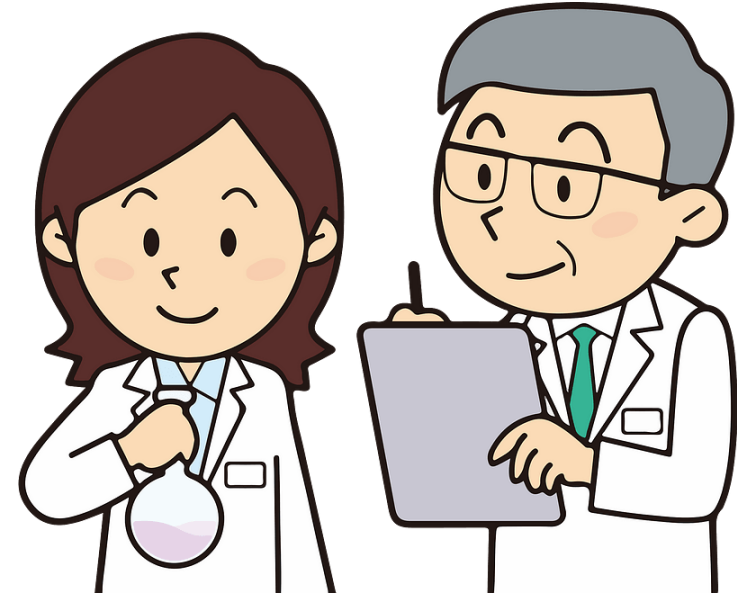


From Lab



To Farmers



Lucille V. Abad, Ph.D.

*Philippine Nuclear Research Institute
Department of Science and Technology
Philippines*

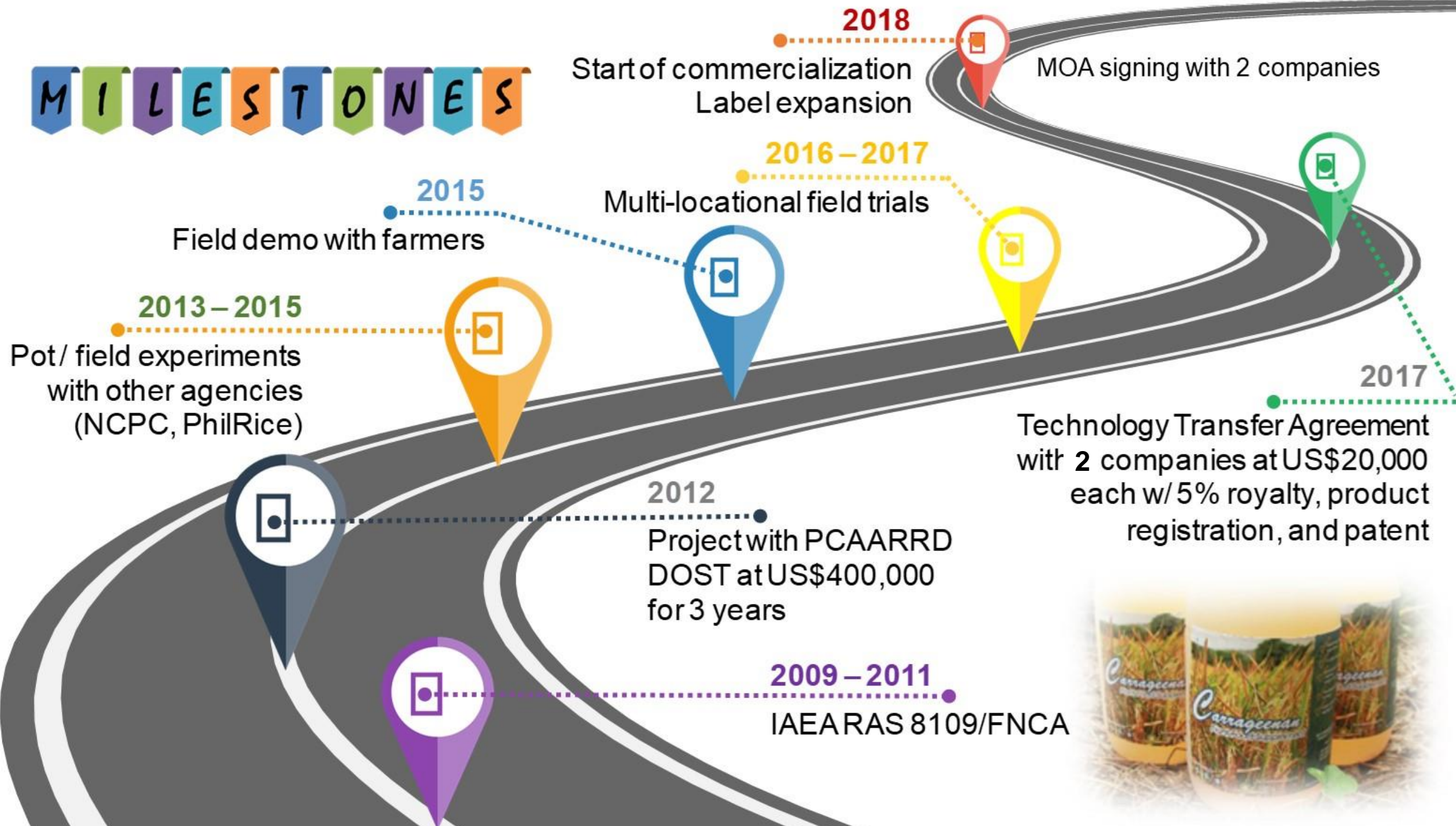




Carrageenan plant growth promoter

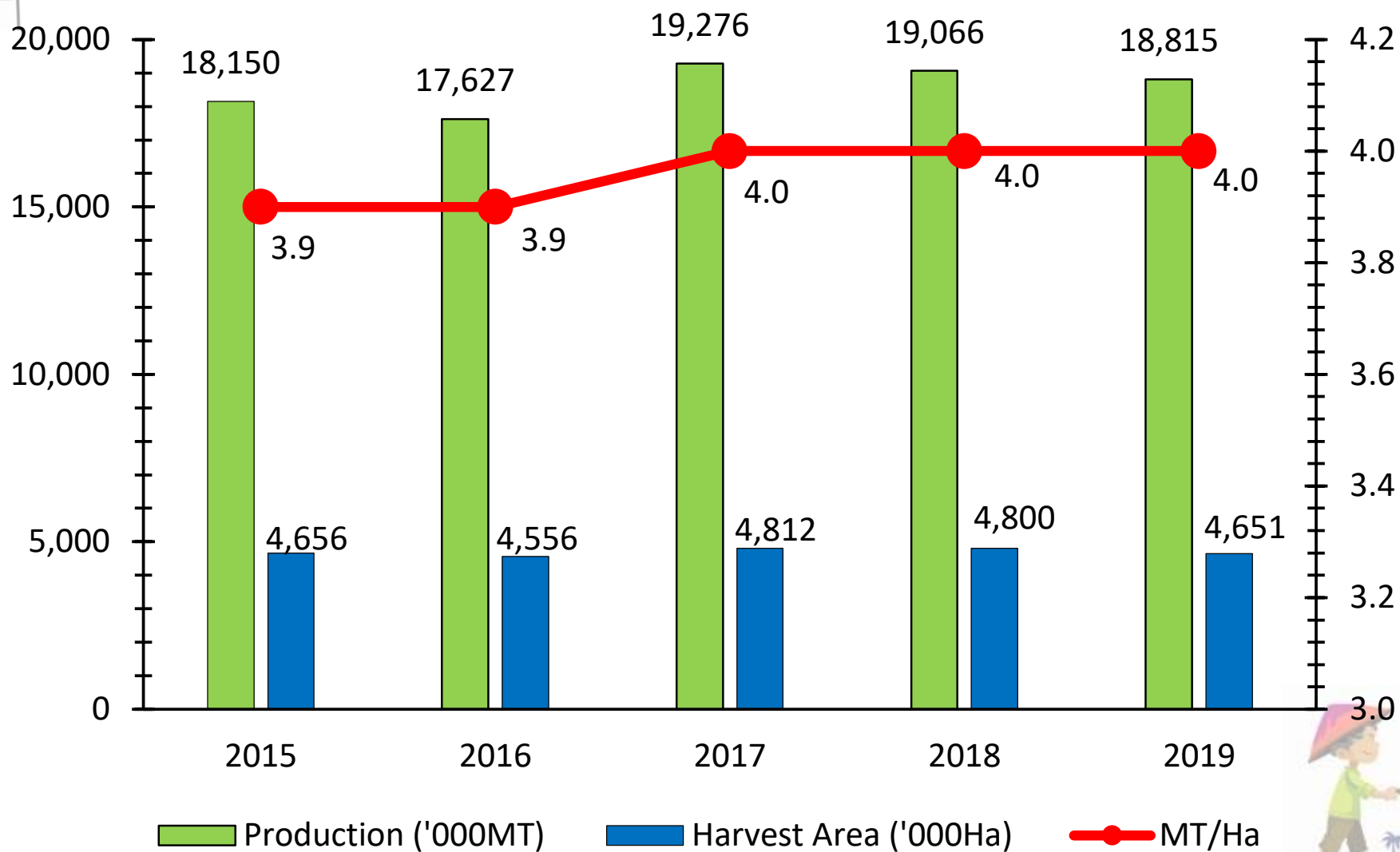


M I L E S T O N E S



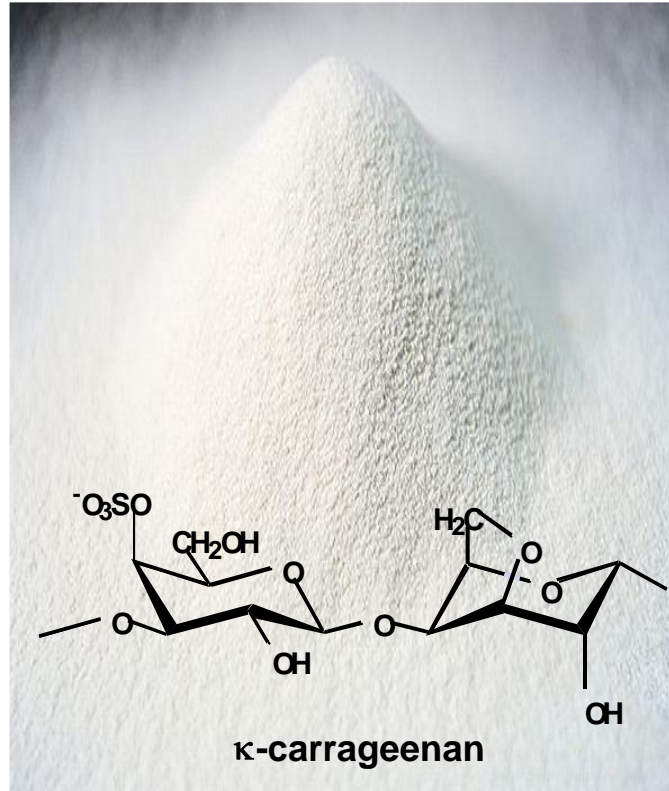


Palay Crops Estimate, Philippines January – December, 2015-2019





Eucheuma Cottonii (*Kappaphycus alvarezii*)

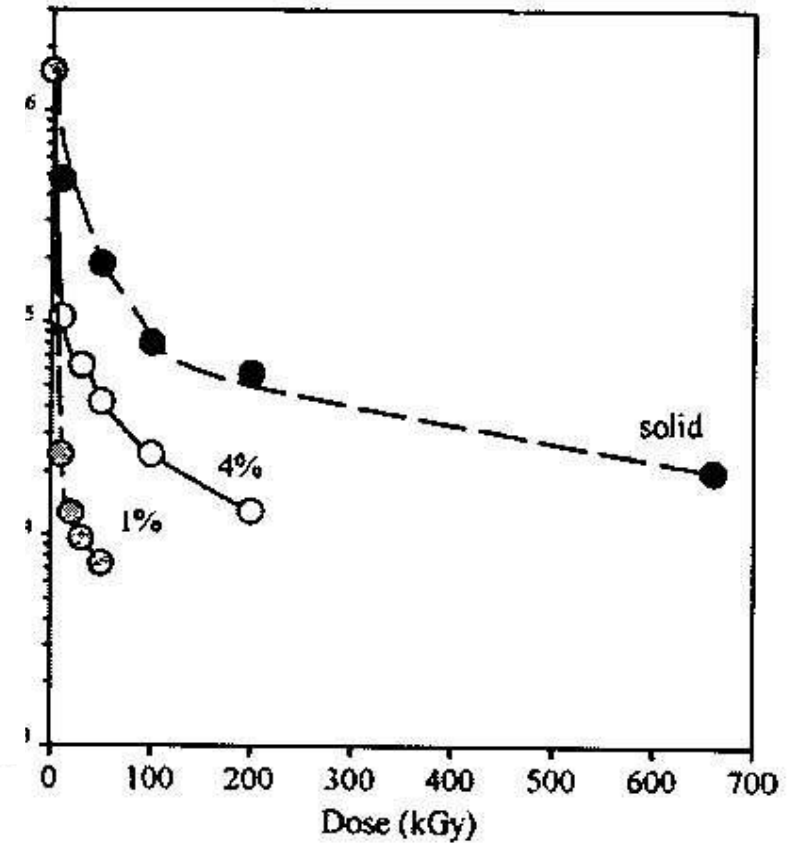
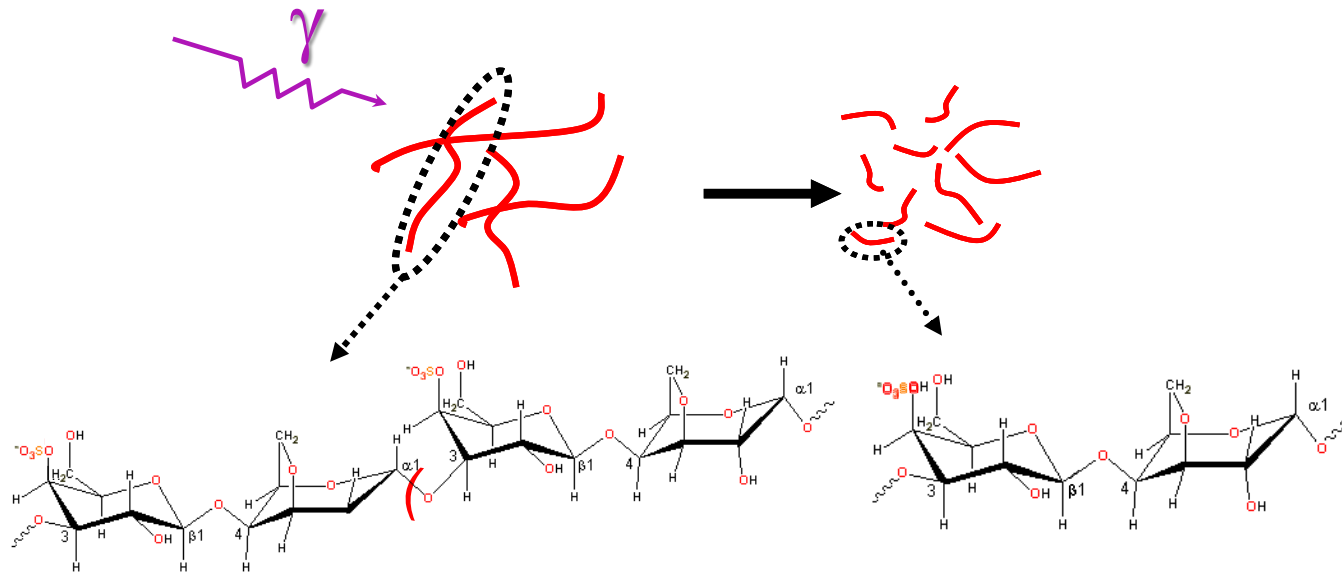


Raw Material



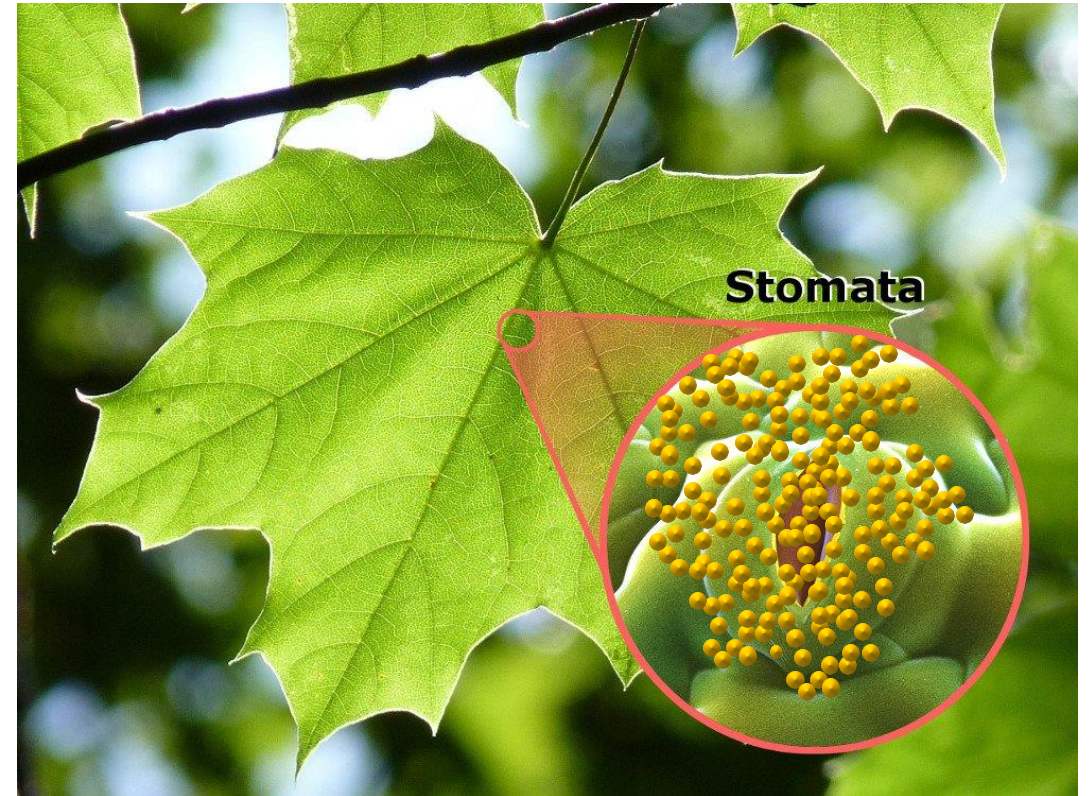
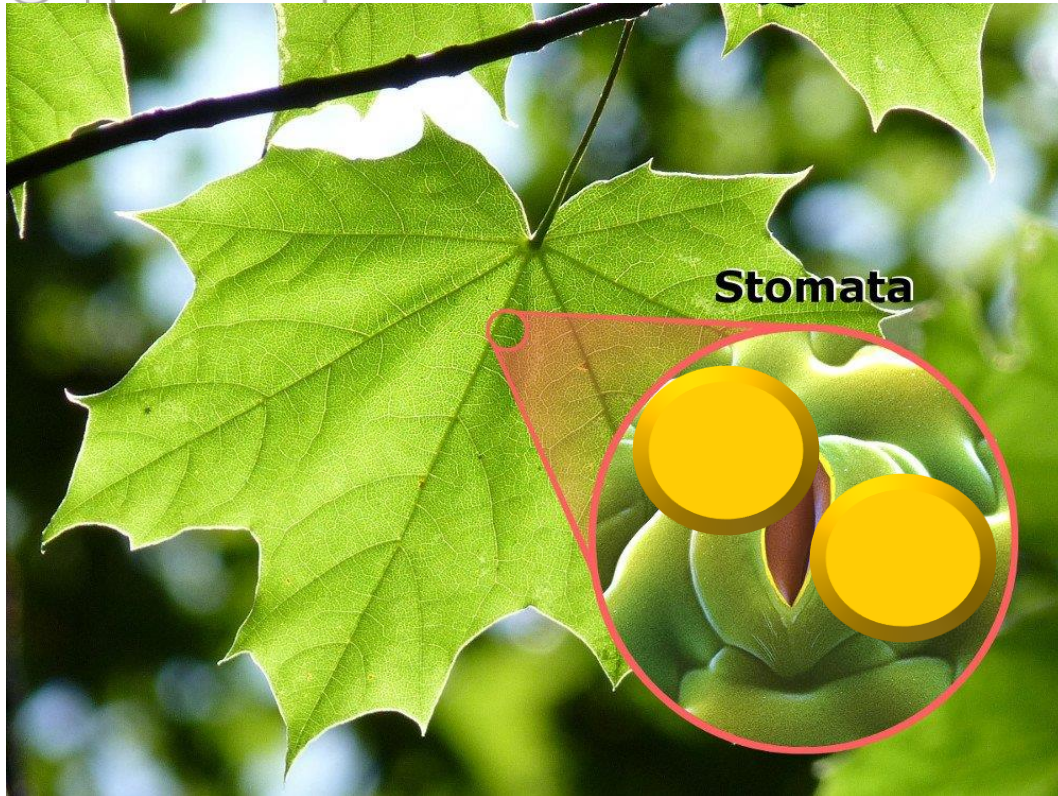


Effect of Irradiation

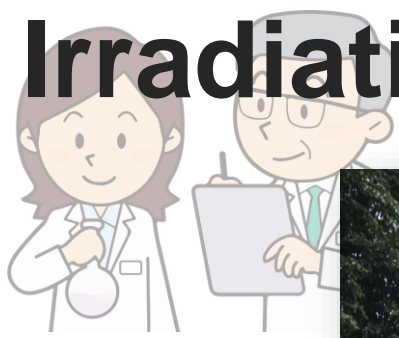




Radiation effects on carrageenan



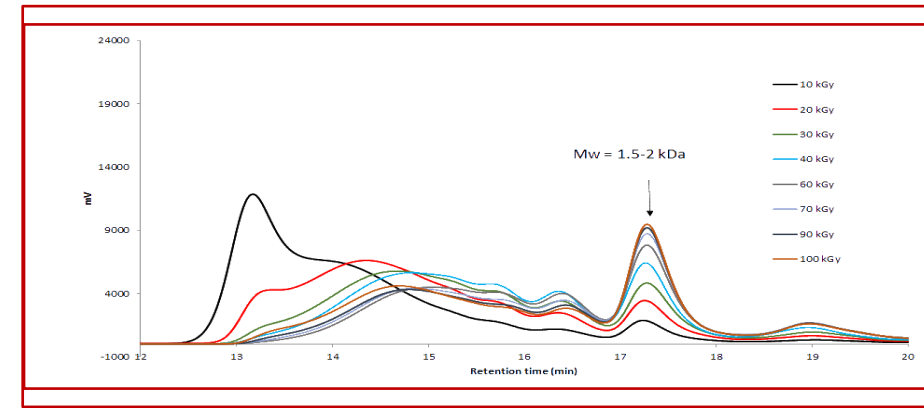
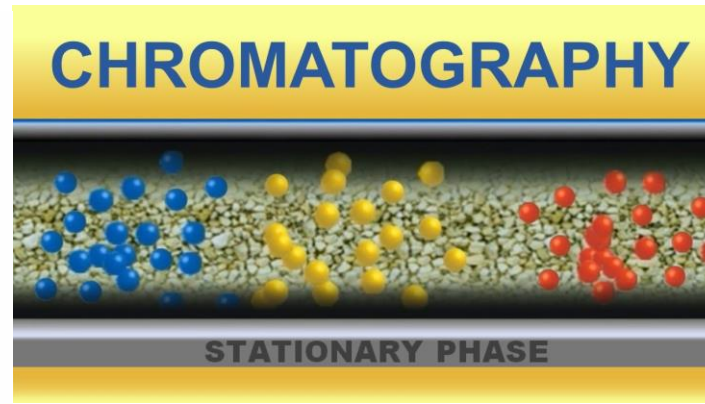
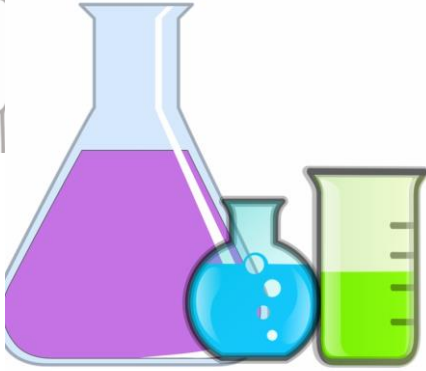
Irradiation Facilities

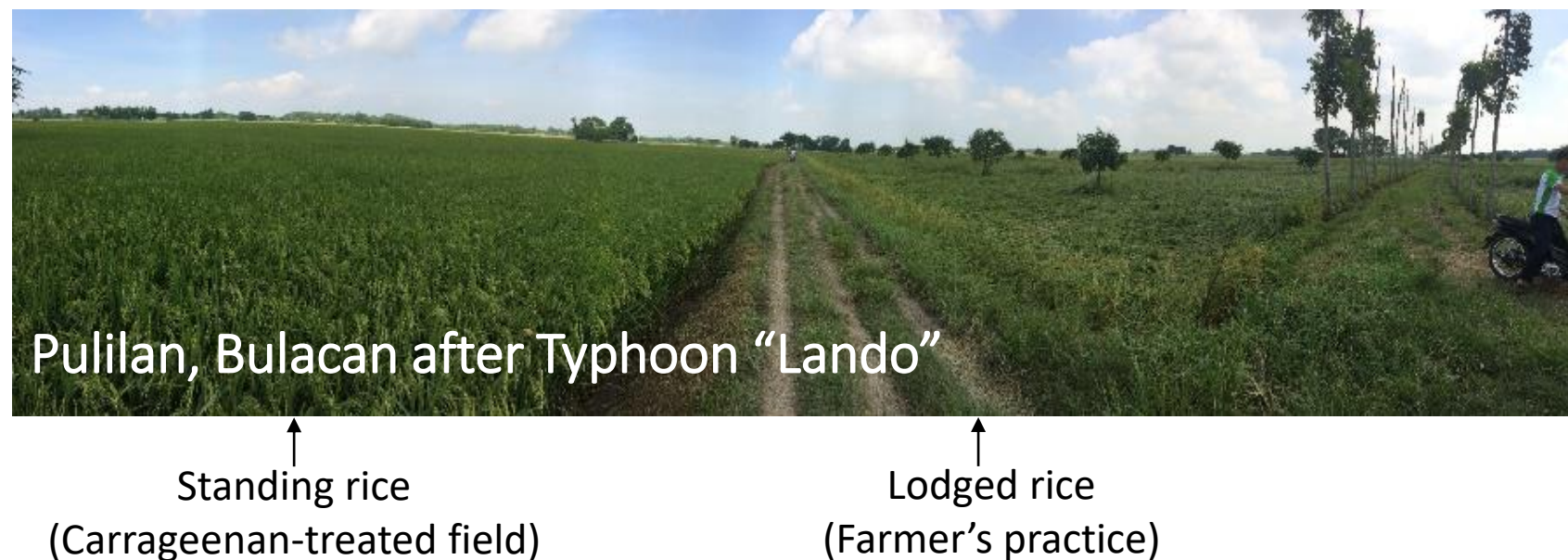
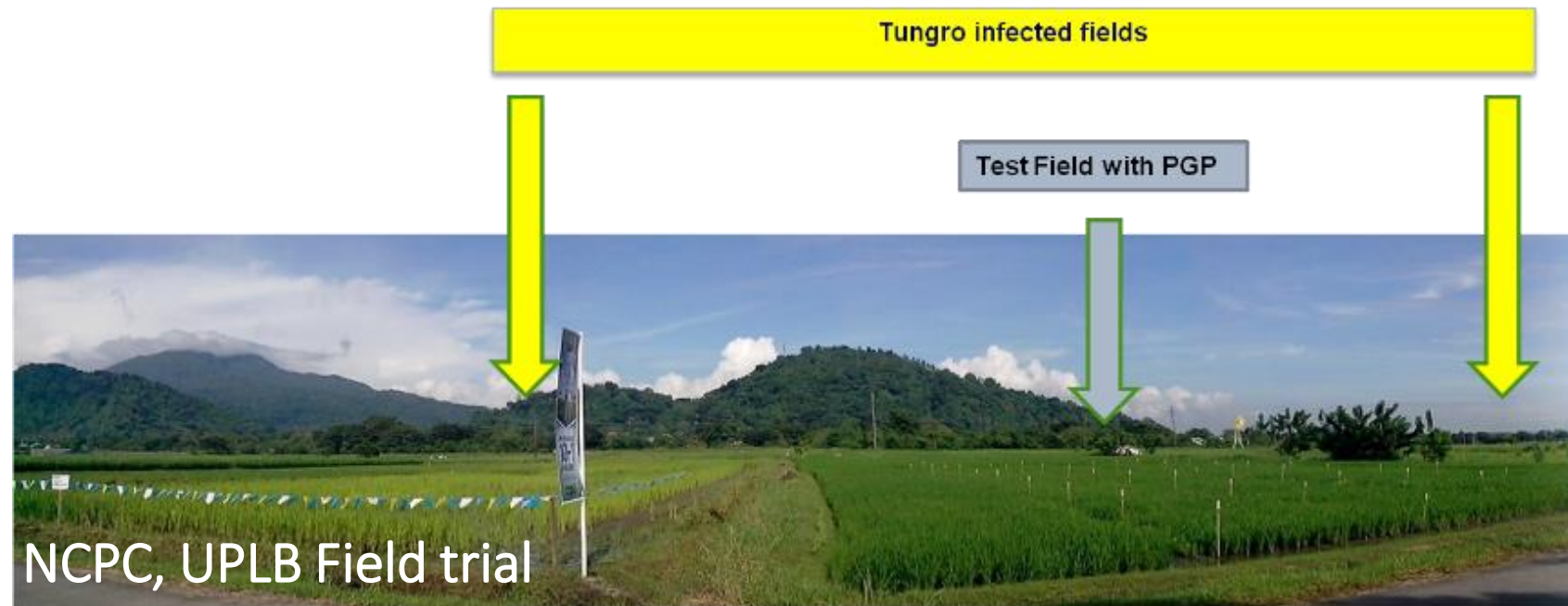
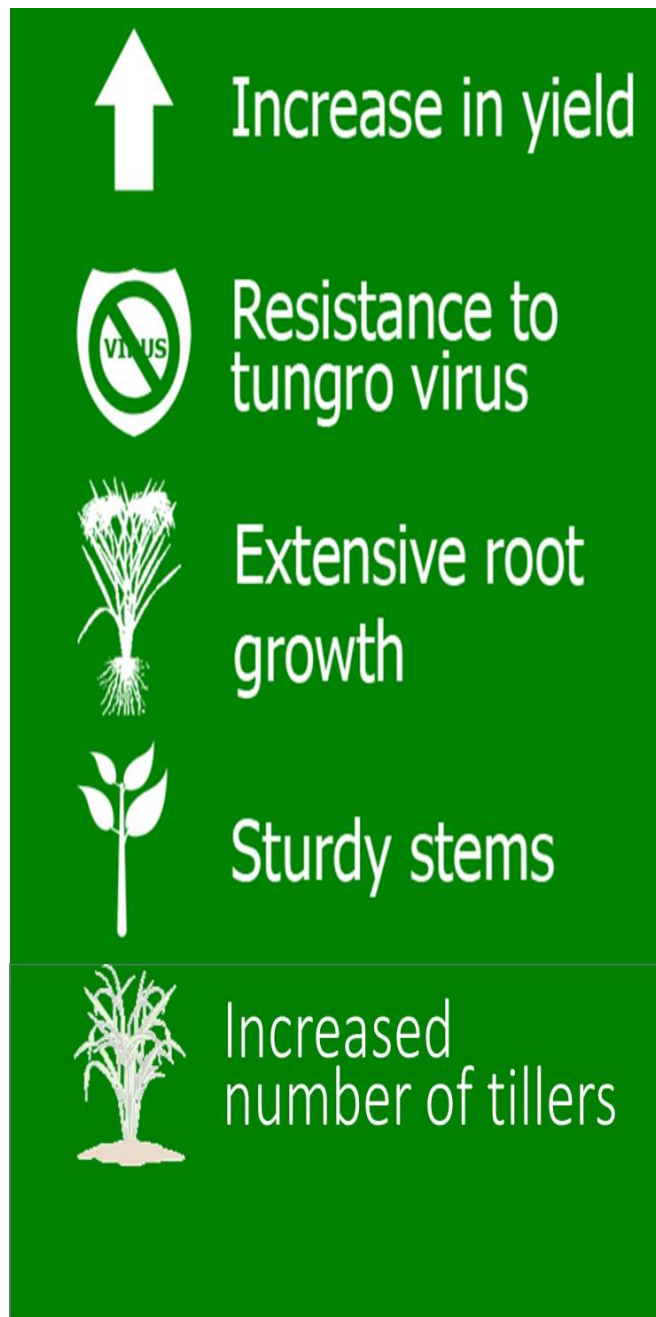


Cobalt-60
multipurpose
irradiator

Electron beam
accelerator

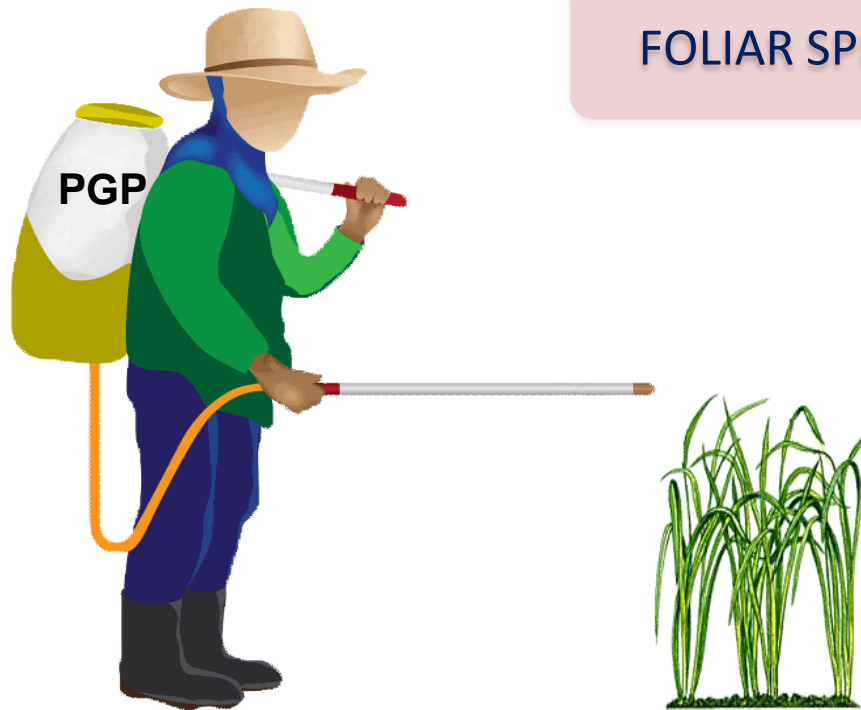






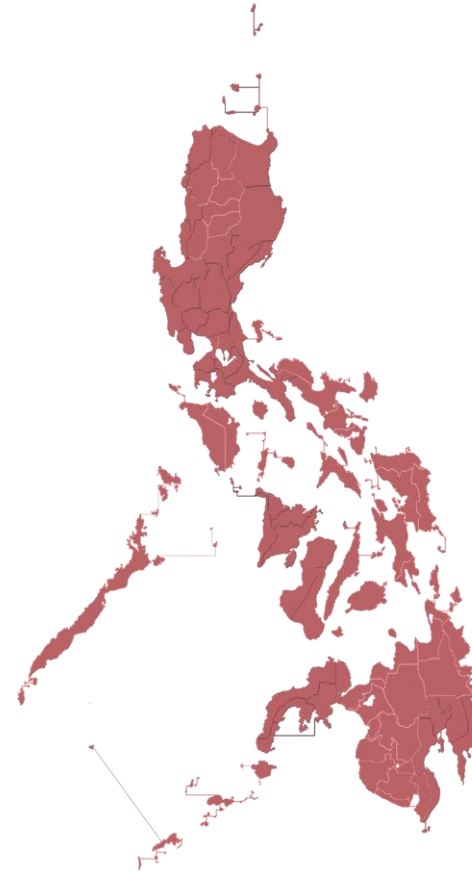


Field application



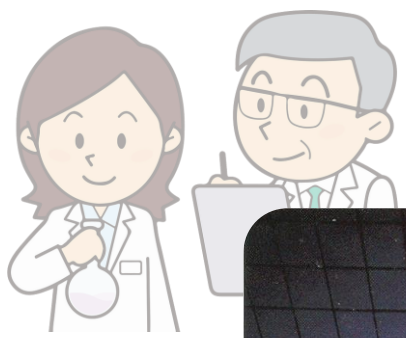
FOLIAR SPRAYING

**At least
20%
increase in
yield**

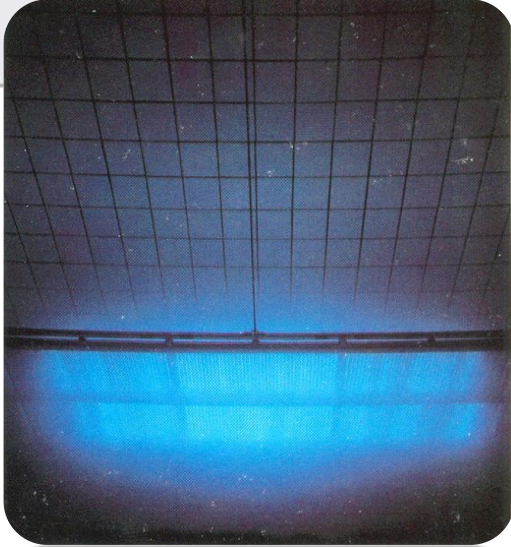


40,000 ha. rice field across
the Philippines





PNRI's Capacity to Produce Carrageenan PGP



Co-60 source

1,200L /4 days

Good only for 133 ha.





Electron Beam Facility



EB Accelerator Specifications:

Model: EB Tech ELV-8

Maximum Energy: 2.5 MeV

Maximum Current: 50 mA

Maximum Power: 100 kW







UTILIZATION OF ELECTRON BEAM MACHINE

Fabrication of the **LIQUID HANDLING SYSTEM** for irradiation of carrageenan

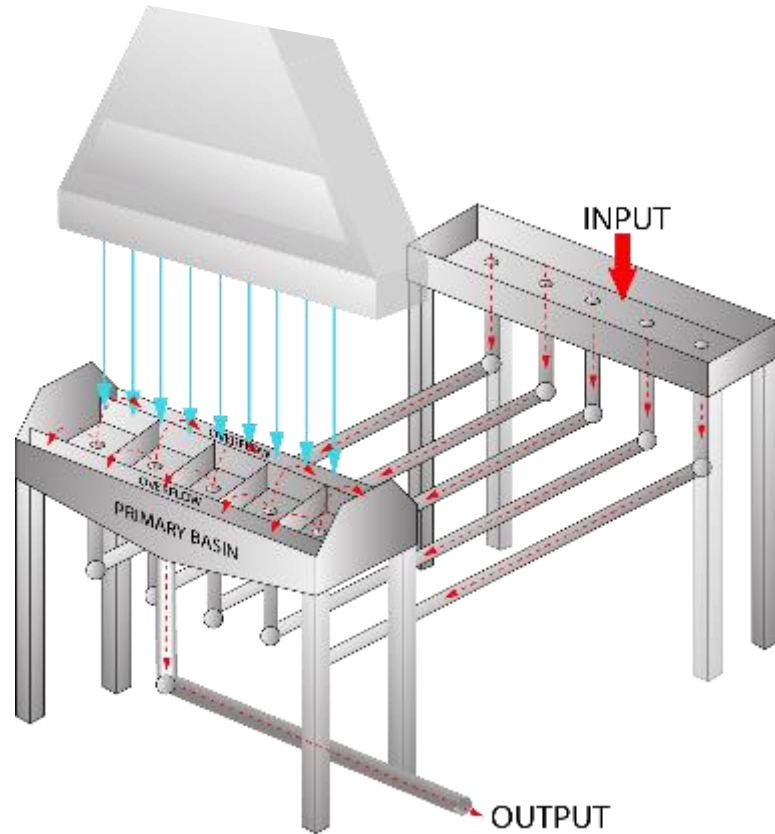
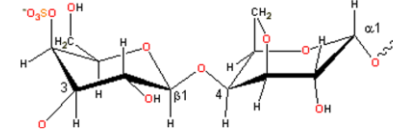
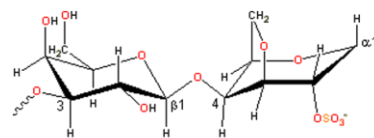
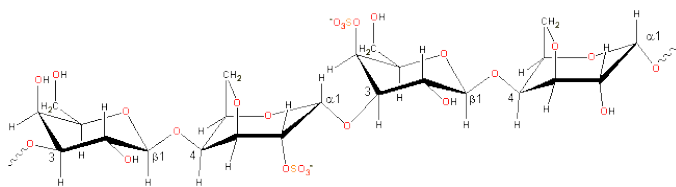
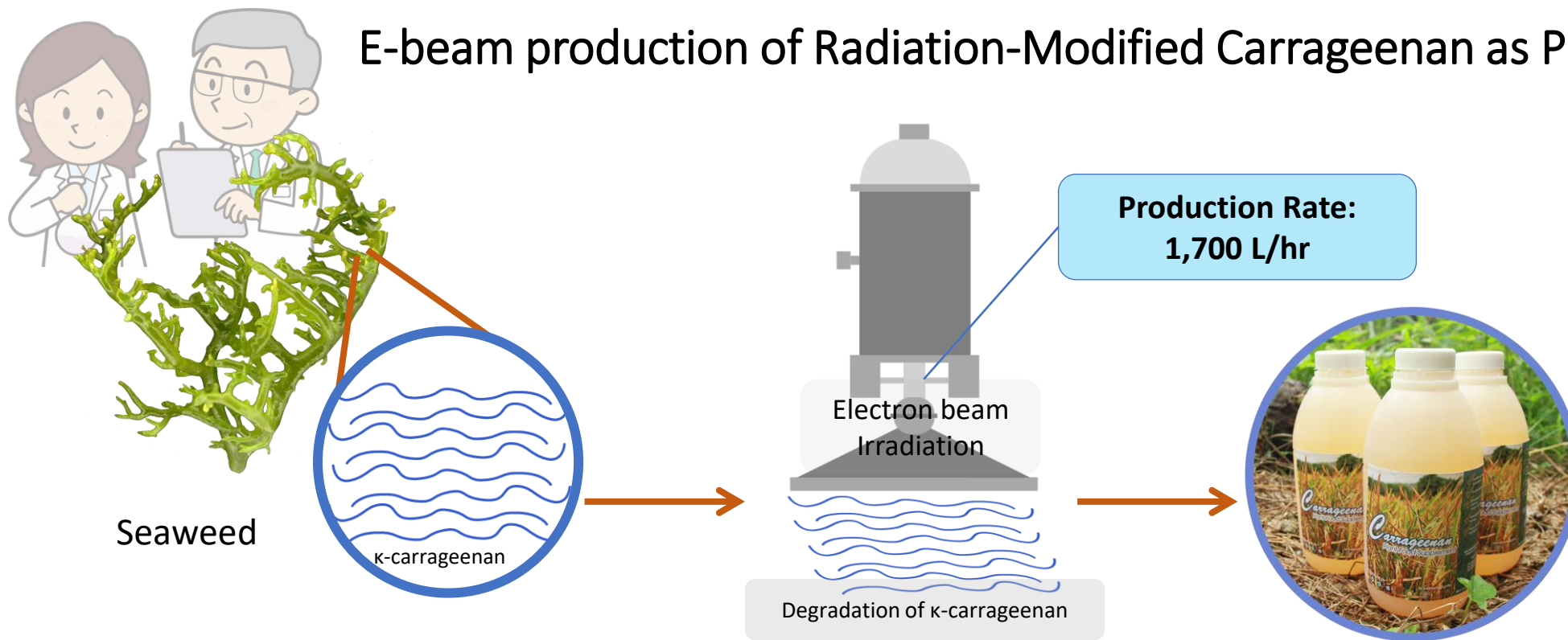


Diagram of the fabricated liquid handling system



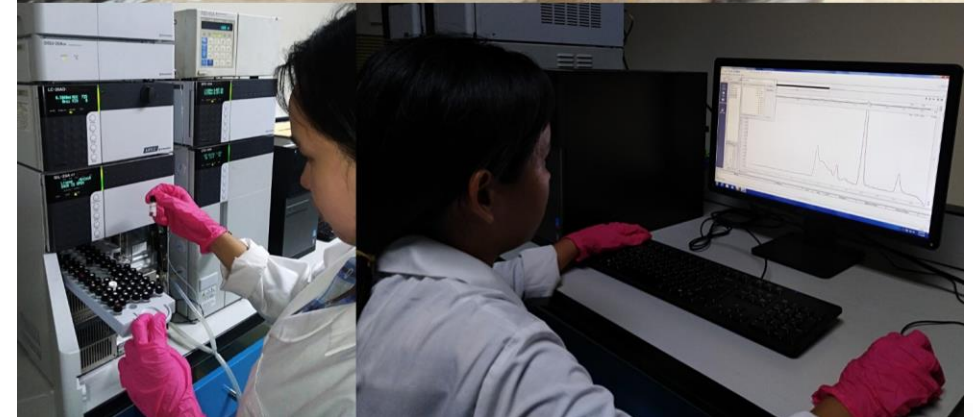
E-beam production of Radiation-Modified Carrageenan as Plant Growth Promoter



If 8 hrs. operation / day
13, 600L/day

Good for 1,500 ha.









Treatment	Weight of Rice (kg/sack)
With Carrageenan	56 kg/sack
Without Carrageenan	47 kg/ sack

One farmer in Solana, Cagayan reported her harvest data through weight of rice seeds per sack and average yield per hectare and income. It is reported that rice applied with CPFS have heavier seeds with a difference of 9 kg/sack.

Treatment	Average Yield (cavans/ hectare)	Weight of Rice (kg/ sack)	Price per kilogram	Total Income (Pesos)
With Carrageenan	107	56	17	Php 101,864.00
Without Carrageenan		47		Php 85,493.00

US\$ 300






Republic of the Philippines
Department of Science and Technology
Office of the
Technology Application and Promotion Institute
as Secretariat of the Fairness Opinion Board.

Having complied with the provisions of Republic Act No. 10055 otherwise known as the "Philippine Technology Transfer Act of 2009", I hereby issue this

Certificate of Fairness Opinion

on the proposed transaction to transfer the technology entitled
"Carrageenan Plant Growth Promoter"
of the

Philippine Nuclear Research Institute
as Licensor to the
HL Trading Company Inc.
as Licensee

I hereby declare this proposed transaction as duly designated by law as
FAIR
to the Licensor.

This Certificate is only applicable to this request. All other transactions
related to the subject technology are still subject to the independent
Fairness Opinion Reports and fairness opinions.

J. P. de la Peña
FORTUNATO T. DE LA PEÑA
Secretary

09 January 2017
Bicutan, Taguig City



Code: FOB-2016-044


 DIRECT LICENSING TERM SHEET

Exhibit Code: _____

Background of the Technology: Seaweed-derived plant biostimulant
Title of Technology: Plant Food Supplement / Carrageenan Plant Growth Promoter
Cost of Technology: ₱8.6-M
Basis of Valuation: ☐ R&D Cost ☐ IP Value ☒ Fair Market Value (FMV)
Type of IP: ☐ Patent ☐ Copyright ☐ Trade Secret ☐ Know-How ☐ None

Background of the Licensee:
Licensee is a: ☐ Sole Proprietor ☐ Partnership ☐ Corporation ☐ Cooperative
With DTI Registration? ☐ Yes ☐ No With SEC Registration? ☐ Yes ☐ No
Filipino citizen? ☐ Yes ☐ No With audited FS? ☐ Yes ☐ No
Domestic Corporation? ☐ Yes ☐ No With CDA Registration? ☐ Yes ☐ No
With audited FS? ☐ Yes ☐ No With audited FS? ☐ Yes ☐ No

Years of existence: 36 With Existing Facilities? ☐ Yes ☐ No
Present Net Worth: Equity: ₱10-M Capitalization: ₱10-M
Do you receive government support in your facilities? ☐ Yes ☐ No
If yes, how much?: Approximately N/A % of equity Capitalization

Financial Terms:
(1) Number of Years: 8 (2) Is license renewable? ☒ Yes ☐ No
(3) Licensing fee: ☒ One-time upfront: ₱1,500,000.00
% based on ☐ R&D Cost ☐ IP Value ☐ FMV
(4) Royalty: ☒ 5 % based on gross sales
(5) Exclusivity: Licensing: ☐ Yes ☐ No Remarks: See field of use & geographical appointment
Field of Use: ☒ Yes ☐ No Remarks: Rice crop
Geographical: ☒ Yes ☐ No Remarks: Philippines
(6) Sub-Licensing: ☐ Yes ☐ No Remarks: _____
(7) Other agreed terms: _____

We, as representatives of the Parties to this proposed transaction, do hereby certify that we are authorized to enter into this Technology Transfer Agreement. We further certify that the contents of this Term Sheet are True and Correct to the best of our knowledge. By signing to the contents of this Term Sheet, we shall pursue a formal Licensing Agreement and hereby request a Fairness Opinion Report subject to submission of required documents in accordance with Republic Act No. 10055, its IRR, and policies, and shall make ourselves available, when our participation or presence is requested in any meeting at the DOT.

LICENSOR
Signature: *J. P. de la Peña*
Name: CARLO A. ARCILLA, Ph.D.
Position: Director
Institution/Company: Philippine Nuclear Research Institute
Contact No.: 8206111 to 19 ext 287
Email: carlo.arcilla@gmail.com
Assisted by: Miguelacion, M.T.M.

LICENSEE
Signature: *Uldo T. Horilla, Jr.*
Name: ULDO T. HORILLA, JR.
Position: President & General Manager
Institution/Company: HL Trading Company, Inc.
Contact No.: 082 227 4447 / 09209291790
Email: uldo@hltrading.com
Assisted by: _____




Republic of the Philippines
Department of Science and Technology
Office of the
Technology Application and Promotion Institute
as Secretariat of the Fairness Opinion Board.

Having complied with the provisions of Republic Act No. 10055 otherwise known as the "Philippine Technology Transfer Act of 2009", I hereby issue this

Certificate of Fairness Opinion

on the proposed transaction to transfer the technology entitled
"Plant Food Supplement"
of the

Philippine Nuclear Research Institute
as Licensor to the
Magic Touch Print Shop, Inc.
as Licensee

I hereby declare this proposed transaction as duly designated by law as
FAIR
to the Licensor.

This Certificate is only applicable to this request. All other transactions
related to the subject technology are still subject to the independent
Fairness Opinion Reports and fairness opinions.

J. P. de la Peña
FORTUNATO T. DE LA PEÑA
Secretary

20 June 2017
Bicutan, Taguig City



Code: FOB-2017-071


 DIRECT LICENSING TERM SHEET

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Filipino citizen? ☐ Yes ☐ No With audited FS? ☐ Yes ☐ No
Domestic Corporation? ☐ Yes ☐ No With CDA Registration? ☐ Yes ☐ No
With audited FS? ☐ Yes ☐ No With audited FS? ☐ Yes ☐ No

Years of existence: 19 With Existing Facilities? ☐ Yes ☐ No
Present Net Worth: Equity: ₱8,151,853-M Capitalization: ₱6-M
Do you receive government support in your facilities? ☐ Yes ☐ No
If yes, how much?: Approximately % of equity Capitalization

Financial Terms:
(1) Number of Years: 8 (2) Is license renewable? ☒ Yes ☐ No
(3) Licensing fee: ☒ One-time upfront: ₱1,500,000.00
% based on ☐ R&D Cost ☐ IP Value ☐ FMV
(4) Royalty: ☒ 5 % based on annual gross sales
(5) Exclusivity: Licensing: ☐ Yes ☐ No Remarks: See field of use & geographical appointment
Field of Use: ☒ Yes ☐ No Remarks: Rice crop
Geographical: ☒ Yes ☐ No Remarks: Philippines
(6) Sub-Licensing: ☐ Yes ☐ No Remarks: _____
(7) Other agreed terms: _____

We, as representatives of the Parties to this proposed transaction, do hereby certify that we are authorized to enter into this Technology Transfer Agreement. We further certify that the contents of this Term Sheet are True and Correct to the best of our knowledge. By signing to the contents of this Term Sheet, we shall pursue a formal Licensing Agreement and hereby request a Fairness Opinion Report subject to submission of required documents in accordance with Republic Act No. 10055, its IRR, and policies, and shall make ourselves available, when our participation or presence is requested in any meeting at the DOT.

LICENSOR
Signature: *J. P. de la Peña*
Name: CARLO A. ARCILLA, Ph.D.
Position: Director
Institution/Company: Philippine Nuclear Research Institute
Contact No.: 8206111 to 19 ext 287
Email: carlo.arcilla@gmail.com
Assisted by: Miguelacion, M.T.M.

LICENSEE
Signature: *Uldo T. Horilla, Jr.*
Name: ULDO T. HORILLA, JR.
Position: President & General Manager
Institution/Company: Magic Touch Print Shop, Inc.
Contact No.: 0917 302 1984 / 093 337 4660
Email: uldo@hltrading.com
Assisted by: _____







REBETH RARA
Farmer-Entrepreneur



A Proud **CARRAGEENAN-PGP** Technology Adapter

Technology Applied in
Sugarcane Farm
Located at Alanib, Lanta
Bukidnon since August
up to August 2019



More hands in
every bunch



Well sized
Bananas



Increased in
Productivity



A Proud **CARRAGEENAN-PGP** Technology Adapter

Technology Applied in a
Rice Farm located at
Lalingan, Bukidnon

RENE CALISO
Farmer-Entrepreneur



TECHNOLOGY TRANSFER: **Carrageenan-PGP**

Technology Applied in a
Cacao Farm located at
Calinan, Davao City
since June 2018
up to present

Farmer-Entrepreneur:
FR. BONG GONZAGA



Enhanced Plant Resiliency
to extreme weather condition
and pests infestations



**IN-SITU
APPLICATION OF
THE TECHNOLOGY**

Bring our technologies from the research lab to the marketplace



*From Lab to
Farmers*

