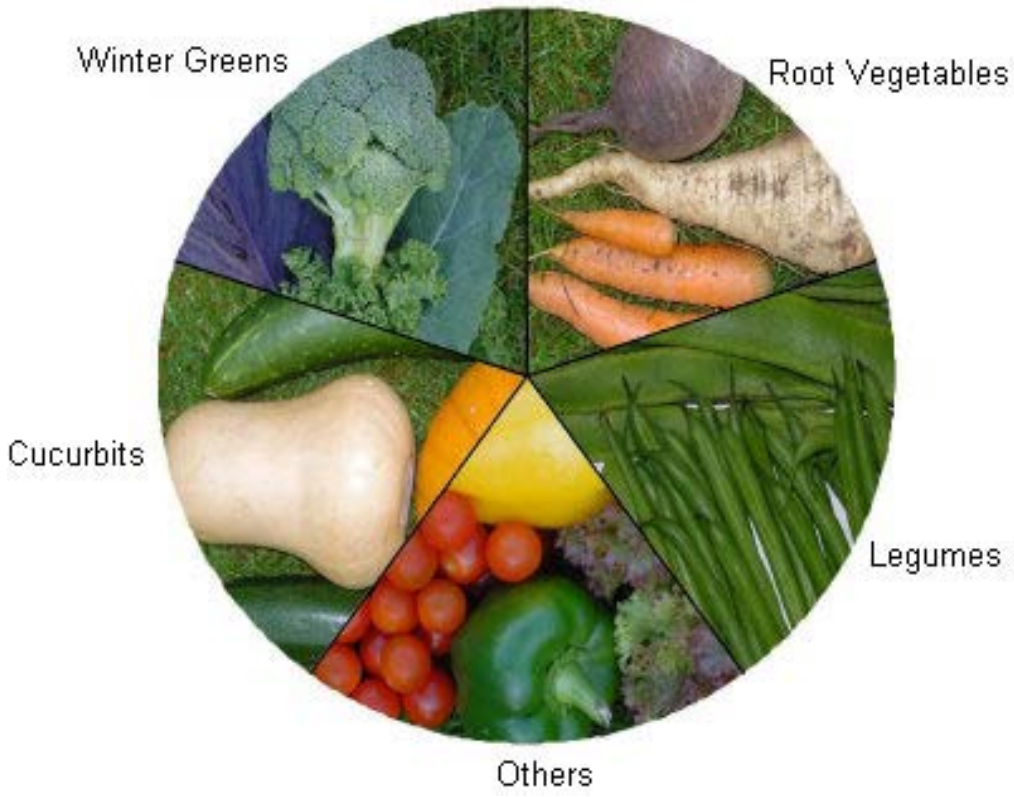
NANOSORB
FERTILIZER BOOSTER



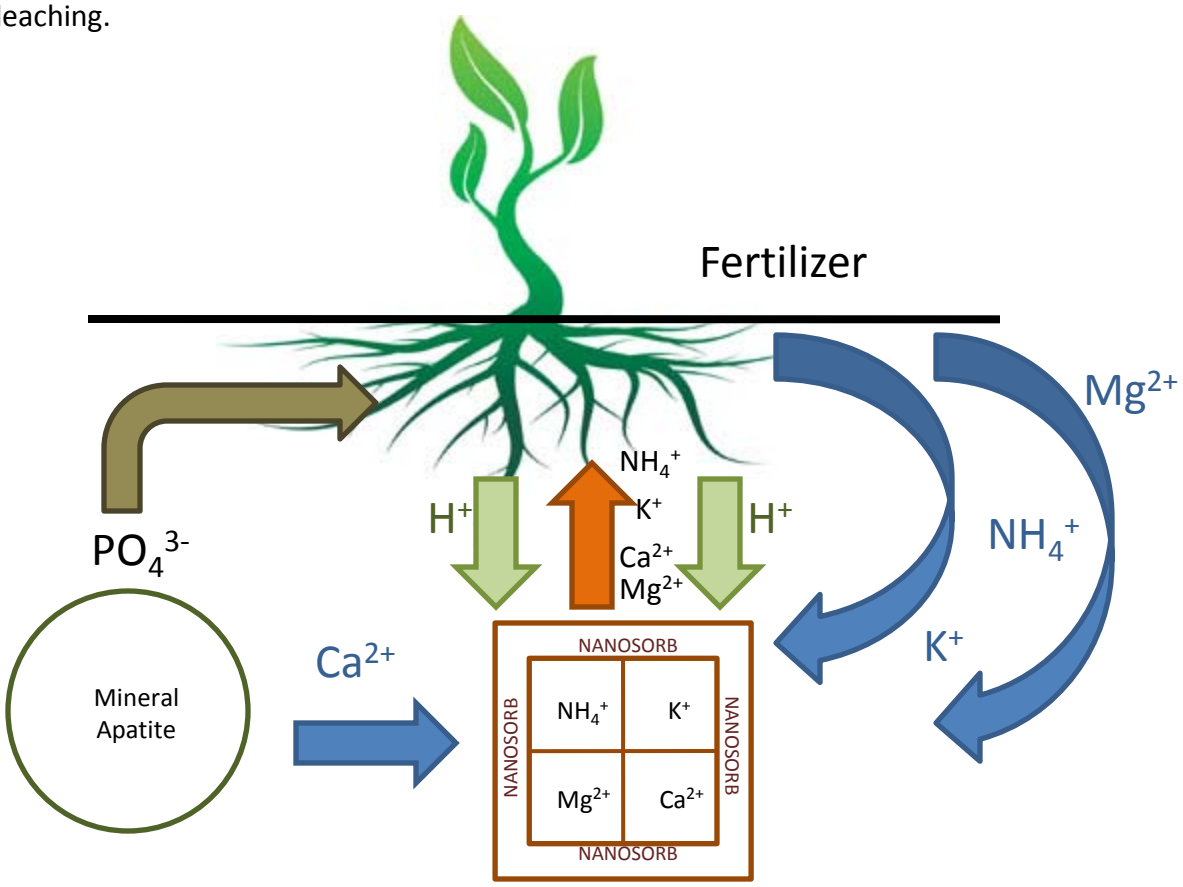
NANOSORB FERTILIZER BOOSTER

Nanosorb Fertilizer Booster in Soil Nutrient Holding & Release

Nanosorb Fertilizer Booster attracts and retains ammonium, potassium, calcium & magnesium as well as many trace elements. It has the greatest affinity for ammonium and potassium but when a plant is taking up the ammonium or potassium off the **Nanosorb Fertilizer Booster** .

Nanosorb Fertilizer Booster attracts calcium from phosphorus mineral apatite such as rock phosphate or locked up phosphorus in soil to balance the **Nanosorb Fertilizer Booster** negative charge. This reaction releases a free phosphorus. The plant extracts the ammonium, potassium and other nutrients by active uptake from roots. This phosphorus release reaction with ammoniated **Nanosorb Fertilizer Booster** .

The nutrient release from the **Nanosorb Fertilizer Booster** is plant driven setting up a natural cycle of nitrogen, potassium and phosphorus release. The **Nanosorb Fertilizer Booster** will recharge when an ammonium or potassium source becomes available either naturally or applied. The **Nanosorb Fertilizer Booster** prevents free nutrients from leaching.



WHAT IS WRONG WITH COMMON CHEMICAL FERTILIZER?

1. 40% of fertilizer nutrients loss due to leaching and high temperature
2. It does not improve soil condition (pH), aeration, irrigation and crop's immunity
3. Minimal or no Micro Nutrients

ADVANTAGES OF NANOSORB FERTILIZER BOOSTER

1. Improves the efficiency and value of chemical fertilizer up to 50%
2. Can be combined with all type of chemical fertilizer
3. Enables better plant growth
4. Improves yield output
5. Reduces loss of chemical fertilizer nutrients by rain or high temperature
6. Retains nutrients for use by plants
7. Balances the pH level of soils (soil conditioner)
8. High cation exchange capacity (CEC)
9. Increases crop's immunity towards crops diseases
10. Improves long term soil quality
11. Natural and organic
12. Absorbs and holds potentially harmful or toxic substances
13. Contains both Macro and Micro Nutrients
14. Suitable for all kinds of crops (palm oil, coconut, paddy, fruit tree, etc)
15. Reduces the chance of root burning from excess ammonia
16. Improves ammonia retention and reduces nitrogen losses
17. Reduces loss of nutrients in soil
18. Improves water infiltration and retention

In conclusion the most common advantages of Nanosorb Fertilizer Booster for agricultural applications is due to its relatively high absorption rate, cation exchange capacity, catalysis and dehydration capacities. Nanosorb Fertilizer Booster is, therefore, used to promote better plant growth by improving the value of chemical fertilizers.

Applying Nanosorb Fertilizer Booster to the soil can improve its ability to hold nutrients and water

Nanosorb Fertilizer Booster is a mixture of natural super porous minerals and nutrients minerals. It carries a negative charge balanced by freely moving cations with positive charges which provides an ideal trap for positive cations like nitrogen rich ammonium and potassium which are then released when demanded by plants. It also has a very open framework with a network of pores giving it a large surface area for trapping and exchanging valuable nutrients.

More efficient chemical fertilizer use

With the current high price of chemical fertilizers, **Nanosorb Fertilizer Booster** can be used to extend their efficiency and performance. Blending fertilizer with **Nanosorb Fertilizer Booster** can produce the same yield from less fertilizer applied because of the reduction of volatilization and leaching losses.

More efficient water use

Nanosorb Fertilizer Booster assists water infiltration and retention in the soil due to its very porous properties and the capillary suction it exerts. Acting as a natural wetting agent, it is an excellent amendment for non wetting sands and to assist water distribution through soils.

The role of Nanosorb Fertilizer Booster

Nanosorb Fertilizer Booster can hold nutrients in the root zone for plants to use when required. This leads to more efficient use of N and K fertilizers - either less fertilizer for the same yield or the same amount of fertilizer lasting longer and producing higher yields.

An added benefit of **Nanosorb Fertilizer Booster** application is that unlike other soil amendments (gypsum and lime) because the super porous minerals in **Nanosorb Fertilizer Booster** do not break down over time but remain in the soil to help improve nutrients and water retention permanently. With subsequent applications the **Nanosorb Fertilizer Booster** will further improve the soil's ability to retain nutrients and produce improved yields.

Nanosorb Fertilizer Booster is not acidic. In fact it is marginally alkaline and its use with fertilizers can help buffer soil pH levels thus reducing the need for lime applications.

Potting Mixes & Composts

An open mix with high air porosity and good drainage is important to stimulate root growth and prevent many root diseases but it also leads to rapid leaching of nutrients away from the root zones of plants. **Nanosorb Fertilizer Booster** prevents this by attracting and holding the nutrients preventing them washing through the container. The typical approach to growing crops has been to apply high rates of fertilizer to overcome the losses due to leaching. This is both expensive and inefficient as well as environmentally damaging in terms of high nutrient run off.

Use of **Nanosorb Fertilizer Booster** will soak up excess ammonium in mixes often released under hot conditions, preventing root burning. **Nanosorb Fertilizer Booster** is not effected by temperature and buffers the dumping of nutrients by polymer coated fertilizers under hot conditions. And **Nanosorb Fertilizer Booster** is not acidic. In fact it is marginally alkaline and its use with fertilizers can help buffer soil pH levels thus reducing the need for lime applications.

Nanosorb Fertilizer Booster carries a negative ionic charge which naturally attracts positive charged cations like Ammonium, Potassium, Magnesium and Calcium. The open crystalline structure of **Nanosorb Fertilizer Booster** has many storage sites for these ions which hold naturally through a loose chemical bond. These fertilizer ions are available to plants. **Nanosorb Fertilizer Booster** has a very high cation exchange capacity and thus increases the mixes ability to hold and release nutrients. As cations are water soluble they escape from mixes by leaching.

You get better value from your fertilizer dollar, improved plant growth and reduce the nutrient load in your runoff and collected water, reducing the E.C. levels of your water storages.

AGRICULTURE COMPOSTING

*Basic principles of **Nanosorb Fertilizer Booster** in composting operations methods of holding cations such as ammonium and plant nutrients.*

The first method is by absorption in its porous matrix. The second method is by cation exchange (CEC) . **Nanosorb Fertilizer Booster** has two holds ammonium and other plant nutrients in the crystal structure where they are not water-soluble but are plant-accessible on an as-needed time-release basis.

***Nanosorb Fertilizer Booster** adds value to manure and compost.*

It has a high affinity for the ammonium ion. This is a plant usable form of nitrogen. One of only three forms of nitrogen that is plant accessible (ammonia/ammonium, nitrates and nitrites). The introduction of **Nanosorb Fertilizer Booster** with the manure, compost, or lagoon water to the soil has the added benefit of increasing water retention, holding the nitrogen and other micro-nutrients in the growth zone, providing a medium for the future capture of nitrogen, increasing the ion exchange capacity of the soil, and enhancing infiltration and aeration of the soil.

*How does using **Nanosorb Fertilizer Booster** benefit my Soil?*

Using **Nanosorb Fertilizer Booster** will cut fertilizer and water costs by holding the nutrients and water in the root zone until the plant is ready to utilize them. Thereby requiring less fertilizer and water to be applied. This promotes good stewardship of the land by reducing pollution brought on by fertilizers leaching to the groundwater or running off into surface water sources.

Nanosorb Fertilizer Booster , when used properly, can yield some impressive results in regards to faster germination times, faster growth rates, larger plants, crop yields and reduced fertilizer and water applications.

Reduces water requirements during irrigation as **Nanosorb Fertilizer Booster** holds moisture in the growth zone.

Nanosorb Fertilizer Booster has a high CEC that enables a greater loading of plant nutrients such as nitrogen & micronutrients. The nutrients are held in the growth zone and are plant accessible but not water-soluble.

Reduces nitrogen fertilizer requirements as a large portion of nitrogen fertilizers leach through the growth zone and into the aquifer. **Nanosorb Fertilizer Booster** will hold nitrogen and prevent the pollution of the water table by nitrates and nitrites.

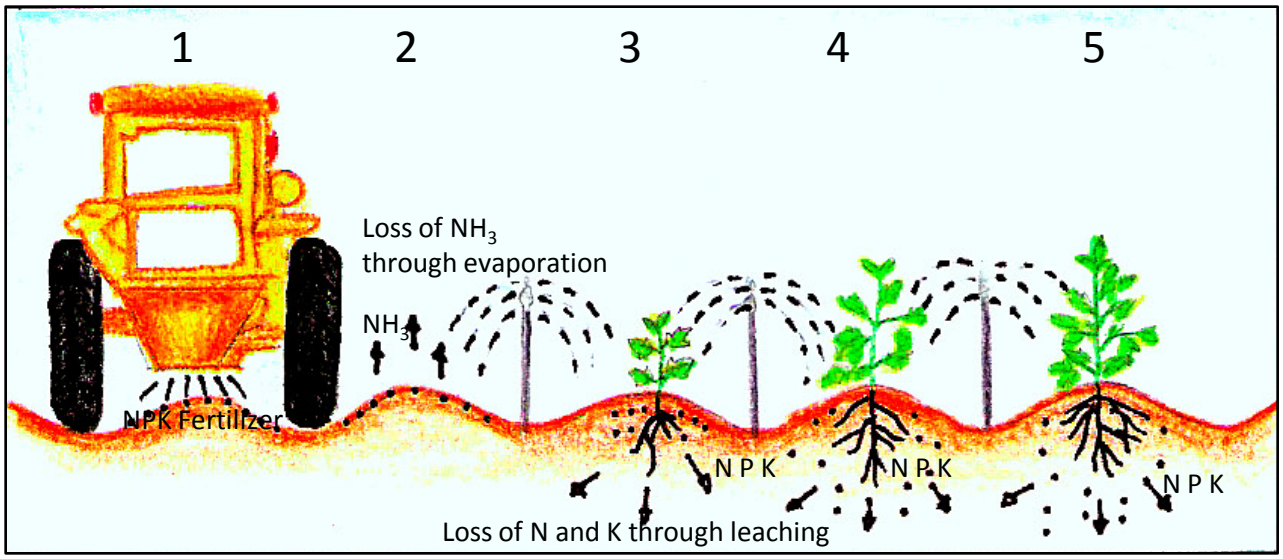
Nanosorb Fertilizer Booster prevents compaction, increases infiltration, and helps the aeration of deep root systems due to its high surface area and porosity.

Nanosorb Fertilizer Booster is 100% natural for organic operations and when composted with manure, it becomes a natural fertilizing system.

Nanosorb Fertilizer Booster *Use in Compost or Dry Stacked Manure.*

The compost or dry stacked manure should be top-dressed with a thin layer of **Nanosorb Fertilizer Booster** after it is turned or after the addition of a new layer of manure. Alternatively, a layer of **Nanosorb Fertilizer Booster** should be placed in the area of the barn receiving the fresh manure. Composting is an important process that (1) converts organically bound nitrogen that is not plant accessible to ammonium hydroxide, ammonium nitrate, and ammonia that are all plant accessible, (2) kills the pathogens, (3) reduces or eliminates the odor, (4) dries the manure, (5) reduces the flies, and (6) kills weed seeds. Composting should be conducted in-vessel to prevent groundwater and air pollution. Wash down operations are no longer environmentally acceptable due to groundwater pollution of nitrates, nitrites, and hydrogen sulfide.

More Efficient Use of NPK Fertilizer



Without Nanosorb FertilizerBooster

Applying NPK fertilizer onto soil surface.

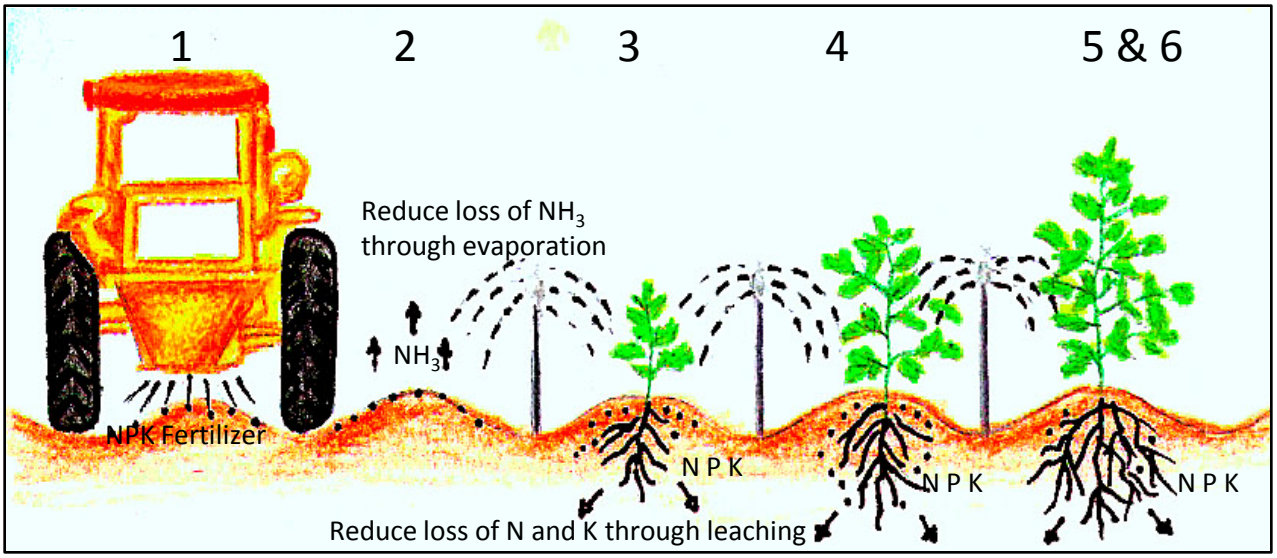
Irrigation after application increases nitrogen losses as ammonia gas due to evaporation.

Irrigation washes fertilizer into the root zone of plants.

Plants can take up fertilizer required whilst it remains in the root zone. Some fertilizer lost through early leaching.

Large losses of fertilizer which move out of the root zone (leaching) as sandy soil is not capable of holding high levels of nutrients.

More Efficient Use of NPK Fertilizer



With Nanosorb Fertilizer Booster

Applying NPK fertilizer to soil that has had an application of **Nanosorb Fertilizer Booster** possible shallow incorporated; or applying NPK fertilizer mixed with **Nanosorb Fertilizer Booster** .

Less risk of Nitrogen losses as ammonia gas as **Nanosorb Fertilizer Booster** soaks up free ammonia.

Irrigation washes fertilizer into the root zone of plants whilst some fertilizer remains bound up and adsorbed in **Nanosorb Fertilizer Booster** .

Fertilizer in **Nanosorb Fertilizer Booster** remains in root zone until it is required by the plant.

Less fertilizer losses from leaching and fertilizer from **Nanosorb Fertilizer Booster** becomes available to extend fertilizer life.

Long term soil improvements through increase in CEC and nutrient retention in soil).

Testing of Nanosorb Fertilizer Booster on Chrysanthenum

Four pots of Chrysanthemum plant in fertile soil were bought from nursery.

Plant A: Original soil

Plant B: Original soil + two table spoon of Nanosorb

Plant C: Original soil + two teaspoon of N:P:K = 7:9:6

Plant D: Original soil + one teaspoon of N:P:K = 7:9:6 + One tablespoon of Nanosorb

Conclusions

The results of the trials using **Nanosorb Fertilizer Booster** showed a significant increase of the life span of the flowers and slow down wilting of flowers.

Table spoon

Tea spoon

Original with nothing added.

6/11/10

8/11/10

13/11/10

Flower wilted and dried up.

A

Original with two table spoon of Nanosorb Fertilizer Booster.

6/11/10

8/11/10

13/11/10

Flower wilted very slow.

B

Original with two tea spoon of N:P:K = 7:9:6 Fertilizer.

6/11/10

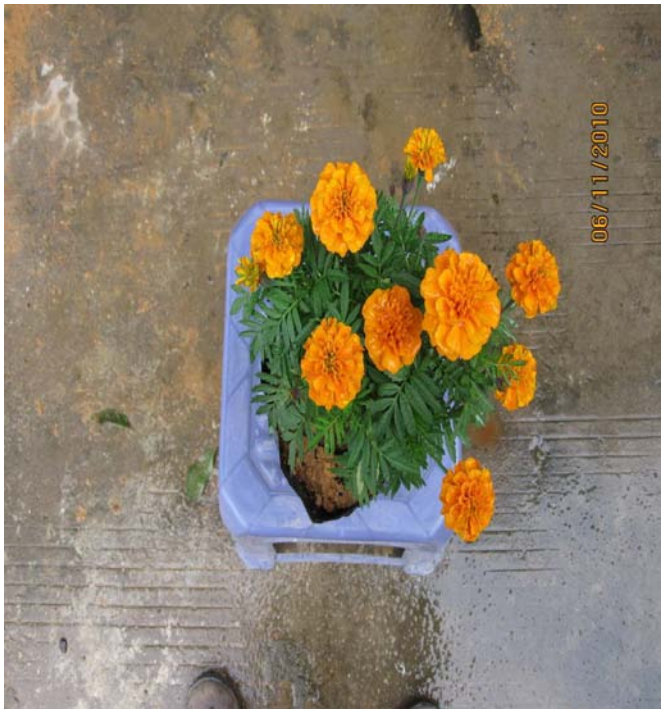
8/11/10

13/11/10

Flower wilted and dried up.

C

Original with one tea spoon of N:P:K = 7:9:6 fertilizer and one table spoon of Nanosorb Fertilizer Booster.



6/11/10

8/11/10

13/11/10

No wilted flower.

D

PERFORMANCE OF NANOSORB FERTILIZER BOOSTER ON DECORATIVE CHILI PLANTS

By: Shepros Sdn. Bhd.

February 9, 2011

INTRODUCTION

Nanosorb Fertilizer Booster is used as a magnesium, calcium and sulfur bearing materials in fertilization.

It has a special property of attracting and retaining ammonium, potassium, calcium & magnesium as well as many trace elements when mix with chemical fertilizers.

When mixed with chemical fertilizers, it can be used as a slow release fertilizer which is more environment friendly and cost effective in fertilization.

Nanosorb Fertilizer Booster has the following advantages:

- Improves the efficiency and value of chemical fertilizer up to 50%;
- Can be combined with all type of chemical fertilizers;
- Enables better plant growth;
- Improves yield output;
- Reduces loss of chemical fertilizer nutrients by rain or high temperature;
- Retains nutrients for use by plants;
- High cation exchange capacity (CEC);
- Increases crop's immunity towards crops diseases;

- Improves long term soil quality;
- Absorbs and holds potentially harmful or toxic substances;
- Reduces the chance of root burning from excess ammonia ;
- Improves ammonia retention and reduces nitrogen losses ;
- Reduces loss of nutrients in soil;
- Improves water infiltration and retention.

PURPOSE

This experiment is conducted to determine the effect of Nanosorb Fertilizer Booster on miniature decorative chili as below:

- life span
- root burning from excess fertilizer
- yield output
- plant growth
- efficiency improvement of fertilizer

MATERIALS

- plastic pots with an upper diameter of 140mm, lower diameter of 950 mm and a height of 120mm
- compost soil
- fully grown miniature decorative chili
- light source - outdoor with shaded sunlight under palm tree
- water source - no watering since it is monsoon season

METHODOLOGY

Purchase three pots of approximately same size fully grown miniature decorative chili plants from nursery. The potting medium is a fertile soil with a mixture of organic soil, sand, compost and palm oil fibers. The three pots of chili are marked A,B and C.

Pot A: Original condition (no fertilizer and no Nanosorb)

Pot B: ½ teaspoon of NPK 15:15:15

Pot C: ½ teaspoon of NPK 15:15:15 and 1 table spoon of Nanosorb

All the pots are kept in the same setting to minimize any variation in temperature, lighting, pests, and other environmental factors. This helps to further minimize the effect of any environmental differences.

Pot A, B and C are kept outdoor with shaded sunlight exposure under palm tree. This is due to the advice from nursery not to expose the chili plants to direct hot sunlight which will dry the soil in the pots and kill the chili plants within two days.

All the chili plants will not be watered because of the monsoon season. The plants will get the water supply from rain.

The duration of the experiment is 94 days based on the nursery information that the decorative chili plants will not last up to three months life span.

Calculate the number of chili in each pot and make a table of comparison.

Take photographs to record and to compare the chili plants in life span, plant growth, and observations about plant health such as color, vigor, or damage due to pests and diseases.

RESULTS AND DISCUSSION

This experiment analyses the results of the Performance of Nanosorb Fertilizer Booster. The experiment went as expected with no unusual events such damage due to pest and disease.

The best result of the experiments is the decorative chili plant in “Pot C” with NPK fertilizer (15:15:15) and Nanosorb. The result showed that Nanosorb had the greatest positive effect on the decorative chili plant in yield, growth and life span. Pot C produces the highest chili yield output up to 102.94% in Day 8 and still maintaining a yield output of 41.18% compared to Pot A of -40.74% & and Pot B of -100% in Day 94 as in Table 1. Pot C is also the healthiest and has greener leaves compared to both Pot A and B as in Table 2.

The second best result of the experiments is the decorative chili plant in “Pot A” with no addition of fertilizer and Nanosorb. The yield output drop to -40.74% in Day 94. The health of the plant start deteriorating in Day 6 with the appearance of yellowish green leaves as in Picture 2 and is getting worse as in Picture 6A in Day 94.

The worst result of the experiments is the decorative chili plant in “Pot B” with addition of NPK fertilizer (15:15:15) only. Almost all the leaves start to turn yellowish green in Day 6 and the plant died in Day 27. This might due to root burning from excess fertilizer.

Photography comparison in terms of life span, yield and growth of the chili plants in Day 94 can be seen on Picture 6.

TABLE 1: COMPARISON OF CHILIES YIELD OUTPUT

	Chili Yield Output (number and percentage)					
DAY	**POT A**		**POT B**		**POT C**	
	Original Condition (No fertilizer and no Nanosorb)		**½ tea spoon of NPK 15:15:15**		**½ tea spoon of NPK 15:15:15 1 table spoon of Nanosorb**	
1	27	-	46	-	34	-
6	40	+48.20%	73	+58.70%	65	+91.18%
8	46	+70.37%	72	+56.52%	69	+102.94%
27	38	+40.74%	19	-58.70%	63	+85.29%
94	16	-40.74%	0	-100.00%	48	+41.18

Notes:

Chili Yield Output (number) = The total yield output of ripened chilies and unripened chilies.

Chili Yield Output (percentage)
= [(# of chilies in Day X – # of chilies in Day 1)/# of chilies in Day 1] x 100%

TABLE 2: SUMMARY OBSERVATION OF DECORATIVE CHILI PLANTS

DAY	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon of Nanosorb**
1	Chili plant is healthy.	Chili plant is healthy.	Chili plant is healthy.
6	Still in good position but some leaves are turning pale with lighter green.	Leaves change to yellowish green and lighter green. Some of the leaves are dry.	Healthy and the leaves are slightly greener than previously. Best among the three.
8	Still in good position but more leaves are turning pale with lighter green compare with Day 6.	Leaves change to yellowish green and lighter green. Some of the leaves are dry. Some chilies dropped down.	Healthy and the leaves are greener than Day 6. Best among three.
27	Still in good position but more leaves are turning pale with lighter green compare with Day 8. Very little chilies yield increase.	The plant is dying and all the leaves are gone. Most twigs are dry. Only chilies left.	Healthy and the leaves remain greener than Pot A. There is a big increase chilies yield. The chilies ripe faster compared to Pot A and Pot B. The surface texture of the chilies look glossier compared to chilies from Pot A.
94	Almost half of the leaves are gone. Ripen chilies are almost all gone. No dry twig. Very little chilies yield increase.	The plant is dead. All the leaves are gone and the twigs are totally dry. No chili left.	Healthy and the leaves remain greener than Pot A. There is a slight increase in chilies yield. Generally, the ripen chilies are healthy and remain intact even after long period of time compared to Pot A. The surface texture of the chilies look glossier compared to chilies from Pot A.

TABLE 3: DAY 1

DATE (DAY)	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon Nanosorb**
27th Oct 2010 (Day 1)	Chili plant is healthy.	Chili plant is healthy.	Chili plant is healthy.

PICTURE 1: DAY 1

TABLE 4: DAY 6

DATE (DAY)	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon Nanosorb**
1st Nov 2010 (Day 6)	Still in good position but some leaves are turning pale with lighter green. Free from pest and disease attack.	Leaves change to yellowish green and lighter green. Some of the leaves are dry. Free from pest and disease attack.	Healthy and the leaves are slightly greener than previously. Best among the three. Free from pest and disease attack.

PICTURE 2: DAY 6

TABLE 5: DAY 8

DATE (DAY)	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon Nanosorb**
3rd Nov 2010 (Day 8)	Still in good position but more leaves are turning pale with lighter green compare with Day 6. Free from pest and disease attack.	Leaves change to yellowish green and lighter green. Some of the leaves are dry. Some chilies dropped down. Free from pest and disease attack.	Healthy and the leaves are greener than Day 6. Best among three. Free from pest and disease attack.

PICTURE 3: DAY 8

TABLE 6: DAY 27

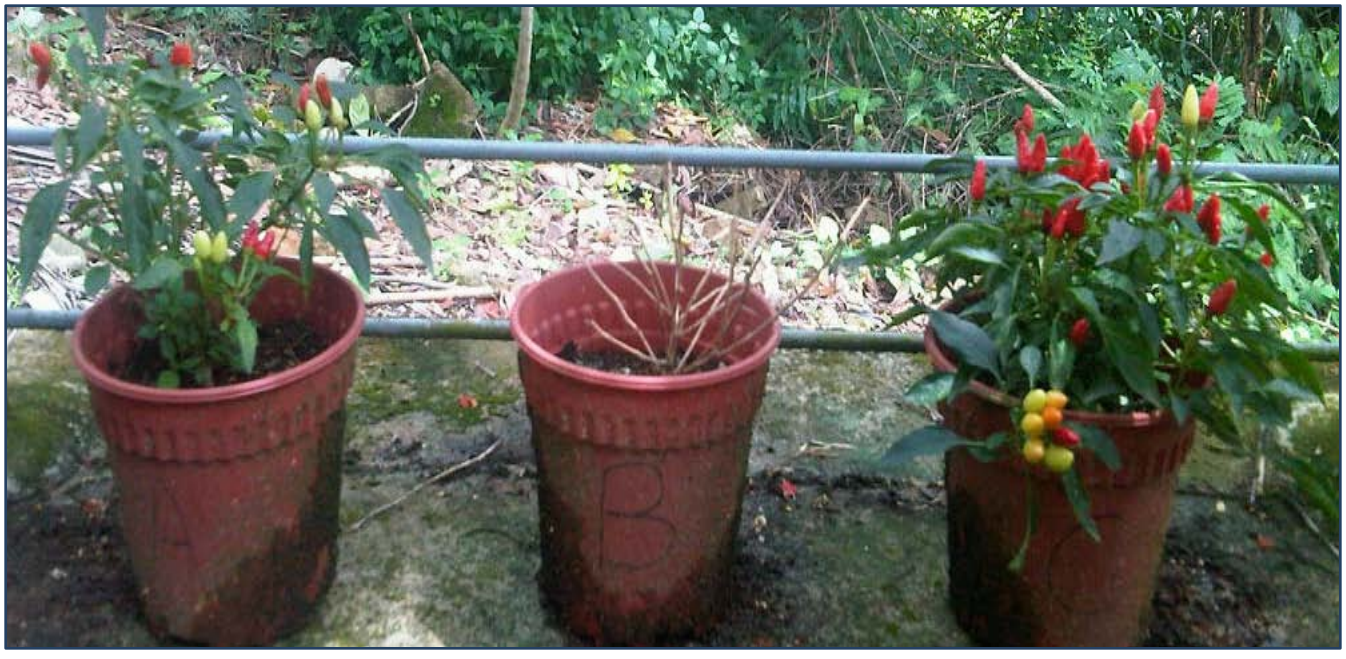
DATE (DAY)	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon Nanosorb**
22nd Nov 2010 (Day 27)	Still in good position but more leaves are turning pale with lighter green compare with Day 8. Very little chilies yield increase. Free from pest and disease attack.	The plant is dying and all the leaves are gone. Most twigs are dry. Only chilies left. Free from pest and disease attack.	Healthy and the leaves remain greener than Pot A. There is a big increase chili yield. The chilies ripe faster compared to Pot A and Pot B. The surface texture of the chilies look glossier compared to chili from Pot A. Free from pest and disease attack.

PICTURE 4: DAY 27

TABLE 7: DAY 94

DATE (DAY)	POT A	POT B	POT C
	Original Condition (No fertilizer and no Nanosorb)	**½ tea spoon of NPK 15:15:15**	**½ tea spoon of NPK 15:15:15 1 table spoon Nanosorb**
28th Jan 2011 (Day 94)	Almost half of the leaves are gone. Ripen chili are almost all gone. No dry twig. Very little chilies yield increase. Free from pest and disease attack.	The plant is dead. All the leaves are gone and the twigs are totally dry. No chili left. Free from pest and disease attack.	Healthy and the leaves remain greener than Pot A. There is a slight increase in chilies yield. Generally, the ripen chilies are healthy and remain intact even after long period of time compared to Pot A. The surface texture of the chilies look glossier compared to chilies from Pot A. Free from pest and disease attack.

PICTURE 5: DAY 94



PICTURE 6: POT A, B and C after 94 days

PICTURE 6A: POT A

PICTURE 6B: POT B

PICTURE 6C: POT C

CONCLUSION

The result of Chili plant in Pot C clearly indicated that addition of fertilizer and Nanosorb Fertilizer Booster to plant will provide longer life span, better growth and higher yield.

Nanosorb Fertilizer Booster helps in preventing root burning from excess fertilizer. This will provide a cost effective and a better efficiency improvement for chemical fertilizer application.

PERFORMANCE
OF
NANOSORB
FERTILIZER BOOSTER
AT
CHILI FERTIGATION FARM
(PULAU INDAH, SELANGOR)

By: Shepros Sdn. Bhd.

March 21, 2011

INTRODUCTION

Nanosorb Fertilizer Booster is used as a macronutrients and micronutrients bearing materials in fertilization.

It has a special property of attracting and retaining ammonium, potassium, calcium & magnesium as well as many trace elements when mix with chemical fertilizers.

When mixed with chemical fertilizers, it can be used as a slow release fertilizer which is more environment friendly and cost effective in fertilization.

Nanosorb Fertilizer Booster has the following advantages:

- Improves the efficiency and value of chemical fertilizer up to 50%;
- Can be combined with all types of chemical fertilizers;
- Promotes better plant growth;
- Improves yield output;
- Reduces loss of chemical fertilizer nutrients by rain or high temperature;
- Retains nutrients for use by plants;
- High cation exchange capacity (CEC);

- Increases crop's immunity towards crops diseases;
- Improves long term soil quality;
- Absorbs and holds potentially harmful or toxic substances;
- Reduces the chance of root burning from excess ammonia;
- Improves ammonia retention and reduces nitrogen losses ;
- Reduces loss of nutrients in soil;
- Improves water infiltration and retention.

PURPOSE

This experiment is conducted to determine the effect of Nanosorb Fertilizer Booster on chili plants in a fertigation farm at Pulau Indah, Selangor. The following properties are observed:

- germination;
- water retention;
- chemical fertilizer leaching ;
- yield output;
- quality of chilies;
- plant growth rate;
- pH of coconut husks as soil medium in fertigation;
- life span.

MATERIALS

- germination boxes;
- compost soil for germination (a mixture of soil, vermicompost and Biosol organic fertilizer);
- Nanosorb Fertilizer Booster from Shemical;
- poly bags;
- SHEPLANT - non toxic pest control from Shemical;
- coconut husks as soil medium for fertigation farming;
- 3 months old chili plants;
- light source – outdoor sun light;
- fertigation water source – pipe water from Jabatan Bekalan Air (JBA) through micro irrigation;
- fertigation fertilizer source - from Federal Agriculture Marketing Authority (FAMA) through micro irrigation;
- chili seeds from Federal Agriculture Marketing Authority (FAMA).

METHODOLOGY

EXPERIMENT 1

Chili seedlings are cultivated through germination boxes under partially shaded nursery. Two types of germination boxes are prepared where Box Type A is without Nanosorb and Box Type B is with Nanosorb. Below are the nursery standard procedures.

1. Germination Box Type A: Original condition (no Nanosorb)

    a) Add 3 inches layer of coconut husks;
    b) Add 1 inch layer of nursery media (peatmoss);
    c) Sprinkle chili seeds evenly on top of the media;
    d) Apply a thin layer of compost enough to cover the seeds;
    e) Spray SHEPLANT (1:200) enough to wet the media;
    f) Spray SHEPLANT again (1:200) if fire ants appear to feed on the germinating seeds;
    g) Water twice daily using fine sprayer;
    h) After the germination of seeds, spray seaweed foliar fertilizer to maximize the growth and elongation of stem and shoot;
    i) Spray seaweed foliar fertilizer every week;
    j) Spray SHEPLANT (1:500) every two days until seedlings are ready for transplant to poly bags.

2. Germination Box Type B: Original condition with Nanosorb

    a) Add 3 inches layer of coconut husks;
    b) Add 1 inch layer of nursery media (peatmoss);

c) Sprinkle chili seeds evenly on top of the media;
d) Apply a thin layer of compost enough to cover the seeds;
e) Apply a thin layer of Nanosorb evenly on top of the compost;
f) Spray SHEPLANT (1:200) enough to wet the media;
g) Spray SHEPLANT again (1:200) if fire ants appear to feed on the germinating seeds;
h) Water twice daily using fine sprayer;
i) After the germination of seeds, spray seaweed foliar fertilizer to maximize the growth and elongation of stem and shoot;
j) Spray seaweed foliar fertilizer every week;
k) Spray SHEPLANT (1:500) every two days until seedlings are ready for transplant to poly bags.

The above procedures will enable us to determine the health and the success rate in cultivating of seedlings in germination with Nanosorb.

Based on the farmer's observation and photographs, a summary of results and discussion are prepared as per listed in the purpose of this testing.

EXPERIMENT 2

A total of 3500 seedlings are transplanted to poly bags with about 1.5 to 2 kgs of coconut husks as a soil medium for fertigation farming in an open area with no shade. A total of 2 tablespoons or 10 grams of Nanosorb are mixed into the coconut husks soil medium in each poly bag. The watering and fertilizing will be channeled to the poly bag through micro irrigation application 5 times/day except rainy days.

The results of this experiment will be compared to the previous result of planting chilies without Nanosorb application in the soil medium.

Based on the farmer's observation and photographs, a summary of results and discussion are prepared as per listed in the purpose of this testing.

EXPERIMENT 3

A plot of an existing 3500 chili plants which are 3 months old is used for testing. Two tablespoons or 10 grams of Nanosorb are added to the soil medium in the poly bags. The standard procedures of watering, fertilizing and spraying of pesticide to the chili plants will remain the same.

The results of this field test will be compared to the previous results of the same farm and the current results of a nearby chili farm without Nanosorb application.

Based on the farmer's observation and photographs, a summary of results and discussion are prepared as per listed in the purpose of this testing.

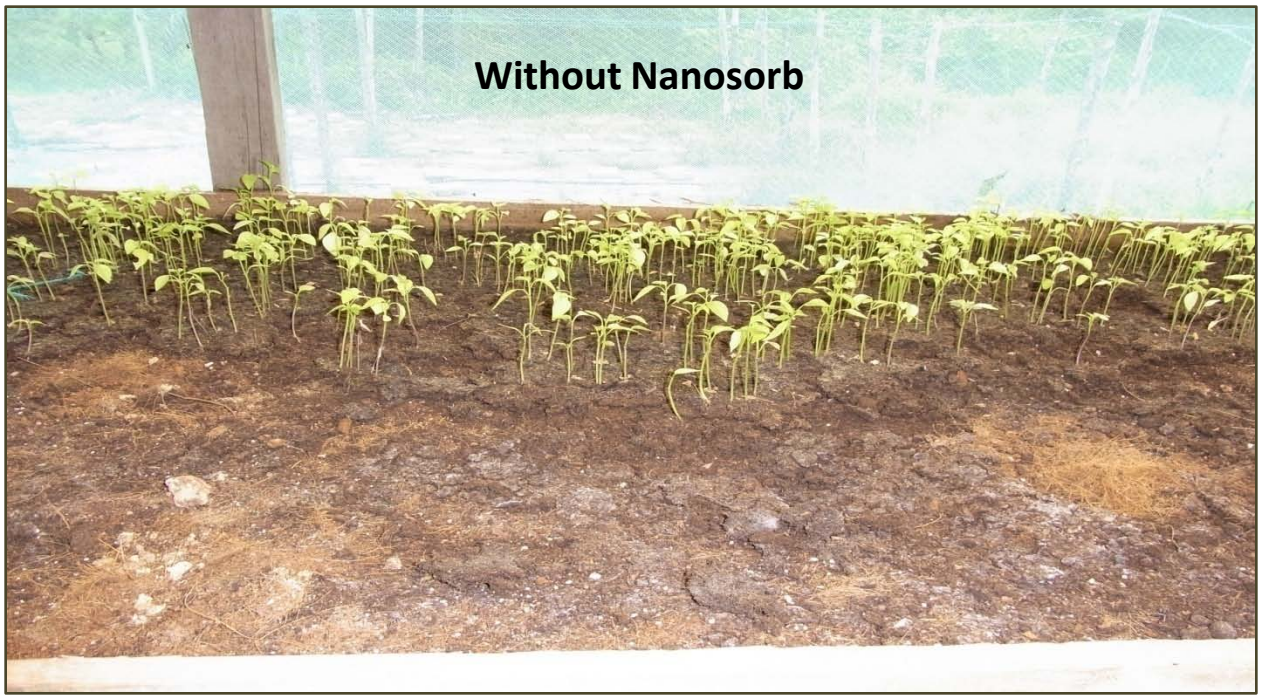
RESULTS & DISCUSSION

This experiment analyses the results of the Performance of Nanosorb Fertilizer Booster. The experiment went as expected with no unusual events such as damage due to pests and diseases.

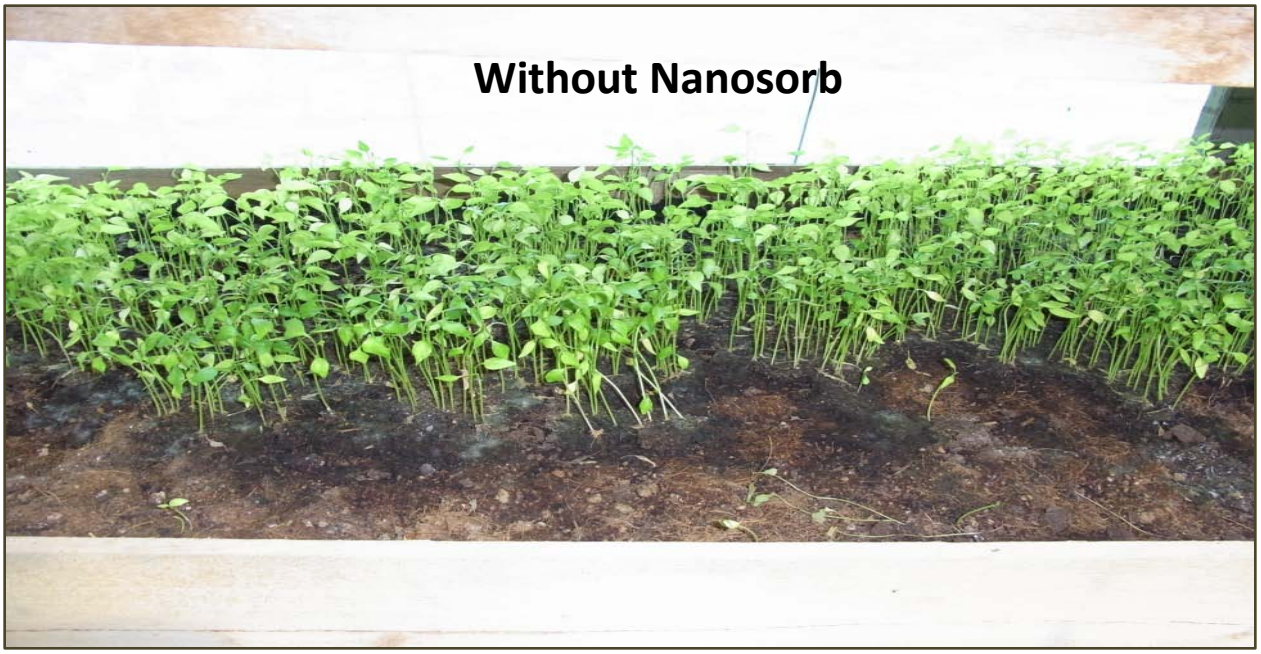
EXPERIMENT 1

1. Germination Box Type A: Original condition (no Nanosorb)

There is only a 10% - 50% success rate in germination in Germination Box Type A without Nanosorb application. Stem and shot of the seedlings are weak and unhealthy. Most of the seedlings die after germination due to withering cotyledons.



Picture 1: *An estimate of a 10% success rate in germination.*



Picture 2: *An estimate of a 50% success rate in germination.*

2. Germination Box Type B: Original condition with Nanosorb

There is almost a 100% success rate in germination in Germination Box Type B with Nanosorb application. Stem and shot of the seedlings are strong and healthy.

Picture 3: *An estimate of almost a 100% success rate in germination.*

EXPERIMENT 2

Picture 4: *1.5 months old chili plants which used seedlings with Nanosorb application.*

Below are the observation and feedback from the farmers at Pulau Indah:

1. Water retention

   There is better water retention when coconut husks are mixed with Nanosorb as soil medium.

2. Chemical fertilizer leaching

   Chemical fertilizer leaching is greatly reduced when coconut husks are mixed with Nanosorb as soil medium. This can be seen with less algae on top of the soil medium and soil outside the poly bags.

3. Yield Output

Some of the chili plants are already producing chilies even though they are less than 1.5 months old. Normal chili plants without Nanosorb only start producing chilies after 2 months old.

Picture 5: *Chili plants with Nanosorb application are already producing chilies even though less than 1.5 months old.*

4. Plant Growth

Chili plants are healthy with greener leaves. The plants with Nanosorb are 15% taller compared to previous 1.5 months old chili plants without Nanosorb.

5. pH of coconut fibers as soil medium in fertigation

The application of Nanosorb in soil medium gives a pH between 5- 6 compared to pH of 3-4 without Nanosorb. There are a lot of earthworms in the soil medium which didn't exist previously.

EXPERIMENT 3

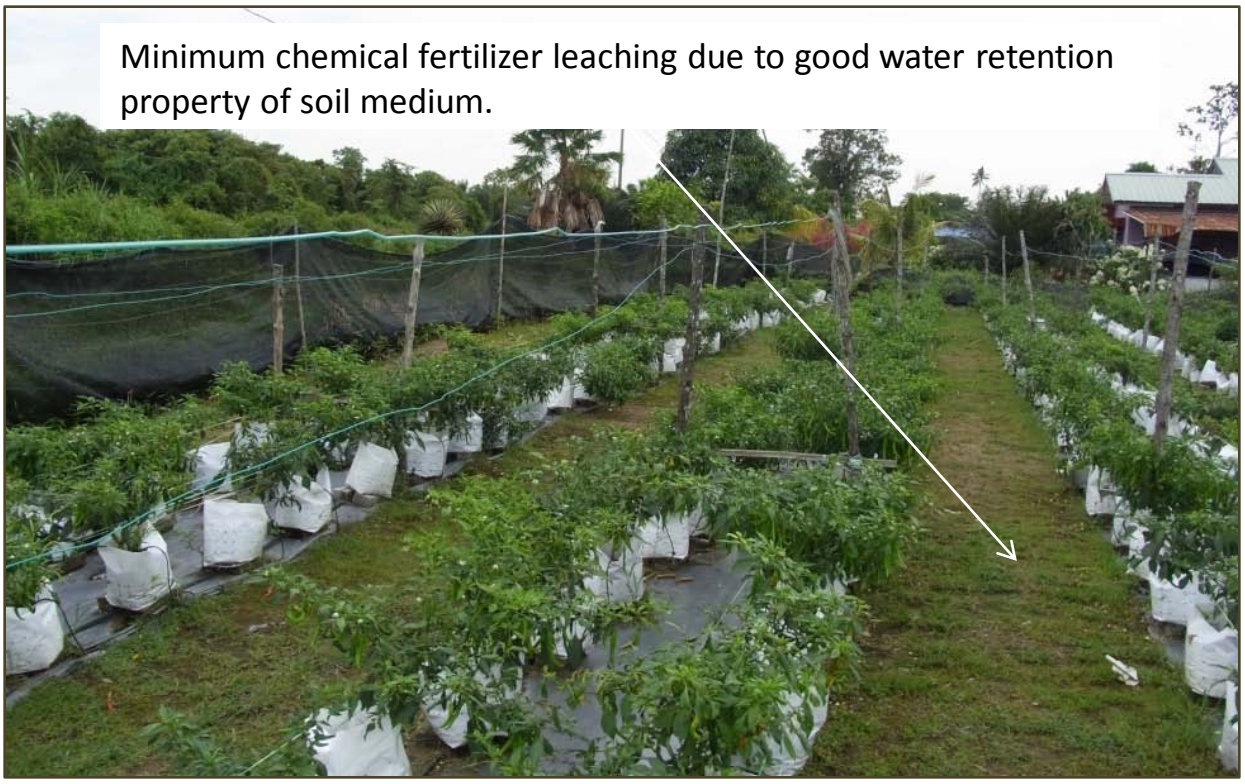
Below are the observation and feedback from the farmer at Pulau Indah:

1. Water retention

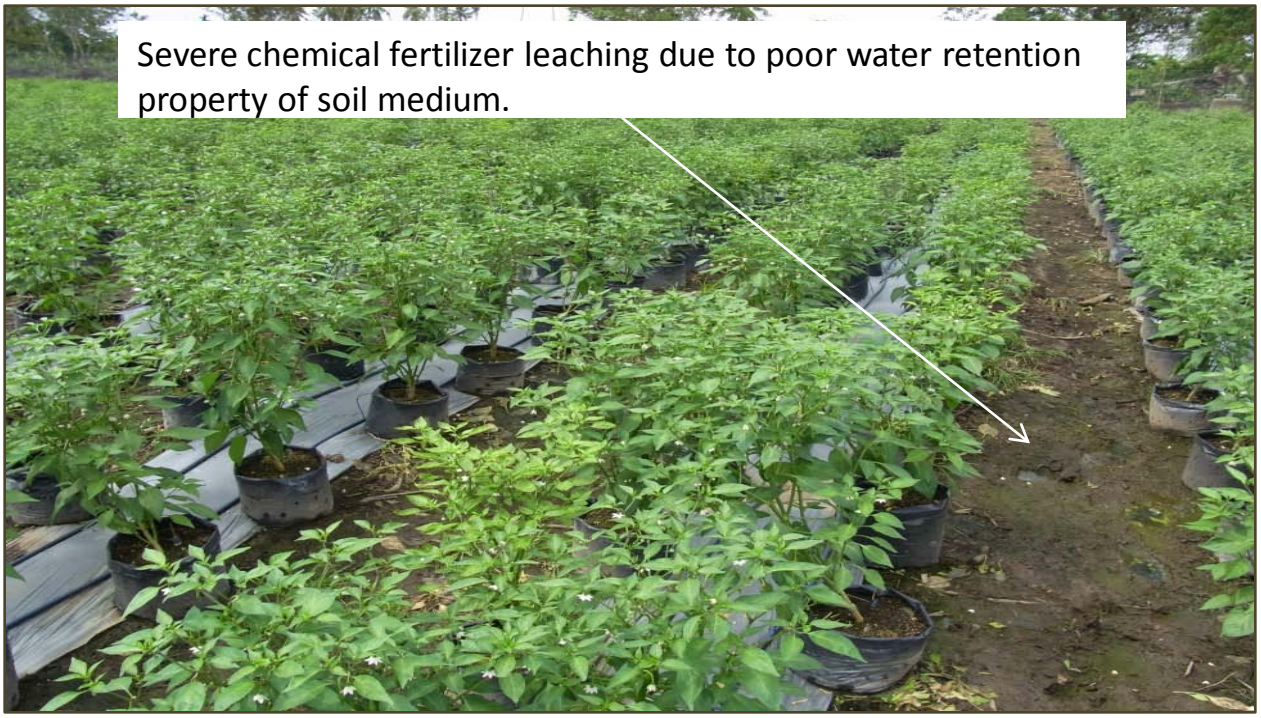
   There is better water retention when coconut husks are mixed with Nanosorb as soil medium.

2. Chemical fertilizer leaching

   Chemical fertilizer leaching is greatly reduced when coconut husks are mixed with Nanosorb as soil medium.



Picture 6: *Minimum chemical fertilizer leaching due to good water retention with Nanosorb.*



Picture 7: *Severe chemical fertilizer leaching due to poor water retention at a nearby chili farm without Nanosorb.*

3. Yield output

All the data in Table 1 and Table 2 are given by the farmer. Table 1 showed the results of previous 3 months old chili plants without Nanosorb in 2010. Table 2 showed the results of 3 months old chili plants with Nanosorb in 2011.

Chart 1 showed a comparison of 3 months old chili plants without Nanosorb in 2010 and chili plants with Nanosorb in 2011. It is clearly indicated that chili plants with Nanosorb in 2011 produce much more yield compared to chili plants without Nanosorb in 2010. The percentage of actual yield per plant in 2011 out beat 2010 by 406.25% in January, 445.31% in February and 3,625% in March.

TABLE 1: *Chili Yield without Nanosorb in 2010*

MONTH (YEAR 2010)	JAN	FEB	MAR
No. of chili plants (unit)	2500	2500	2500
Estimated Yield (kg)	500	500	500
Actual Yield (kg)	400	400	100
% of Actual yield	80%	80%	20%
*Estimated Yield / plant (kg)	0.2	0.2	0.2
*Actual Yield / plant (kg)	0.128	0.128	0.008

TABLE 2: *Chili Yield with Nanosorb in 2011*

MONTH (YEAR 2011)	JAN	FEB	MAR
No. of chili plants (unit)	3500	3500	3500
Estimated Yield (kg)	2200	2200	2200
Actual Yield (kg)	2000	2100	1500
% of Actual yield	91%	95%	68%
*Estimated Yield / plant (kg)	0.63	0.63	0.63
*Actual Yield / plant (kg)	0.52	0.57	0.29

* *Estimated Yield / plant = Estimated Yield / No. of chili plants*
Actual Yield / plant = Actual Yield / No. of chili plants

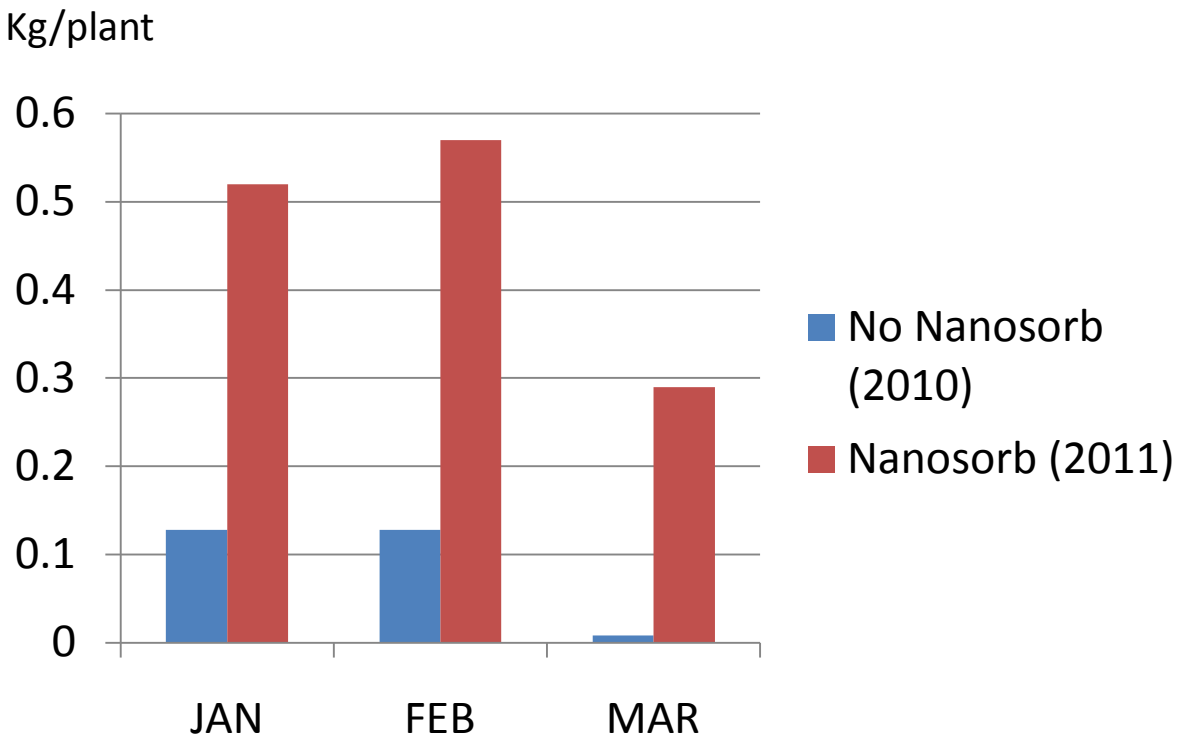


Chart 1: *Comparison of Actual Yield per plant*

Chilies are bigger in size and in straight shape (grade A). The leaves are dark green which shows the plant is healthy.

Picture 8: *Chili plants with Nanosorb*

Chilies are smaller in size and in hooked shape (grade B). The leaves are yellowish green which shows the plant is not healthy.

Picture 9: *Chili plants without Nanosorb at a nearby farm.*

4. Quality of chilies

The weight of the chili with Nanosorb is between 30 - 40g/pc, The normal weight for chili without Nanosorb is about 15 - 20g/pc.

About 70% of chili with Nanosorb is grade A compared to previous farming without Nanosorb which can only achieve 20 – 30% grade A yields.

The length of chili with Nanosorb is between 7 to 8 in. compared to previous farming without Nanosorb which achieved an average length of 5 in.

Picture 10: *Comparison of grade A and grade B chilies*

Picture 11: *Grade A chilies ready for delivery*

5. Plant growth

The chili plants with Nanosorb with yellowish and curly leaves has been reduced at least 50% compared to previous chili plants without Nanosorb.

The leaves of the chili plants with Nanosorb is greener and healthier compared to previous chili plants without Nanosorb.

About 90% of the chili flowers are able to grow into complete chilies compared to previous chili plants without Nanosorb which is less than 50%.

The healthy plants have smooth and green leaves; and produce a lot of chilies.

Picture 12: *A healthy chili plant using Nanosorb*

Picture 13: *Chili plants with yellowish green leaves from nearby farm (without Nanosorb)*

Picture 14: *Chili plants with curly yellowish green leaves from nearby farm (without Nanosorb)*

6. pH of coconut fibers as soil medium in fertigation

The application of Nanosorb in soil medium gives a pH between 5 – 6. There are a lot of earthworms in the soil medium.

Before the application of Nanosorb, the soil medium gives a pH between 3 – 4. There are no earthworms in the soil medium. The soil medium has to be flushed with water once a week to reduce the acidity by using micro irrigation 5 times/day for 5 minutes per flush.

7. Life span

According to the farmer, chili plants of 5 – 6 months without Nanosorb will normally give low yield and low grade chilies. The growth will be stagnant. This is the time where the farmer will do replanting.

The application of Nanosorb on 3 months old chili plants showed a very positive results after 2 months. The chili plants still produce new leaves, new branches and flowers. The yield is about 50 kgs/day based on 3500 chili plants.

CONCLUSION

The results of Nanosorb application in chili plants at Pulau Indah clearly indicate that Nanosorb can improve the germination, water retention, chemical fertilizer leaching, yield output, qualities of chilies, plant growth, pH of soil medium and life span of chili plants in fertigation farming.