-Microbial Inoculant*

Biostimulant for improved yield and nutritional quality of sweet potato and purple yam

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Philrootcrops, Visayas State University

TECHNOLOGY: *BioMeg-Microbial Inoculant*

Technology: BioMeg microbial inoculant



TECHNOLOGY: *BioMeg-Microbial Inoculant*

DESCRIPTION:

BioMeg is a microbial inoculant containing ***Bacillus megaterium*** as the active ingredient. Its subsequent nutrient uptake by plants with the use of the product in the **presence of macrofertilizers** was found to **increase yield and improve nutritional quality**. Only a trace amount of BioMeg is applied a few days after planting to effect the desired benefit. The expected yield increase in crop production will translate into a corresponding **increase in income** and provide a **sustainable livelihood** for our farmers.

TANGIBLE OUTPUT(S):

Microbial Inoculant for production of sweet potato and purple yam

STATUS:

The technology can be adopted by the Department of Agriculture. It will be distributed to sweet potato and purple yam farmers through the technology brochures and guidebooks. Training will be conducted in order to capacitate the farmers in their understanding and application of the principles and practices in sweet potato and purple yam production more specifically in the application of BioMeg.

TECHNOLOGY: *BioMeg-Microbial Inoculant*

TECHNOLOGY FEATURE:

- *Low-cost*
- *Environment-friendly*
- *Organic-based*
- *Improves yield, nutritional quality, and income*
- *Use of locally sourced materials*
- *More sustainable*

FARM-LEVEL APPLICATION:

2 Field trials (area less than 1 ha)

Application

APPLICATION TABLE

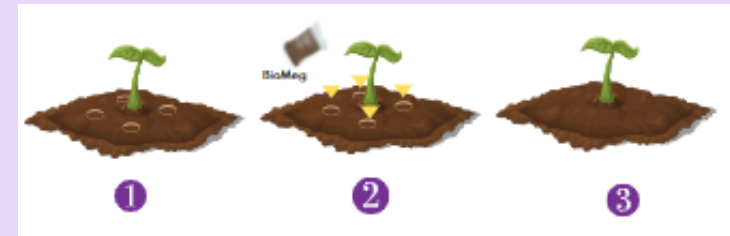
Crop's type	Age of crop	NPK	Bioinoculant <i>Usage/ plant</i>	Frequency
		<i>Usage/ plant</i>		
Sweet potato	2 weeks after planting	60-60-60 kg/ha	12 kg/ha	Once
Purple yam	1 month after planting	75-25-75 kg/ha	6 kg/ha	Twice
	1 month after first application	75-25-75 kg/ha	6 kg/ha	

Way of Application

Storage: Store in cool dry place and away from direct sunlight or heat.

Type of Soil: Neutral soil (pH 6.5-7.5)

1. Make four holes around each plant having a distance of 5 cm from the soil surface.
2. Add the exact amount for each corresponding fertilizer treatment (as shown in Application table). Two holes for the bioinoculant and the other 2 holes for the complete fertilizer. Equally divide it into the holes.
3. Cover the holes with soil to prevent the volatilization of N-containing fertilizers.



Production Cost

Basis: 5 kg Dried Product

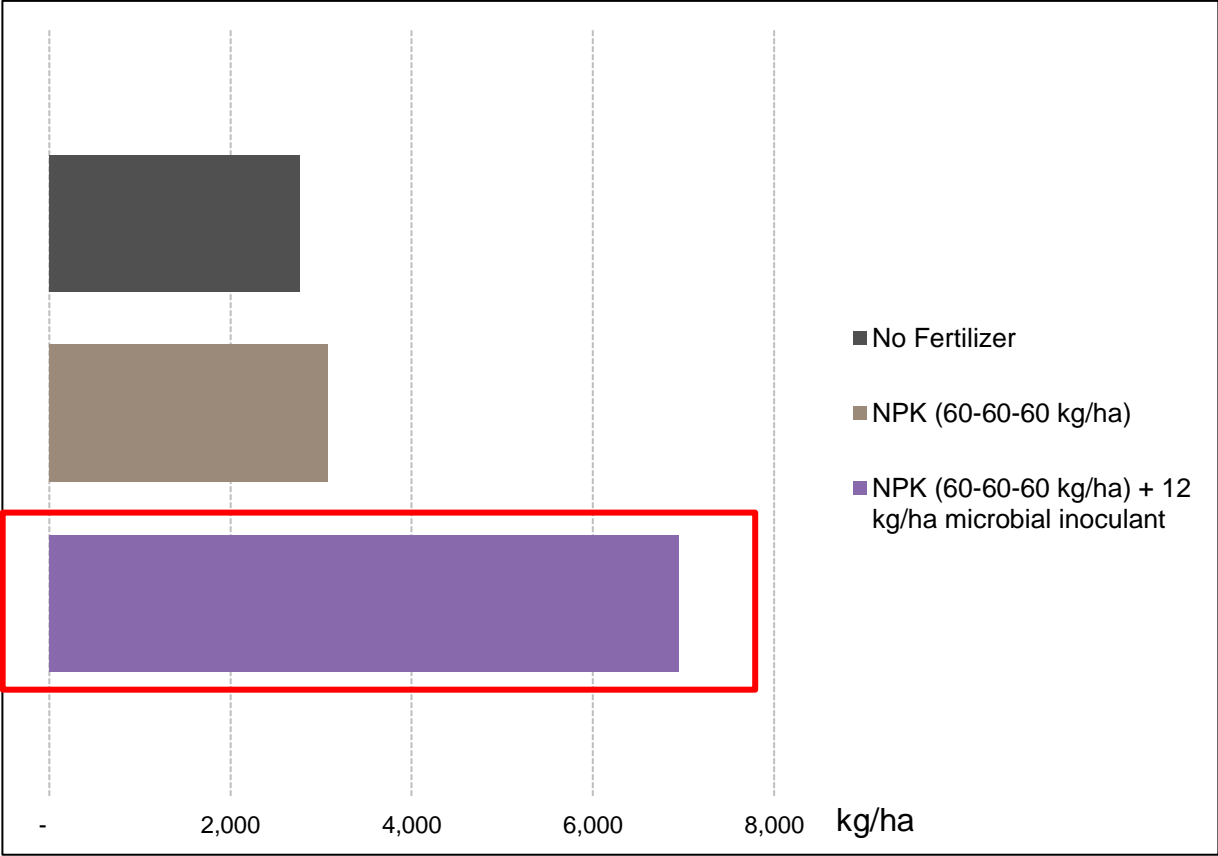
Type	Item	Unit Price (Php)	Amount (Php)
Material Cost	Ipil-ipil Leaves, 1.67Kg	5/Kg	8.00
	Cassava Peeling, 3.37Kg	1/Kg	4.00
	Empty water container used as incubator, 3pcs	95/pc	288.00 (recyclable)
	Pure culture stock	100/tube	250.00
	Other lab supplies	200/set-up	200.00
Utilities	Gas for substrate sterilization	100/set-up	100.00
	Electricity	100/set-up	100.00
	Water	50/set-up	50.00
	Laborer (3man days)	350/day	1,050.00
Total			2,050.00

Unit price:
**PhP 218.00/ kg
bioinoculant**

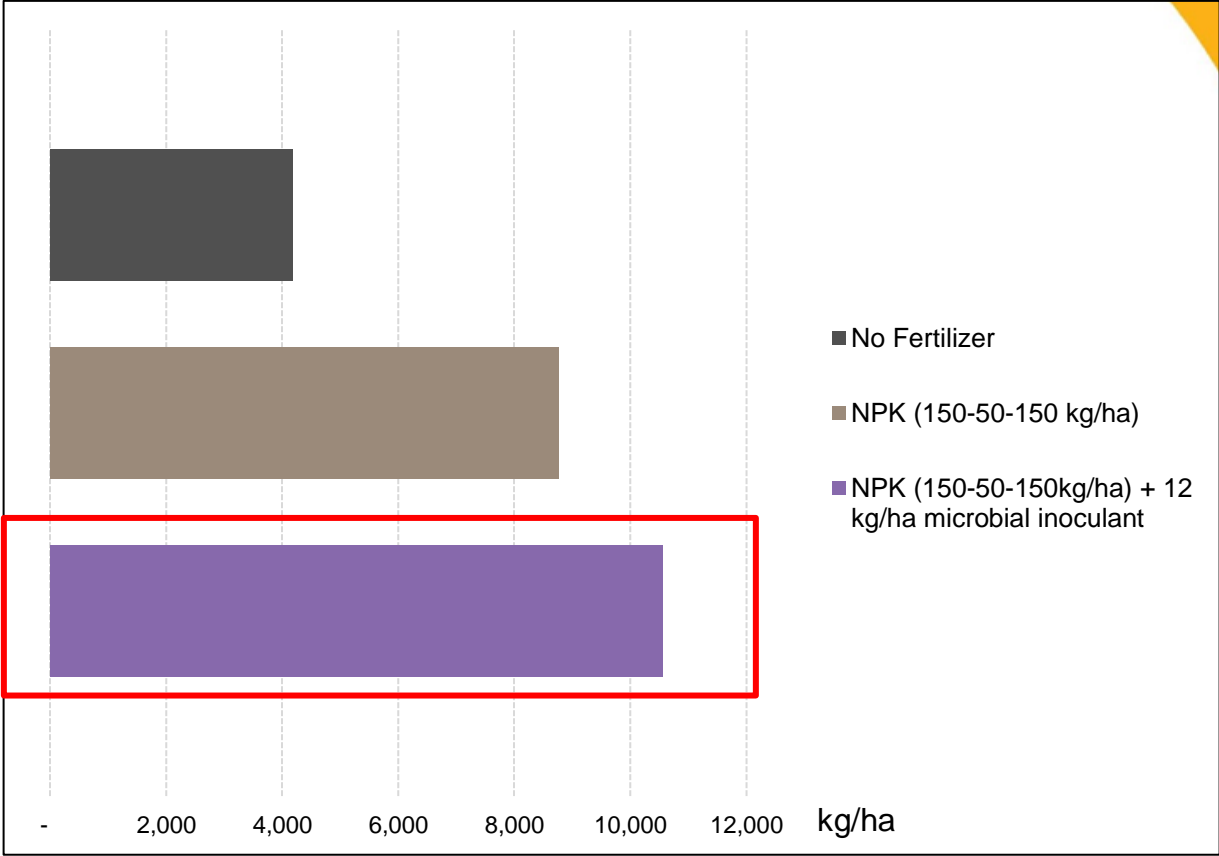
Test Results

- ✓ **Marketable Yield**
- ✓ **Cost-benefit Analysis**
- ✓ **Anthocyanin (Nutritional value)**

Marketable Yield



Comparison of sweet potato tuber yield (kg/ha) grown under neutral soil

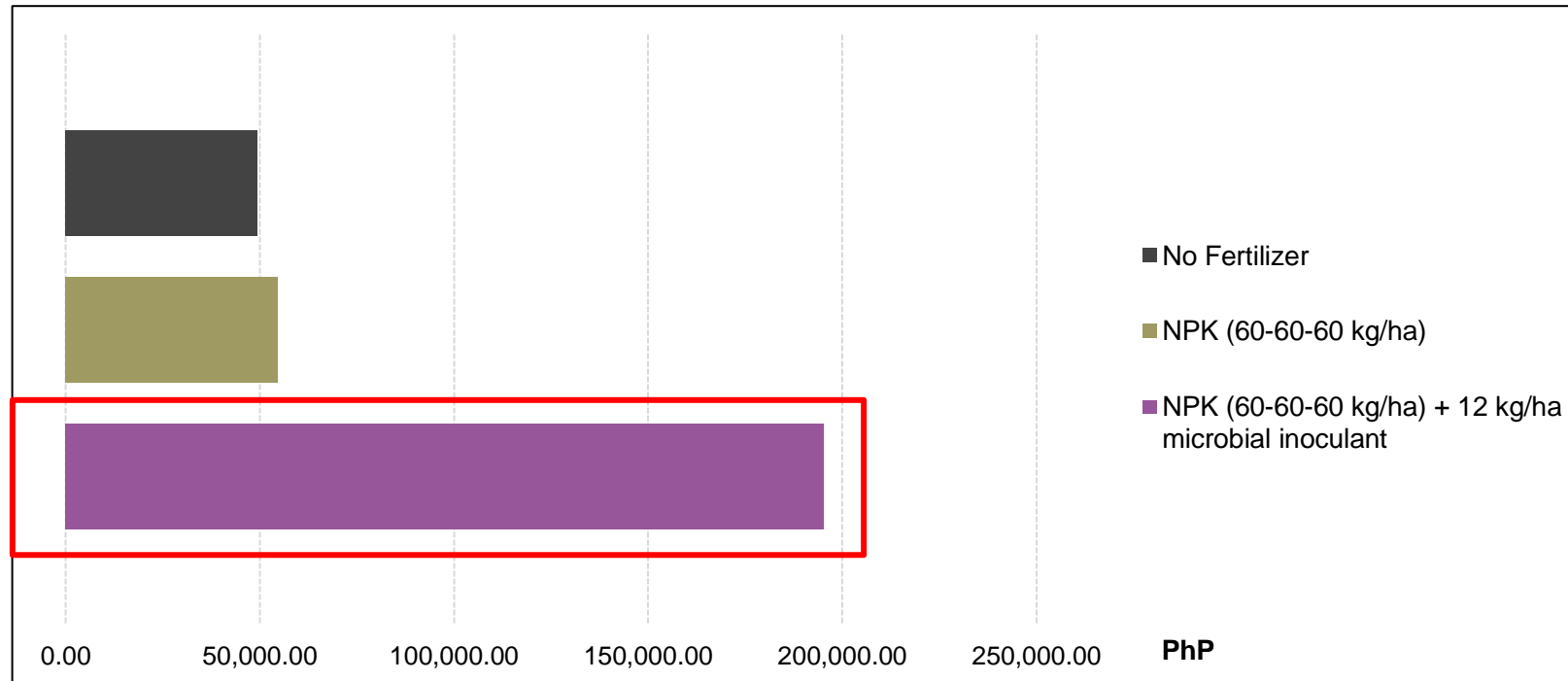


Comparison of purple yam tuber yield (kg/ha) grown under neutral soil

Cost-benefit Analysis

Sweet potato

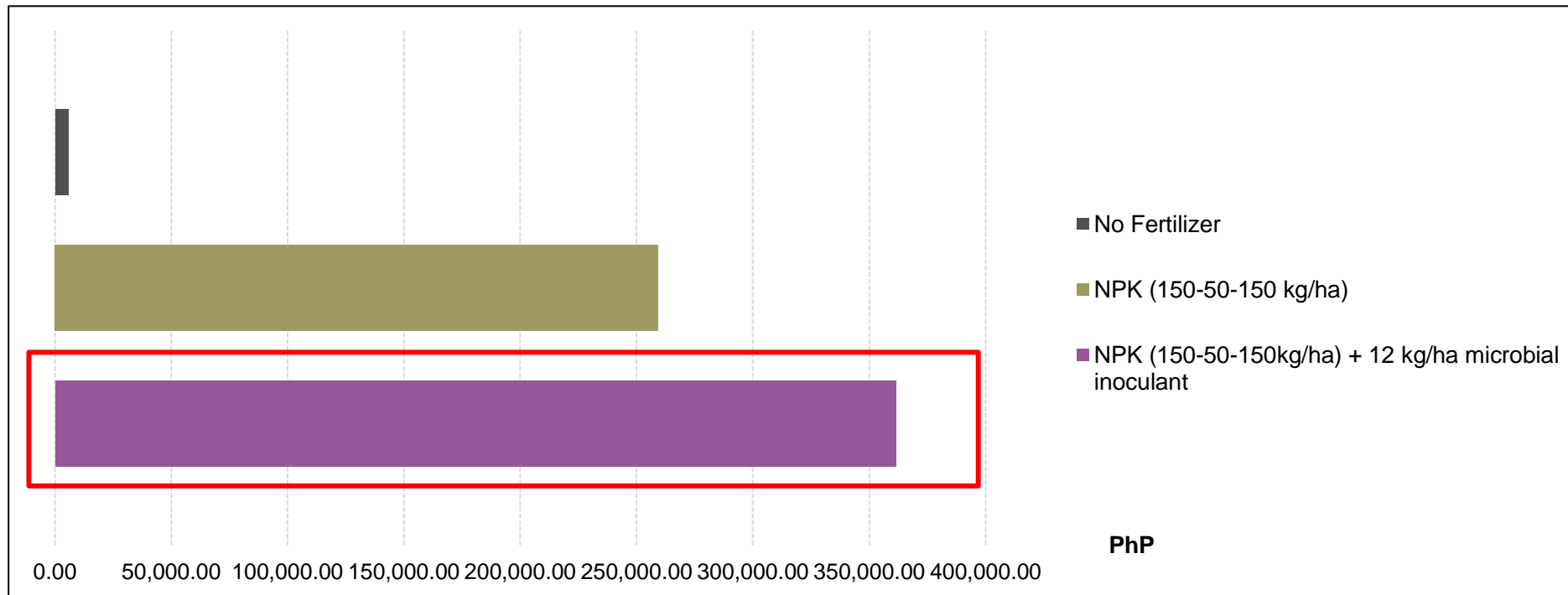
Treatment	Plant population	Potential total yield (Kg/ha)	Selling Price/kg, PhP	Gross Income, PhP	Total Production Cost, PhP	Net Income, PhP
No fertilizer	40,000	3,776	30	113,283	64,000	49,283
NPK	40,000	4,257	30	127,709	73,178	54,531
NPK + 12 kg microbial inoculant/ha	40,000	9,106	30	273,176	77,978	195,198



Cost-benefit Analysis

Purple yam

Treatment	Plant population	Potential total yield	Selling Price/kg, PhP	Gross Income, PhP	Total Production Cost, PhP	Net Income, PhP
No fertilizer	30,000	4,185	60	251,089	245,250	5,839 b
NPK	30,000	8,770	60	526,222	266,798	259,424
NPK + 12 kg microbial inoculant/ha	30,000	10,551	60	633,054	271,598	361,455



Anthocyanin

Sweet Potato

No fertilizer



NPK



**NPK + 12kg/ha
microbial inoculant**



Purple Yam



TECHNOLOGY: *BioMeg-Microbial Inoculant*

IMPACT:

Global Competitiveness

The use of this technology would significantly increase the production of sweet potato and purple yam. This would provide an adequate supply of sweet potato and purple yam for the development of their local value chains and industries that will provide sustainable livelihood or income opportunities to sweet potato and purple yam farmers, processors, and other stakeholders in the locality. The generated products can also be exported given the rising popularity of sweet potato and purple yam worldwide.

Food Security

The subsequent nutrient uptake by sweet potato and purple yam with the use of the technology in the presence of macrofertilizers was found to increase yield and improve nutritional quality. Only a trace amount is applied a few days after planting to effect the desired benefit. The expected yield increase in crop production would ensure sustainable food security.

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IMPACT:

Climate Change

The technology that will be generated in this project uses sweet potato and purple yam enriched naturally by nutrients through proper nutrient management using natural microorganisms present in the soil. These crops grow in almost all soil types and are found to withstand the adverse effects of climate change. Since it can be easily cultivated, the crops are highly accessible to farmers.

Environmental Protection

This technology help increase the yield of purple yams without damaging the environment. Realizing the deteriorative effects of synthetic and chemical fertilizers in improving soil fertility, the technology employs a useful microorganism responsible for the continuous availability of nutrients from natural sources to revive soil health and improve soil quality.

Conclusions

- The release of micronutrients and subsequent uptake by plants with the use of the product in the presence of macrofertilizers was found to **increase yield and improve nutritional quality.**
- Only a **trace amount of BioMeg** is applied a few days after planting to effect the desired benefit.
- The expected yield increase in the presence of micronutrients in crop production will translate into a corresponding **increase in income and provide a sustainable livelihood for our farmers.**

IEC Materials

APPLICATION

Crop's Name	Age of crop	NPK (kg/kg/ plant)	Microbial (kg/kg/ plant)	Frequency
Sweet potato	2 weeks after planting	60-60-60	12 kg/ha	Once
Purple Yam	1 month after planting	75-25-75	6 kg/ha	Twice
	1 month after first application	75-25-75	6 kg/ha	

Ways of Application

Storage: Store in cool dry place and away from direct sunlight or heat.

Type of soil: **Neutral soil (pH 6.5 to 7.5)**

1. Make four holes around each plant having a distance of 5 cm from the soil surface.
2. Add the exact amount for each corresponding fertilizer treatment (as shown in Application Table). Two holes for the bioinoculant and the other 2 holes for the complete fertilizer. Equally divide it into the holes.
3. Cover the holes with soil to prevent the volatilization of N-containing fertilizers.

BioMeg

✓ Mega sa ANI,
✓ Mega sa KITA,
✓ Mega sa SUSTANSYA!

BioMeg is a microbial inoculant containing *Bacillus megaterium* as the active ingredient. Its subsequent nutrient uptake by plants with the use of the product in the presence of macrofertilizers was found to increase yield and improve nutritional quality. Only a trace amount of BioMeg is applied a few days after planting to effect the desired benefit. The expected yield increase in crop production will translate into a corresponding increase in income and provide a sustainable livelihood for our farmers.

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DR. EDUARDO E. TULIN
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Layout and Design:
APRIL JOY S. VERGARA

Anthocyanin Content

Sweet potato

No Fertilizer NPK NPK + 12kg/ha microbial inoculant

Purple yam

No Fertilizer NPK NPK + 12kg/ha microbial inoculant

Sweet potatoes and purple yams applied with microbial inoculant have more intense purple coloration compared to that of the treatment with no fertilizer and NPK fertilizers alone. The more intense the purple coloration of the tubers, the higher is the anthocyanin content. Anthocyanin-rich crops offer tremendous health benefits due to their antioxidant properties.

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Visayan short and long brochure

English short and long brochure

PAAGI SA PAGAMIT

Matang sa Paghimo	Antas sa Antas	Quant (kg/ha)	Microbial (kg/ha)	Frequency
Kamote	2 weeks after planting	60-60-60	12 kg/ha	Once
Ubi nga Kinampay	1 month after planting	75-25-75	6 kg/ha	Twice
	1 month after first application	75-25-75	6 kg/ha	

Mga Pahayag

Paghimo: Tipig kini sa makapag-apon nga mga dapat ug apin ipakigay sa dinkbang kit sa adlaw.

Kiam sa yuta: Neutral ang pH magkubog gikan sa 6.5 ngadto sa 7.5

1. Pagbuho ug buho apin ka buok palibot sa kada panikan sa tubero nga mag gintang nga 5 sentimetro gikan sa tubero sa buho.
2. Idagang ang hangang gidaghanon alang sa hangang rate nga hangang pagpaway (treatment) gikan sa application table. Dagang ang uba buho ug microbial inoculant ug ang hang buho ka mga buho hangang ug complete nga uba. Babaw makubog ang complete nga uba sa ginkasandad.
3. Tubero ang mga buho ug yuta aron makigayon ang pagpaway sa Nitrogen nga uba sa uba.

BioMeg
(Visayan version)

✓ Mega sa ANI,
✓ Mega sa KITA,
✓ Mega sa SUSTANSYA!

BioMeg usa ka microbial inoculant nga adunay *Bacillus megaterium* top sibbo nga sibong. Ang pagbuho ning maong mga sustansya gikan nini dha sa mga tanom nasuta nga makapadagang kini sa kang abot ug makapalambog labi sa kalidad sa mga sustansya nga makaha gikan kamote. Dugang lamang ang paglay nga BioMeg human sa pipila ka mga adlaw gikan sa pagtanom nla aron masuta ang glisoman nga mga makuhang beneplyo. Ang glisoman nga tubero sa apin sa produksyon sa mga tanom magkahugan ug ubaw nga kita ug mangion ang malubutong pagmabuhi alang sa atong mga mag luwa.

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Gihupnat nga Anthocyanin

Kamote

No Fertilizer NPK NPK + 12kg/ha microbial inoculant

Ubi nga Kinampay

No Fertilizer NPK NPK + 12kg/ha microbial inoculant

Ang kamote ug ubi nga kinampay nga gihupnat ug microbial inoculant mas tingad ang kolor nga kinatib-ay hangang gihupnat lamang ug NPK. Kiam magka tingad pag-ayon ang kolor nga kinatib-ay ug uba magka ang gihupnat nga anthocyanin. Ang mga kamote nga nagka sa anthocyanin maong ug dughang beneplyo sa uba hangang sa gihupnat nla nga mga anto-oxidant.

BioMeg
(Visayan version)

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✓ Mega sa KITA,
✓ Mega sa SUSTANSYA!

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Layout and Design:
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Brochure

Print Trifolds

TEST RESULTS

Anthocyanin

Sweet Potato

Purple Yam



No Fertilizer



NPK

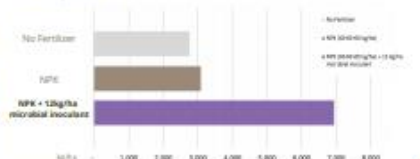


NPK + 12kg/ha microbial inoculant

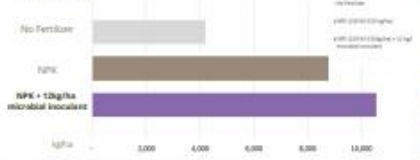
Field Trials PhillRootcrops, VSU

Marketable Yield

Sweet potato

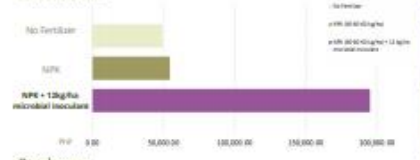


Purple yam

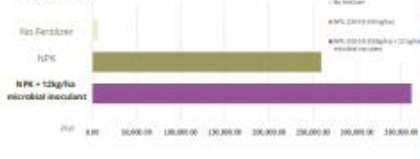


Profit

Sweet potato



Purple yam



BioMeg

- ✓ Mega sa ANI,
- ✓ Mega sa KITA,
- ✓ Mega sa SUSTANSYA!



ABOUT

The Product

Contents

Organic Substrates

Ground ipil-ipil leaves (N-source) and Cassava Peeling (C-source) with 2:1 Carbon Nitrogen Ratio

Microorganism

Bacillus megaterium

A rod-shaped, fast-growing spore-forming bacteria for micronutrient mobilization.

Production Cost

Type	Item	Unit Price (Php)	Amount (Php)
Material	Ipil-ipil leaves, 1.67kg	5/kg	8.00
	Cassava Peeling, 3.37kg	1/kg	4.00
	Empty water container used as incubator, 3pcs	95/pc	285.00
	Pure culture stock	100/set-up	250.00
Utilities	Gas for substrate sterilization	100/set-up	100.00
	Electricity	100/set-up	100.00
Total	Water	50/set-up	50.00
	Laborer (3man days)	350/day	1,050.00
Total			2,050.00

Base: 5 kg Dried Product
Unit Price: P10 410.00/kg bioinoculant

APPLICATION

APPLICATION TABLE

Crop's type	Age of crop	NPK	Bioinoculant	Frequency
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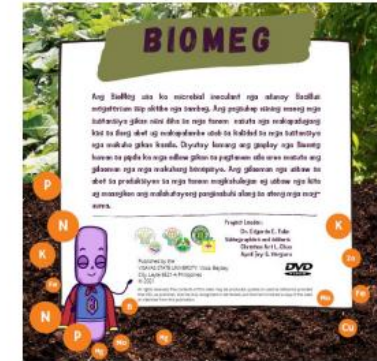
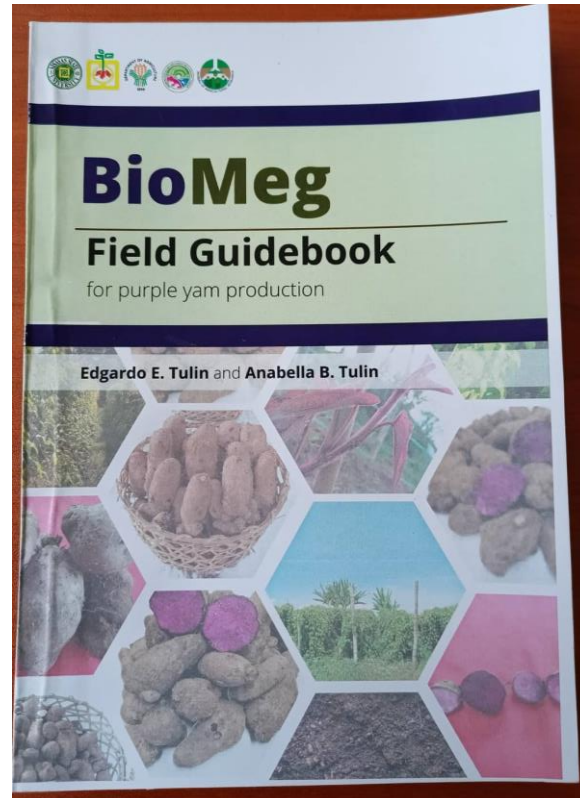
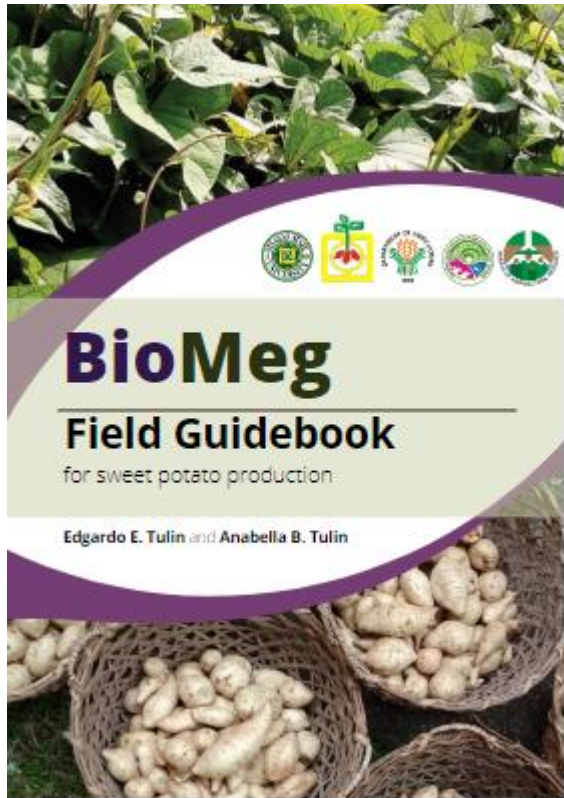
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Front

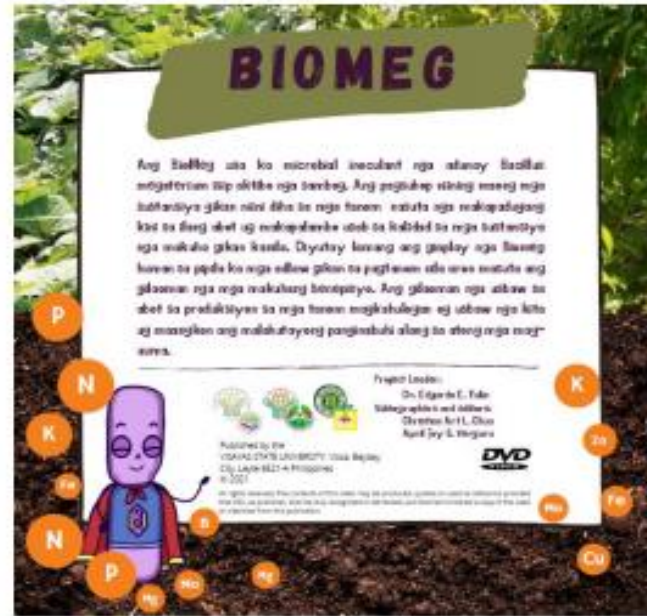
Back

IEC Materials



BioMeg Field Guidebook for sweet potato and purple yam production

CD (promotional video)



Thank you.