

KI “BIO-FERTILIZERS”

*Ki paralok jong ka
mariang*



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Ka jinglamphrang:

Ka jingpyndonkam sha ba palat ia ki sboh sorkar lane ki sboh ba ioh na ki kharkhana (*Chemical fertilizer*) ha ka rep ka riang ka pynthut ia ki jingtreikam ka khyndew, ka jingbym biang jong ki jingbam (nutrients) ia ki jingthung, ki jingthung ki kloi ban shah pynjulor ha ki khniang ne ki jingpang, ka pynduna ruh ia ki phngit jingim ki ba bha kiba don ha ka khyndew bad kine ki pynswai bad pynduh ia ka bor jong ka khyndew. Kine baroh ki ktah shibun ia ka meirilung bad ka pynlong bih ruh ia ki tyllong um.

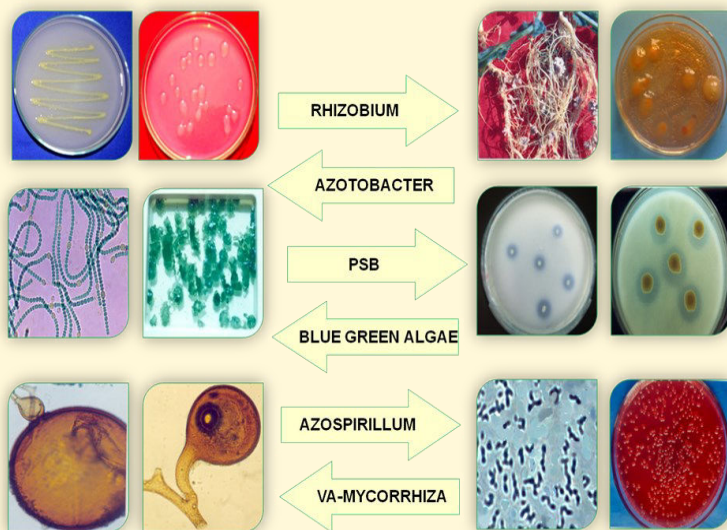
Ka jingsngewthuh ia kine ki jingktah ka pynlong ia ngi ban phai sha ka “Organic farming” lane ka rukom rep ba khlem da pyndonkam ia ki sboh sorkar, ki bih khniang bad kiwei ki jait bih ba pyndonkam ha ka rep ka riang bad ri jingri. Bad ha kane ka rukom rep Organic ki “*biofertilizers*” ne ki phngit jingim ki don ka kamram ba kongsan ban trei kaba long kumba lah buh beit da u Nongbuh Nongthaw.

Ka Jingmut:

Ka ktien ‘*Bio*’ ka dei ka ba lah shim na ka ktien *Greek* ka ba mut **jingim** bad ka ktien ‘*Fertilizer*’ - Ka dei ka ktien *America* ka ba mut ka **sboh** . Kumta ki biofertilizer ki dei ki ki kynja sboh kiba don jingim bad kiba iarap ban pynbiang jingbam ia u jingthung haka rukom kaba u lah ban pyndonkam ia ki bad pynbha ruh ia ka khyndew.

Balei la khot ia ki ki sboh ba don jingim?

Namar ba ki don ha ki, ia ki jait phngit jingim (*micro organism*) ba kyrpang bad ba bha ia ki ba ngin ym lah satia ban iohi daki khmat jong ngi lait noh sa tang da pyndonkam daki kor khmih (*Microscope*).



Dur: Ki phngit jingim biofertilizer lyngba ka kor khmih

Ki jaid Bio-fertilizer :

Ki don bun jait ki *Bio-fertilizer*, kine harum ki long ki *biofertilizers* ki ba ki nongrep ha Ri India ki ju pyndonkam bha.

- Ki sboh biofertilizers ba lah ban ring ia ka *Nitrogen* kaba don ha haw haw bad pynkylla ia ka sha ka sboh ka ba lah ban pyndonkam da u jingthung (***Nitrogen fixing bio-fertilizers***) .

Nuksa- *Rhizobium*, *Bradyrhizobium*, *Azospirillum*, *Azotobacter*, *Blue Green Algae* bad *Azolla*.

- Ki sboh biofertilizers ki ba lah ban pyllait ia ka jingteh u *Phosphorus* ha khyndew khnang ba ki jingthung kin lah ban kjit ia u (***Phosphate Solubilising Biofertilizers, PSB***).

Nuksa: *Bacillus*, *Pseudomonas* bad *Aspergillus*

- Ki sbob biofertilizers ki ba lah ban pynmih ia ki jaid jingbam na ka bynta ka jingheh jingsan jong ki jingthung kum ki *Indole acetic acid*, *Gibberelins*, *B- vitamins* bad ki ba iada na ki jingpang (*Anti-fungal substances*) (**Plant Growth Promoting biofertilizers**)

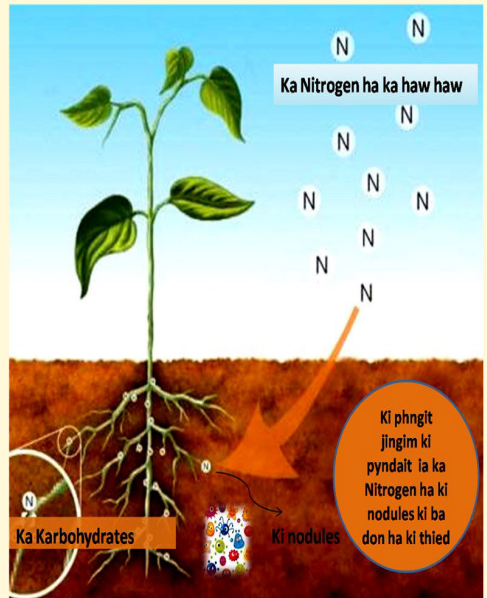
Nuksa: *Blue Green Algae*, *Azotobater*, *Azospirillum* bad *Pseudomonas*

- Ki biofertilizers ki ba lah ban pynjem ne pynum ia u jingbam phosphate bad pynbun ia ka jingdon jong u ha ka khyndew bad ha ka juh ka por kiwei pat ki jaid jingbam kum u *potassium*, *sulphur*, *copper*, *zinc*, *aluminum*, *manganese*, *iron* (**Phosphate mobilizing bacteria**).

Nuksa: *Vesicular Arbuscular Mycorrhiza (VAM)*.

Ka rukom treikam jong kine ki jait sbob:

- Ki ring ne tan shapoh khyndew ia ka jingbam Nitrogen (Atmospheric Nitrogen) kaba don ha suin ne ha haw haw bad pyndait ia kane ka nitrogen ha ki thied jong ki jingthung kiba dei ki jait toh lane phresbin khnang ba u jingthung un ioh ban kjit dairek ia kane ka jingbam Nitrogen. Ka **Nitrogen** ka pynlong ia ki jingthung ba kin jyrngam, kin heh ki sla , kin san bad plung.



Dur: Ki phngit jingim ba tan ia ka Nitrogen na ka haw haw

- Ki pynpait ne pharia ia ki jingbam ba eh bad ba sah kut hapoh khyndew (*Complex organic matter*)
- Ki iarap ban pynjem ne pynum ia u jingbam phosphate (PSB) u ba shah teh ha ka khyndew khnang ba ki jingthung kin ioh ban kjit ia u.



Dur: Ki nodules ki ba don ha ki thied jong ki pulse lane legumes (ki toh lane ki dai)

Ki jingmyntoi:

1. Ki lah ban bujli 20 haduh 50 na ka 100 ia ka jingdonkam dawai sbob Nitrogen bad 15 haduh 25 na ka 100 iaki dawai sbob Phosphate
2. Ka nitrogen ka pynlong ia ki jingthung ba kin plung kin san, kin jrong bad ki sla kin heh kin jyrngam bad kine kin pynkiew ia ka jingmih jong u jingthung. Ka pynduna ruh ia ka jingpynlut jong ki nongrep da ka ba duna ban thied ne pyndonkam ia ki sbob sorkar (Urea, Super, MOP, DAP)
3. Ki iarap ban kyntiew bad pynmih kham bun ki soh ne ki symboh jingbam ha ki jaka rep da kumba 10 haduh 40 naka 100 bad 15 haduh 30 na ka 100 ha ka jingkhie plung ki jingthung
4. Ki pynkhlain ia ka jinglong im ka khyndew bad ki pynkiew ia ka jinglong sbob jong ka.
5. Ki iarap ban pynmih ki um tei met ban pynheh pynsan ia u jingthung (Hormones bad ki vitamins)
6. Ki iarap ban pynmih ia ki kynja dawai (antibiotic) ki ba lah ban pynduna bad ban ia leh pyrshah ia ki jingpang ba bunjait jong u jingthung

7. Ki iarap ban pynlko ne pynpyut ia ki jingdon ki bynta ba sah jong ki phlang ki kynbat haka khyndew, kumta ki pynbha ia ka jinglong dur long doh ka khyndew bad ka khyndew ka lah ban bat um ne ban shong sngem.

8.Ki pynmih ia ki hormone ki ba pynlong ia ki jingthung ba kin lah ban kjit kham bha shuh shuh ia ki jingbam na ka khyndew bad kin lah ban ialeh ia ka jingtyrkhong jong ka khyndew

9.Ki long kum ki paralok jong ka mariang ki bym pynsniew ia ka jinglong jingdon jong ka hynrei ki iarap pynban ban pynpait pynpra ia ki dawai ki ba long bih ki ba don ha ka khyndew (Chemical residue)

Ki Biofertilizers bad ki jait jingthung ba ia hap bad ki:

Ki jait biofertilizers	Ki rukom treikam jong ki	Ki jait jingthung balah ban pyndonkam da kine ki biofer- tilizers
Rhizobium	1.Ka teh ia ka Nitrogen kumba 30 haduh 300 kilo ha ka shi hektar 2.Ka pynkiew ia ka jingmih kum- ba 10 haduh 30% 3.Ka pynsboh ia ka khyndew	Ki jait toh baroh, ki jait shana baroh, u budam, u toh tung. (Leguminous crops) bad ki jait dai kum u dai iong, dai saw, dai jyrngam (Pulses)
Azotobacter	1.Ka teh ia ka nitrogen kumba 20 haduh 30 kilo ha ka shi hektar 2. Ka pynkiew ia ka jingmih haduh 25% 3.Pynneh ia ka jingsboh jong ka khyndew	Ki jait jhur baroh, ki jait dieng- soh baroh , u kba pynthor bad kba lum.u kew, u riew hadem, u pai, ki jait syntiew baroh bad kiwei pat ki jingthung

Azospirillum	1. Ka teh ia ka nitrogen kumba 20 haduh 40 kilo ha ka shi hektar 2.Ka pynkiew ia ka jingmih 5 ha-duh 39% 3.Ka pynlong ia u jingthung ban lah tan kham bun ia ki sboh ba don ha khyndew	Ki jait jhur baroh, ki jait diengsoh baroh , u kew, u kba pynthor bad kba lum u riew hadem, u pai, ki jait syntiew baroh bad kiwei pat ki jingthung
Blue green algae	1. Ka teh ia ka nitrogen kumba 20 haduh 40 kilo ha ka shi hektar ha ka pynthor kba 2.Ka pynkiew ia ka jingmih 10 haduh 30% 3. Ka pynmih ki jaid jingbam na ka bynta ka jingheh jingsan jong ki jingthung kum ki indole acetic acid, gibberellins	Kba sha pynthor
Azolla	1.Ka teh ia ka nitrogen ha ka khyndew 40-80 kilo Nitrogen ha ka pynthor kba 2.Ka pynkiew ia ka jingmih 10 haduh 25%	Kba sha pynthor
Vesicular Arbuscular Mycorrhiza (VAM)	1. Pynbun ia ka jingdon jong ka phosphorus bad ha ka juh ka por kiwei ki jaid jingbam kum u potassium, sulphur, copper, zinc, aluminum, manganese, iron.	Baroh ki jait jingthung

Bacillus, Pseudomonas bad Aspergillus	1. Pyllait ia ka jingteh u Phosphorus ha ka khyndew khnang baki jingthung kin lah ban kjit ia u	Baroh ki jait jingthung
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Dur: Ki biofertilizers bapher bapher ba lah dep song ha ki jingsong bapher bapher

Ka rukom pyndonkam ia ki biofertilizers:

- Ka rukom ai sboh biofertilizer da ka ba pdem ia u symbai:**

Khleh 200 gm Azotobacter lane ka *Azospirillum* bad 200 gm ka phosphotika ha 300 haduh 400 ml ka um. Theh ia kane ha 10 ne 12 kilo u symbai bad sa khleh bha. Thad ia kine ki symbai ha jaka ba dum sngi bad nangta sa thung noh

Na ka bynta ki jait toh baroh, khleh 200 gm ka Rhizobium +200 gm PSB ha 300-400 ml ka um ha 10 kilo u symbai

Kane ka rukom ai sboh biofertilizers ka iarap ia u jingthung ba un khie lung

kloi bad ruh u ba khlain bor. Kane ka rukom ka iarap ruh ia u jingthung ban mih bad ban heh ban san ryntih.

- **Ka rukom ai sboh biofertilizer da ka ba pdem ia ki sara:**

Ban thung ha shi akar ka jaka, khleh 1-2 kilo Azotobacter bad 1-2 kilo Phosphotika ha 5-10 litar ka um. Pdem ia ki thied u jingthung ha kane ka jingkhleh kumba 20-30 minit shuwa ban rah trai.

Na ka bynta u kba ha ki lyngkha, shna ka jaka pyllang um barit ha lyngkha, pyndap kumba 3-4 inchi ka um. Khleh 2kilo u Azospirillum bad 2 kilo Phosphotika. Pdem ia ki thied kba baroh shimiet (8-12 kynta) bad sa thung ha ka step ba bud.

Kane ka rukom ai sboh biofertilizers ka iarap ban pynioh bor kham sted ia u jingthung lyngba ka jingkit ba sani jong ki thied jong u ia ka sboh biofertilizers.

Ia ka um ba lah dep pdem ia ki symbai ne ki sara lah ban shu pharait lane synreit sha ki jingthung lane ai sha ka khyndew ba thung jingthung.



- **Ka rukom ai sboh biofertilizer ha khyndew:**

Ia ka jaka rep ba shi akar buh artylli ki kynton sboh mariang ba 50 kilo. Khleh 4 kilo ka Azotobacter lane ka Azosprillium bad 4 kilo ka Phosphotika ha ka kynton sboh mariang ka ba 200 kilo ryngkat bad 10-12 litar ka um. Khleh bha ia kine bad ieh shimiet. Ai ia kane ka sboh ha ki nur lane da ka ba shu bet ha ka por ba dep puh kper, por thung, por ai khyndew lane 20 sngi hadien ba dep thung.

Kane ka rukom ai sboh biofertilizers ka pyllait ia ka jingshah teh u phosphorous ha ka khyndew, pynbun ia ki phngit jingim ba bha ki ba don kti ha ka ba pynsboh ia ka khyndew.



Dur: U Azolla biofertilizer ha ka pynthor kba

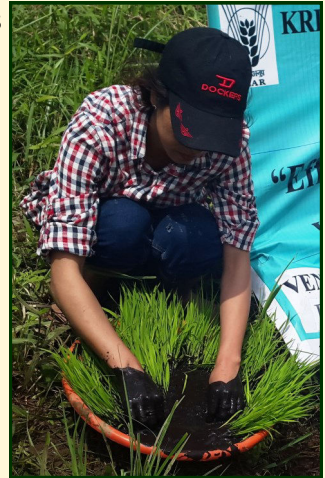
Ki mat ba kongsan ba dei ban kynmaw haba pyndonkam ia ki sboh biofertilizers:

- Ki song biofertilizers ki dei ban long ki ba don ia ki phngit jingim u ba bha
- Pyndonkam shwa ka tarik bakut
- Pyndonkam ha ka rukom ba lah batai bad ha ka por ba dei ban ai
- Ha ki khyndew ba jew, donkam ban ai shun ia ka khyndew
- Shisien ba lah plied ia ki song dei ban pyndonkam lut ha ka juh ka por ba kan dang kham khlain ja bor jong ki

- Donkam ban ai lang ki Nitrogenous and Phosphate bio- fertilizers ban ioh ka jingtreikam ba kham bha
- Donkam ban khleh lang ia ki biofertilizers bad kiwei ki jait sboh mariang
- Pyndonkam ia ki biofertilizers ki ba ia dei bad ki jait jingthung



Dur: Khleh lang bad kiwei ki jait sboh mariang



Dur: Ka rukom pdem

Ki mat ba hap bud ryntih bad kiba dei ban phikir haba pyndonkam ia ki Biofertilizer:

- Dei ban buh ia ki song biofertilizers ha ki jaka ba rkhiang, ba tngen bad sha jngai na ka jingshoh ka sngi
- Ia ki dawai bala dep khleh Bioferilizer ym dei satia ban pynkhleh ne pyniadei bad ki dawai sboh ne ki dawai khniang. Lada donkam khleh shwa iaka dawai khniang pynbud saka biofertilizer arshah
- Ha ka por khleh ia ki biofertilizers bad ki symbai dei ba khleh ha ki jaka ba tngen barabor
- Peit bha ia ki tarik ba dang lah ban pyndonkam ia kine ki dawai. Pyndonkam hapoh ka tarik ba la buh

Bio Fertilizer



La pynbit bad pynbiang da :

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