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# Compendium of Organic Farm Inputs

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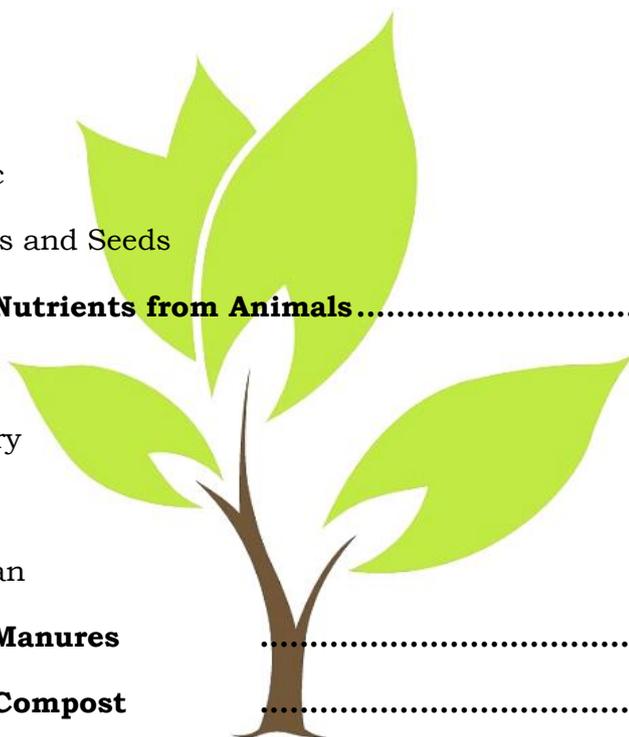
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## **Chapter - 1**

### **INTRODUCTION**

#### **ORGANIC AGRICULTURE INPUTS**

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##### **ORGANIC PERSPECTIVE:**

“In a world of many choices organic agriculture is a serious option for many farmers, enterprises and consumers. Supporting that choice with credible science can be vital for improving the over all productivity, food security, food sovereignty and environmental impact of agriculture in the country. The challenge lies in creating an environment in which organic is treated as complimentary approach and efforts are focussed on harvesting benefit, organic agriculture can give to a section of the Indian farmers’”

##### **NEED FOR ORGANIC INPUTS WHILE CONVERTING TO ORGANIC:**

For conversion of a conventional field to organic, first step is to build up the lost fertility of the soil. This can be achieved by complete ban on use of synthetic inputs and increased use of organic and biological inputs. For nutrient management and soil fertility build up crop residue, animal dung, forest leaf litter, bone meal, slaughter house waste, blood meal and green manures are important organic sources. All such organic material needs to be composted properly for appropriate impact. Nutrient value of the raw material and composting methodology determines the quality of produce. Biological resources such as biofertilizers and other microbiological inputs have also attracted lot of attention and are being promoted on large scale.

##### **BASIC SPIRIT ON USE OF INPUTS IN ORGANIC AGRICULTURE:**

In present day organic farming, stress is given on on-farm management. In this on-farm management nutrient management is looked after by crop rotation, multiple cropping, mixed cropping, incorporation of legumes as intercrops, crop residue management and by use of on-farm made compost. Plant protection is achieved by habitat management, multiple cropping, cropping combinations, crop rotations, release of pest predators and parasitoids and use of botanical and bio-pesticides.

## Chapter - 2

### ORGANIC NUTRIENTS FROM KITCHEN WASTE

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- **COOKING WATER:**

Many different nutrients are released into the water that food is cooked in. Water that is used to boil potatoes, vegetables, eggs, and even pasta can be used as a fertilizer. Just remember to let the water cool before applying it to your soil.

**BENEFITS:**

- ✓ It conserves water in area of drought. It keeps your plants boost.

- **BANANA PEELS**

Eating a banana helps replenish lost potassium. Roses love potassium too. Simply throw one or two peels in the hole before planting or bury peels under mulch so they can compost naturally.



- **VEGETABLE AND FLOWER PASTE:**

Organic material like kitchen wastes, dry leaves from the garden and flowers used for pooja, can be collected in a separate bin and crushed with an ‘organic waste crusher’, a small tool used for crushing. After crushing, the waste is converted to a solid paste. “If

you put 10kgs of solid waste for crushing, this can be reduced to one kg of solid paste'. The paste is added with lime powder and saw dust, put into the hexagon instrument and rotated for a few minutes. After 21 days, the solid paste decomposes into manure which can be used for gardening.

- **GREEN TEA:**

A weak solution of green tea can be used to water plants every four weeks. Use one teabag to 2 gallons of water.

**BENEFITS:**

- ✓ Cooling and keeping plants leaves healthy
- ✓ 85% increase in health of the plants

- **COFFEE GROUNDS:**

If using as a soil drench, soak 6 cups of coffee grounds in a 20 lit bucket of water. Let it sit for 2-3 days and then saturate the soil around your plants. Sprinkled on top of the ground before watering or pour a liquid version on top of the soil.

**BENEFITS:**

- ✓ Rich in nitrogen.

- **HOME COMPOST:**

Organic wastes& dried leaves is collected. After 90 days, it become compost.

- **COMPOST TEA:**

Step 1- Fill a bucket 1/3 full of quality finished compost.

Step 2- Add water to the top of the bucket (unchlorinated is best, or good well water).

Step 3- Let the mixture steep for 3-4 days. Stir it now and then.

Step 4- Strain the mixture through cheesecloth or other porous fabric (burlap, old shirt) into another bucket. Add the remaining solids to your garden or compost bin.

Step 5- Dilute the remaining liquid with water- so it's the colour of weak tea (use a 10:1 ratio of water to tea).

Step 6- Use tea immediately for optimal absorption into the soil around plants.

**BENEFITS:**

- ✓ Suppress the foliar disease.
- ✓ Increase amount of nutrients.

• **LIQUID COMPOST:**

Diluted liquid (1 litre compost juice to 10- 20 litres of water).Used to control fungus diseases such as Phytophthera.

**BENEFITS:**

- ✓ It is control the fungal disease in plants .

• **MOLLASSES:**

Mix 1-3 tablespoons of molasses into 4 lit of water. Water your plants with this and watch them grow bigger and healthier.

**BENEFITS:**

- ✓ Using molasses in compost tea supposedly increases microbes and the beneficial bacteria that microbes feed on.

• **HAIR:**

Hair is a good source of nitrogen and it does double duty as a deer repellent. A good source for this hair is not only your hairbrush but also the local barbershop or beauty salon. Many of these establishments will save hair for your garden, if you ask them for it. But do not limit yourself to only human hair. Dog hair, horse hair, and cat hair work just as well.

**BENEFITS:**

- ✓ Hair is a good source of nitrogen.



## BIO-ACTIVE BOTANICALS

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### 3.1 'From Neem'

- **NEEM KERNEL EXTRACT:**

- ✓ Fifty grams of neem kernel are required for use in 1litre of water.
- ✓ The neem kernel is pounded gently in such a way that no oil comes out. The outer coat is removed before pounding. This is used as manure.
- ✓ If pounded with the seed coat on, one and a half times the amount of seeds (75 g) is required.
- ✓ The seeds that are used for the preparation of neem kernel extract should be between three and eight months old. Otherwise, the quantity of azadirachtin in the seeds is quite low and hence they cannot be efficiently used for pest control.
- ✓ The pounded neem kernel powder is gathered in a muslin pouch and soaked overnight in water. The pouch is squeezed and the extract is filtered.
- ✓ To the filtrate, an emulsifier like khadi soap solution (a soap with no detergent) is added. One milli litre of emulsifier is added to 1litre of water. The emulsifier helps the extract to stick well to the leaf surface.

- **NEEM LEAF EXTRACT:**

For 5 litres of water, 1 kg of green neem leaf is required. Since the quantity of leaves required for the preparation of this extract is quite high (nearly 80 kg are required for 1 hectare), this can be used for nursery and kitchen gardens. The leaves are soaked overnight in water. The next day ,they are ground and the extract is filtered.

**BENEFITS:** The extract is suited for use against leafeating caterpillars, grubs, locusts and grasshoppers. To the extract, emulsifier is also added.

- **NEEM CAKE EXTRACT:**

A hundred grams of neem cake are required for 1 litre of water. The neem cake is put in a muslin pouch and soaked in water overnight. It is then filtered and an emulsifier is added at the rate of 1 millilitre for 1 litre of water, after which it is ready for spraying.

- **NEEM OIL SPRAY:**

Thirty millilitres of neem oil are added to the emulsifier and stirred well to ensure that the oil and water can mix well. After this, 1 litre of water is added and stirred well. It is very essential to add the emulsifier with the oil before adding water. It should be used immediately, otherwise oil droplets will start floating. A knapsack sprayer is better for neem oil spraying than a hand sprayer.



- **PUNGAM, ALOE & NEEM EXTRACT:**

One kilogram of powdered pungam cake, 1 kg of powdered neem cake and 250 g of powdered poison nut tree seeds are put in a muslin pouch and soaked overnight in water. In the morning, the pouch is squeezed and the extract is taken out. This is mixed with 1/2 litre of aloe Vera leaf juice. To this, 15 litres of water are added. This is again mixed with 2-3 litres of cow's urine. Before spraying, 1 litre of this mixture is diluted with 10 litres of water. For an acre, 60-100 litres of spray are used.

**BENEFITS:**

- ✓ This is effective in the control of pests of cotton and crossandra.

- **CUSTARD APPLE, NEEM & CHILLI EXTRACT:**

Five hundred millilitres of water are added to 2 kg of ground custard apple leaves and stirred. This is filtered to get the extract and the filtrate is kept aside. Separately, 500 g of dry fruits of chilli are soaked in water overnight. The next day, this is ground and the solution filtered to get the extract. One kilogram of crushed neem fruits is soaked in 2 litres of water overnight and the extract is filtered. All the three filtrates are subsequently mixed with 50-60 litres of water, filtered again and sprayed over the crops.

## 3.2 'From Chilli'



- **CHILLI SPRAY**

Crush and grind 4 cups of ripe chilli pods or 5 cups of chilli seeds. Place in a pan with 3 litres of water and boil for 15 to 20 minutes. Take off the heat and add 3 more litres of water. Leave to cool. Then filter through a cloth and keep the liquid. Add soap so that the mixture sticks to the pests and the leaves. Use potash based soft soap that is used for washing dishes and not the modern washing powders that contain caustic soda which will harm plants.

**BENEFITS:**

Use as a spray or sprinkle using twigs or grass tied together to form a whisk, against most insects including caterpillars, aphids, flies, ants and mealy bugs. Apply once a week if there is no rain or two or three times a week if it rains. It is important to use this solution as a preventative measure.

If the concentration of the chilli solution is too strong, it can burn the leaves. So it is important that the right strength is found by testing.

- **CHILLIES AND GARLIC SPRAY**

Grind 1 garlic bulb and 1 onion. Add 1 tablespoon of powdered chilli peppers. Stir into 2 litres of hot water. Leave the mixture to cool. Strain through a fine cloth and keep the liquid. Add 1 tablespoon of soft soap and stir well.

**BENEFITS:**

- ✓ Use as a spray for caterpillars in fruit trees.

- **CHILLI, MEXICAN MARIGOLD AND ONION SPRAY**

Chop 4 chilli pods, 4 onions and a handful of Mexican marigold leaves. Soak for 1 day in soapy water. Use potash based soft soap that is used for washing dishes and not the modern washing powders that contain caustic soda which will harm plants. Strain using a sieve and keep the liquid. Add 2 litres of water.

**BENEFITS:** Spray onto red spider mite infestations.

- **CHILLI DUST**

Grind as many dried ripe chilli pods as required.

**BENEFITS:**

- ✓ Sprinkle the powder around the base of plants to repel ants, cutworms, slugs and snails as well as many soil pests.

## 3.3 'From Garlic'



- **GARLIC SPRAY**

Blend 100 grams of grated and crushed garlic cloves, 0.5 litres of water and 10 grams of soap (Use potash based soft soap that is used for washing dishes and not the modern washing powders that contain caustic soda which will harm plants). Mix well. Strain the mixture through a fine cloth. Dilute the solution in 5 litres of water.

**BENEFITS:**

- ✓ Mix the solution well before applying to the affected plants. Use as a spray or sprinkle using twigs or grass tied together to form a whisk. For best effect, use the mixture immediately.
- ✓ Garlic is effective against a wide range of diseases and insects at different stages in their life cycle (egg, larvae, adult). This includes ants, aphids, army worms, caterpillars, Colorado beetle, diamondback moth, pulse beetle, whitefly, wireworm, false codling moth, imported cabbage worm, khapra beetle, mice, mites, moles, Mexican bean beetle, peach borers and termites as well as fungi and bacteria. Nematodes can also be controlled by drenching the soil with garlic liquid. However this method may also kill many beneficial soil bacteria and insects.
- ✓ Garlic is effective against so many pests and diseases that different strengths may need to be experimented with.

- **GARLIC POWDER SPRAY**

Crush and grind dried garlic bulbs. The powder can be used directly onto affected plants. A useful spray can also be made. To do this, add the powder to water and mix well. The amount of garlic powder needed depends on how strong the garlic is.

**BENEFITS:**

- ✓ This mixture is useful against scab, mildew, bean rust and tomato blight.

- **GARLIC AND *TEPHROSIA VOGELII* SPRAY:**

Pound fresh *Tephrosia* leaves and dried garlic leaves into a paste with a little water. Stir 50g of this mixture into 1 litre of water. Mix well, sieve and keep the liquid.

**BENEFITS:**

- ✓ Use the solution as a spray against cabbage worm. Use 1 litre per square metre. Apply once every week until 2 weeks before harvesting of the crop.

## 3.4 'From Leaves and Seeds'

- **LEAF MOULD:**

Withered and dry leaves and garden sweepings are thrown in to a pit in a shady corner in the garden and covered with earth and watered copiously once or twice in summer to assist decomposition. Decomposition will be completed within a year. Well decomposed leaf mould could be powdered and shifted through wire mesh.

**BENEFITS:**

- ✓ Best organic mulch.

- **OIL CAKE:**

Oil cake is one of the natural organic fertilizer with high nitrogen content, which is the residues of peanut seeds, sesame, coconut, soy, nuts rubber ... after oil extraction process of the processing plant.

**BENEFITS:** Pest repellent.



- **COTTON SEED MEAL:**

The seeds may be dehulled, cooked, cracked and flaked, but the oil is extracted by solvent (usually hexane) alone. The extracted cake is heated to eliminate the solvent and then generally ground into meal. As a granular fertilizer it is an excellent source of organic plant nutrients. When incorporated into the garden soil it decomposes slowly releasing its rich supply of nitrogen, phosphorus, potash and numerous trace elements.

**BENEFITS:**

- ✓ It feeds N,P,K and other minor nutrients over a period of time.
- ✓ Eliminating run off and promoting vigorous growth of plants.

- **GREEN MANURE:**

Green manure can be made in a couple of different ways. You can plant a cover crop which you will let grow for a season, then cut and till under. Cover crops can also be grown and cut and added to a compost pile to be used later on the garden. The advantages of this type of crop are that it will choke out weeds, it will improve the soil once it's tilled under, and it will help with soil erosion. The disadvantage is you can't plant in that area until the cover crop is finished and tilled under.

Some of the best cover crops are oat, rye, cow pea, millet, fava beans, mustard, clover, vetch, buckwheat, lupin, fenugreek, sunn hemp, alfalfa, and velvet bean. All of these crops are excellent sources of nitrogen and will also provide other nutrients to your soil.



- **GREEN LEAF MANURE:**

Application of green leaves and twigs of trees, shrubs and herbs collected from elsewhere is known as green leaf manuring. Forest tree leaves are the main sources for green leaf manure. Plants growing in wastelands, field bunds etc., are another source of green leaf manure. The important plant species useful for green leaf manure are neem, mahua, wild indigo, Glyricidia, Karanji (*Pongamiaglabra*) calotropis, avise(*Sesbaniagrandidiflora*), subabul and other shrubs.

- **GRASS CLIPPINGS**

Rich in nitrogen, grass breaks down over time and enhances the soil. Fill a 20 lit bucket full of grass clippings. You can even add weeds! Weeds soak up nutrients from the soil just as much as grass. Add water to the top of the bucket and let sit for a day or two. Dilute your grass tea by mixing 1 cup of liquid grass into 10 cups of water. Apply to the base of plants.

**BENEFITS:**

- ✓ Grass clippings either fresh or dried make an excellent organic mulch, which contain high nitrogen content.



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## Chapter -4

# ORGANIC NUTRIENTS FROM ANIMALS

## 4.1 'From Dairy'



- **FARM YARD MANURE:**

Farmyard manure refers to the decomposed mixture of dung and urine of farm animals along with litter and left over material from roughages or fodder fed to the cattle. Cow dung which we get in abundance (10 cows...) is collected after cleaning cowshed in a pit close by and is allowed to decompose over a period of time. Every month this manure (compost) is applied to the plants or the field to enrich the soil. On an average well decomposed farmyard manure contains 0.5 per cent N, 0.2 per cent  $P_2O_5$  and 0.5 per cent  $K_2O$ . The present method of preparing farmyard manure by the farmers is defective.

**BENEFITS:**

- ✓ Manure contains most elements required for plant growth.
- ✓ Manure as a source of crop nutrients and soil organic matter.

- **PANCHAKAVYA:**

Panchagavya, an organic product has the potential to play the role of promoting growth and providing immunity in plant system. Panchagavya consists of nine products viz. cow dung, cow urine, milk, curd, jaggery, ghee, banana, Tender coconut and water. When suitably mixed and used, these have miraculous effects.

- Cow dung - 7 kg
- Cow ghee - 1 kg

Mix the above two ingredients thoroughly both in morning and evening hours and keep it for 3 days

- Cow Urine - 10 liters

- Water - 10 liters

After 3 days mix cow urine and water and keep it for 15 days with regular mixing both in morning and evening hours. After 15 days mix the following and panchagavya will be ready after 30 days.

- Cow milk - 3 liters
- Cow curd - 2 liters
- Tender coconut water - 3 liters
- Jaggery - 3 kg
- Well ripened poovan banana – 12 nos.

### **Preparation**

All the above items can be added to a wide mouthed mud pot, concrete tank or plastic can as per the above order. The container should be kept open under shade. The content is to be stirred twice a day both in morning and evening. The Panchagavya stock solution will be ready after 30 days. (Care should be taken not to mix buffalo products. The products of local breeds of cow is said to have potency than exotic breeds). It should be kept in the shade and covered with a wire mesh or plastic mosquito net to prevent houseflies from laying eggs and the formation of maggots in the solution. If sugarcane juice is not available add 500 g of jaggery dissolved in 3 liter of water.

### **BENEFITS:**

- ✓ Mango - induce more female flowers. Continues fruiting.
- ✓ Guava – high TSS, shelf life is increased.
- ✓ Turmeric- enriches curcumin content. Extra long finger.
- ✓ Vegetables- very taste and strong flavor.

### • **JEEVAMIRTHAM:**

Material required:

- a) Cow dung- 10 Kg
- b) Cow urine-10 Lit
- c) Black Jaggery- 2 kg
- d) Basan( Chick Pea Flour)- 2 Kg
- e) Plastic Drum- 200 Litres capacity

### **Method of preparation:**

First of all take 200 litres of water in the drum. Add 10 Kg of cow dung to it and mix well. Add powdered jiggery and chick pea flour, mix it well. Cover the drum with jute bag and let it ferment for a week by mixing every two days. This mixture can be used within 2-3 days of mixing. After a week, the microbes develop in the mixture which

can be use with irrigation water Dosage of Jeevamirtham: 200 Litres is applied per acre through irrigation water or direct soil application.

- **AATTOTTAM**

**INGREDIENTS:**

- Goat dung (soaked in water overnight)
- Goat urine (fresh)
- Green gram after grinding (soaked in water overnight)
- Goat Milk
- Curd from goat milk
- Banana (ripened)
- Tender coconut water
- Fermented coconut water
- Sugarcane juice



**PREPARATION:** Aattottam is prepared in a wide mouthed clean plastic container. Metal containers should be avoided. Fresh goat dung (soaked in water overnight) and goats urine are to be added into the container and mixed thoroughly. The other ingredients are then added one by one to the container and again mixed thoroughly. This is to be stirred twice a day in clockwise and anticlockwise directions. Aattottam stock solution is ready for use after 14 days. Keep in shade and cover with a thin cotton cloth to prevent insects from laying eggs and formation of maggots on the surface of the solution. The solution can be stored for a period of six months, provided it is stirred twice everyday. If the solution is too thick to stir over time, water or tender coconut water can be added in required quantities.

**APPLICATION:** Apply 2% in water as spray during dawn or dusk on any crop. The solution should be filtered properly before pouring into the hand sprayer

**BENEFITS:**

- ✓ It is spray at the time of branching, before flowering and fruit setting.
- ✓ It provides excellent nutrients to the soil.
- ✓ It assists in plant growth and increases chlorophyll.
- ✓ Improves branching, leafing, flowering and fruiting.
- ✓ It is easy to prepare and is an excellent plant growth promoter.

- **MILK FERTILIZER:**

Milk is a good source of calcium, not only for humans, but for plants as well. Raw, or unpasteurized, cow's milk has some of the same nourishing properties for plants that it has for animals and people. It contains beneficial proteins, vitamin B and sugars that are good for plants, improving their overall health and crop yields. The microbes that feed on the fertilizer components of milk are also beneficial to the soil.

**BENEFITS:**

- ✓ Milk is a good source of calcium, not only for humans, but for plants as well.
- ✓ The microbes that feed on the fertilizer components of milk are also beneficial to the soil.

## 3.2 'From Poultry'



- **EGG SHELLS –**

Wash them first, then crush. Work the shell pieces into the soil near tomatoes and peppers. The calcium helps fend off blossom end rot. Powdered egg shells can be sprinkled onto your soil to increase calcium carbonate (also known as “lime”).

**BENEFITS:**

- ✓ Eggshells are 93% calcium carbonate, the same ingredient as lime, a true soil amendment.

- **CHICKEN BONE MEAL:**

1. Clean as much of the meat and fat off of the bones as you can. Place them on a microwavable plate and microwave them for three minutes in three separate increments (a total of nine minutes).

2. Let the bones cool for several minutes, as they will be very hot and dry at this point. Place the dry, brittle bones into a heavy iron pot, then gradually mash them with a piece of wood or a hammer. Wear goggles to keep from being hit with little bone fragments. Stir the now-smaller bone fragments around to reposition them.
3. You can keep mashing them until you have mostly powdered bones with some larger fragments, but it's best to mash them into a fine powder.
4. Once you have the powder, you can also add egg shells for added calcium, which will make your plants more disease resistant. Microwave the egg shells for two minutes, then grind and add.
5. Work of all your natural fertilizer 6 to 8 inches (15.2 to 20.3 cm) away from the root ball and 3 to 4 inches (7.6 to 10.2 cm) into the depth of the soil. During the growing season, work gently around the root ball. The roots will spread, so keep adding bone powder as they grow, but keep the powder a 6 to 8 inches (15.2 to 20.3 cm) away from the root ball. Rainwater will gradually work it towards the secondary roots in no time. The secondary roots grow very rapidly, so keeping the bone meal farther away is usually no problem, since these little roots will search for the meal on their own.

**BENEFITS:**

- ✓ It is used to provide Ca & P to plants and soil.

- **CHICKEN DROPPINGS:**

Leftovers from chickens don't have to be just a smelly mess. Their droppings can be used as an effective, fairly balanced fertilizer for your garden. Chicken droppings can also improve the soil.

**BENEFITS:**

- ✓ It is used for strong root system.

- **EGG LIME FORMULATION INGREDIENTS QUANTITY**

**INGREDIENTS:**

- EGG - 10 numbers
- LIME - 20 numbers
- JAGGERY - 250 gm

**PREPARATION:** Take about 20 limes and squeeze the juice into a container (bucket). Take about 250 gm of jaggery and mix it well with the lime juice to form a solution. Place 10 eggs with their shells in the lime solution. Close the container with an airtight lid and keep it in the shade for about 10 days. On the 10th day, the eggs along with the shells

inside the solution would have become rubbery like a rubber ball. Use your hand to mix the egg along with the shells in the lime-jaggery solution and top it up with equal quantity of jaggery solution (about 500 ml) to the lime jaggery solution. Close the container tightly for about 10 days. After the 10th day the formulation is ready for use as a foliar and soil spray in agriculture field.

**APPLICATION:** This formulation can be applied to crops such as paddy, wheat, banana, vegetables, greens, fruits and trees.

**BENEFITS:**

- ✓ It helps in good plant growth.
- ✓ It can also be mixed with Panchagavya and Vermiwash for better results.

## 4.3 'From Fish'



- **GUNAPASELAM**

**INGREDIENTS:**

- Fish waste
- Native jaggery
- Clay pot
- Water

**PREPARATION:** Take a clean clay pot of 10 liters capacity and fill with five liters of water. Add powdered native jaggery and stir well to dissolve in water. Then add fish waste and mix it thoroughly. Tie the mouth of the pot with a cotton cloth to prevent the entry of flies. Mix the pot every day by whirling the contents. After 14 days decant the liquid and use it as a organic liquid foliar spray.

**APPLICATION:** Apply 3% to 5% in water as spray during dawn or dusk on any crop.

## **BENEFITS:**

- ✓ It provides excellent nutrients to the soil.
- ✓ It assists in plant growth
- ✓ In addition with other sprays it helps in control of root grubs.
- ✓ It is easy to prepare
- ✓ Excellent plant tonic

## • **FISH AMINO ACID:**

Fish Amino Acid (FAA) is an effective organic liquid fertilizer. Its making is very easy and we can make it cheaply. Its made from fish and solid jaggery. Do not use liquid type jaggery for this, use only solid. You need to take equal amount of fish and jaggery. For example for 1 kg fish you need 1 kg jaggery. These two are only the ingredient of this is a cheap liquid fertilizer. Use small type fish, especially sea fish like sardine. Or use can use the waste of sardine. Clean the fish or fish parts.

### **Ingredients**

1. Sardine – 1 Kg
2. Solid Jaggery – 1 Kg

Slice Solid Jaggery, Cut the Fish into small pieces. Take an Air Tight Plastic Jar/Bottle and Put the Mixture in it. Mix this well and Store in a cool dry place. Keep it away from direct sun light. You need to keep this for 30 Days. Then filter the waste and remove it, Take the Liquid Portion and Save It. You need to keep this Upto 3 Months.

**Application** – You can apply this to soil or to the leaves of the plant. Do not directly apply this, You need to Dilute This. Apply 40 times of water. You can 25 ml of the fish amino acid can use with 1litre water.

## • **FISH EMULSION:**

- Layer leaves and fish pieces in three or four layers until the bucket is 2/3 full. End with fish on top to keep the leaves from floating.
- Cover with water, leaving a couple inches of space at the top.
- Seal the bucket well and place in an out-of-the way place.
- Check the bucket every day for a week, and then every few days, to see if gas is building up. If so, release it by opening the lid for a moment. Stir once a week once gases start forming.

- Let the emulsion sit for about a month. It will break down faster in warmer weather, slower in cold.

**BENEFITS:**

- ✓ Provides quick Nitrogen to the plants.
- ✓ Stimulate micro organism in the soil.

## 4.4 'From Human'

- **HUMAN URINE:**

A good ratio of urine to water would be 1:8. You can collect a cup of urine and pour it into 8 cups of water in a plastic bucket used outside for fertilizing plants. Pour 2 cups around the perimeter of each small plant. For medium plants add 4 cups and large plants deserve a good 6 cups of your personal home brew.

**BENEFITS:**

- ✓ Urine contains nitrogen, phosphorus and potassium.
- ✓ It is replacement for chemical fertilizers.

- **NIGHT SOIL:**

**Night soil** is a euphemism for human feces collected at night from cesspools, privies, etc. used as a fertilizer. Night soil is collected and dumped in a landfarm which is away from the town area. It is a strong manure and regular watering is needed.

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## AQUATIC MANURES

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- **SEA WEED:**

Chop up a small bucket of seaweed and add it to 20 lit of water. Let it sit for 2-3 weeks loosely covered. Use it to drench the soil and foliage. 2 cups work well for a small plant, 4 cups for a medium plants and 6 cups for a large plant.

**BENEFITS:**

- ✓ High protein and mineral content.

- **KELP SEA WEED:**

- Collect seaweed from the shoreline and place it in a bucket for transport; several handfuls are all that is required to make five gallons of liquid fertilizer. However, to make the resulting mixture more concentrated, simply add more seaweed to the bucket.
- Add water to the bucket and swirl the seaweed around with a waterproof-gloved hand or broom handle. Dump out this first water to rinse the seaweed and remove traces of salt; fill the bucket again with five gallons of fresh water, making sure the seaweed is covered.
- Place the seaweed in a cool, dark place -- such as a garage or corner of the basement -- and let it decompose. Allow the seaweed to soak for several weeks or up to two months. The longer it soaks, the more concentrated the mixture becomes.
- Add a small amount of fish emulsion to round out the fertilizer, providing phosphate and nitrogen; combined with the potassium in the seaweed, the liquid then becomes a complete fertilizer.
- Make a final mixture of one part fertilizer to one part water; if the seaweed has decomposed up to two months, you can dilute this further to stretch out the amount of fertilizer available. Place the diluted fertilizer in a second bucket and pour it around the base of your plants.

**BENEFITS:**

- ✓ Cucumber- 40% increase yield. Fruit suffered less from softening and rotting.
- ✓ Better frost tolerance, increase seed germination and greater capacity to absorb trace elements in plants.

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## Chapter - 6

# ORGANIC COMPOST

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- **WORM CASTING:**

Find something to use as a compost tea bag (old t-shirt, panty hose, cheese cloth, etc). Fill your homemade tea bag with worm compost and tie off the open end of the tea bag somehow.

Submerge the worm compost tea bag in a bucket of water. Use 20lit bucket. Let it sit overnight. In the morning the water should be light brown.

Because the beneficial microbes in the worm compost tea will start to die off, water your garden first thing in the morning for best results.

Remove the worm compost tea bag from the bucket, cut it open and add the worm compost either to your garden, your worm compost bin, or your hot compost pile.

### **BENEFITS:**

- ✓ The castings act as a barrier to help plants grow in soil where the pH levels are too low or too high.
- ✓ The humus in the castings extracts toxins and harmful fungi and bacteria from the soil.
- ✓ Earth worm casting have over 60 micronutrients and trace minerals including Ca, Mg , N & K.



- **VERMICOMPOST:**

1. Build or purchase a worm bin.
2. Purchase worms for your vermicompost bin.
3. Prepare the worm bedding.
4. Moisten the bedding.
5. Add a handful of soil to the bedding.
6. Add the worms to the vermicompost bin.
7. Add food scraps to the bin.
8. Remove the worms when the compost is done.
9. Harvest the vermicompost.
10. Replace the bedding and re-introduce the worms.



**BENEFITS:**

- ✓ Enriching soil, increase in plant growth and yield.
- ✓ Suppress disease.

- **COIR COMPOST:**



For converting one tonne of coir pith into compost, 5 bottles of spawn culture and 5 kg of urea are required. The raw coir pith (100 kg) is spread uniformly over a hard floor of cement, stone, slab or brick in a layer of size 5×3 m with a thickness of 10 cm. Then 1 bottle (350 g.) of the fungus culture (spawn) is spread over the coir pith. Another layer of 100 kg coir pith is spread over it and add 1 kg urea over the second layer. This process is repeated by adding the fungus spawn and urea alternatively with 100 kg coir pith till heap

reaches upto a height of one metre. Keep the heap as such with constant watering and cover with a thin layer of coir waste to conserve moisture. After 30 days of decomposition, coir pith turns into a black mass of compost with reduced lignin, cellulose, organic carbon and C:N ratio. The volume of material is also reduced by 40 percent. In order to ensure moisture retention and protection from heavy rainfall and wind adequate shelter need to be provided to the heap.

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## Chapter - 7

# ORGANIC NUTRIENTS MIXTURES

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- **QUICK FIX FERTILIZER:**

In an empty 1 gallon milk jug, mix 1 teaspoon baking powder, 1 teaspoon of ammonia (a very strong source of quick nitrogen), 3 teaspoons of instant iced tea (the tannic acid in this helps the plants to more quickly and easily absorb nutrients), 3 teaspoons blackstrap molasses (this helps feed soil bacteria), 3 Tablespoons of 3% hydrogen peroxide (hydrogen peroxide is a powerful oxidizer, as it combines with the air and water it decomposes, freeing the oxygen elements and thus providing a supplement of oxygen to the plants and aerating the soil), 1/4 cup crushed bone scraps (this adds phosphorus – any bones will do but use fish bones as they also provide potassium), 1 crushed egg shell or 1/2 a dried banana peel for potassium. Fill the jug the rest of the way with water (again rain water is best). Replace cap and allow the jug to sit in the sun for about 1 hour to warm, then water the plants with this mixture at full strength.

- **ORGANIC HYDROPONICS FERTILIZER:**

Mix the following ingredients in a 20 lit bucket:

- ✓ 2 kg of seed meal
- ✓ 0.5 kg finely ground agricultural lime

- ✓ 0.5 kg gypsum
- ✓ 1 kg dolomitic lime
- ✓ 0.5 kg of bone meal
- ✓ 0.5 kg kelp( large brown sea weed)

Fill the bucket with water and stir it until it creates a thin mix. mix 180 ml mixture in 400 lit of water. The mix can be left in powdered form and used at a ½ teaspoon to 400 lit of water.

- **EPSOM SALTS:**

Mix a tablespoon of Epsom salts with 4 lit of water and apply to garden plants as a foliar spray once every two weeks



- **BENEFITS:**

- ✓ Epsom salts are an inexpensive way to give your whole garden a healthy boost of nutrients.
- ✓ An Epsom salt solution is also a great way to replenish magnesium and sulfur levels in depleted potting soil.

- **VINEGAR FERTILIZER:**

Simply mix a tablespoon of vinegar in one gallon of water. Use this solution in lieu of your regular watering about once every three months. Plain white vinegar is an

inexpensive and effective fertilizer for acid-loving plants like roses, hydrangeas, and berries.

### **BENEFITS:**

- ✓ To increase soil pH.
- ✓ Acetic acid only contains carbon, hydrogen and oxygen- stuff the plant can get from the air.

- **FARMERS' EFFECTIVE MICRO-ORGANISMS (FEM):**



#### **i) INGREDIENTS**

Pumpkin- 3kg, Banana- 3kg, Papaya- 3 kg, Brown Sugar- 3 kg, Eggs- 5,  
Water-10 liter

#### **ii) PREPARATION**

- Chop the fruits.
- Add all the ingredients listed above into an air-tight container.
- On the 10th day, open the lid. Fungus will appear on the surface. If there is no fungus, add more brown sugar and keep it aside.
- Stir the mixture once in 10 days.
- After 30 days stir the mixture everyday until the 45th day. The mixture is now ready to use.
- Filter before using. The recommended dilution when using the mixture for plants is 200 ml to 10 litres of water.

### iii) **COLLECTION OF FEM:**

After 45 days there will be three layers in the container. The upper thin layer is in white color, which indicates successive fermentation. The middle layer will be pure brown colored liquid and the lower layer will be the semi solid formed by the dissolved vegetables. Open the tap fixed at the bottom of the container to collect the semi solid portion in one container. The upper and middle portions are collected in another container.

### iv) **APPLICATIONS OF FEM:**

- ✚ 2% to 5% concentration in water can be used as foliar spray on any crop.
- ✚ It also acts as a weedicide if it is used with goat's urine.
- ✚ It may act as a pesticide if used after being fermented with neem, papaya & nerium leaves.

### v) **BENEFITS**

- ✓ Improve the soil, reduce plant disease and promote plant growth.

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## BIO-FERTILIZERS

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### **BIO COMPOST:**

It is a kind of organic fertilizer, which is prepared from the waste of the sugar industry. The waste is decomposed using a number of human and plants friendly bacteria and Fungi. Biocompost consists of nitrogen, phosphate solubilizing bacteria and plenty of useful fungi like the decomposing fungi. This biofertilizer helps the farmers to increase soil fertility and thereby increase the yield of the crops.

### **VERMI COMPOST:**

It is also an organic fertilizer containing nitrogen phosphorus, potassium, sulphur, organic carbon, sulfur, hormones, enzymes, etc. If used over a period of time, the soil becomes extremely fertile and all the lost nutrients are restored back to the turf and the soil remains fertile.

### **PHOSPHOBACTERIA:**

This is also a kind of bio-fertilizer, which releases insoluble phosphorous in the soil, making it more fertile.

### **RHIZOBACTERIA:**

It is a bacterial, which induces nitrogen fixing nodules on the roots of vegetables like peas, beans, etc., thereby, playing an important role in agriculture.

**AZOTOBACTOR:**

Nitrogen plays an extremely important role in plant growth. Azotobactor improves the quantity of atmospheric nitrogen in the soil and makes it available to the plants. It also shields the roots from other pathogens existing in the soil.

**TRICHODERMA:**

It is an eco-friendly fertilizer, which acts as a biocontrol agent and is hyper parasitic against different pathogens in the field.

**COMPOSTER:**

A composter breaks down all organic substances like cattle waste, dead leaves, etc. present in the soil and thereby increase the productivity of the soil.

**TRICHO-CARD:**

It is an effective bio-fertilizer, which is an effective destroyer of eggs of many rodents, which eat plants and leaves. It is effective when used for many plants namely sugarcane, cotton, brinjal, corn, jawar, paddy apple, etc.

**ADVANTAGES OF USING BIO-FERTILIZERS:**

- ✓ Bio-fertilizers improve root proliferation due to the release of growth promoting hormones.
- ✓ They help in increasing the crop yield by 10-25%.

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## **GROWTH PROMOTERS**

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### **1. IYER'S COMBINATIONS – Amudham**

**Ingredients:** 1 litre cattle urine, 1 kg dung, 10 liters water

Add the above and mix well. Make sure there are no lumps and cover and set aside the mixture for 24 hours. Tie one kilogram waste fruit into a nylon bag and immerse this in urine solution. Let it soak for five days. This helps the fruit ferment well. Add ten times water to this and spray or add 60-100 liters of this in irrigation water for one acre.

**Applications:** Add one liter of this solution to ten liters water (for a 10% solution) and spray. Take care to dilute the solution or else the leaves will get scorched.

**Benefits:**

- ✓ This solution helps growth of leaves directly.
- ✓ It also repels insects.

### **2. PanchakavyaAvUttam**

**Ingredients:** 1 kg fruit, two liters tender coconut, 10-12 any variety of rotten banana (or similar quantity of other fruit), and three to five liters water, one kg **Ingredients:** Five kg dung, three liters urine, two liters fermented curds, two liters milk, 500 ml that has been melted and cooled.

**Preparation:** Knead it well using a bamboo pole. Cover this mixture with moist cloth for four days. Knead it once daily. On the fifth day add the remaining ingredients to this and let it ferment for fifteen days. (Add sufficient quantity of cattle urine and water if the solution is thick). In twenty days you will find nice-smelling AvUttam. Mix dung given in temples is not fermented. Also, it only has the five ingredients from the cow.

**Applications:** Mix one liter of this with 35-50 liters water (two to three percent solution) and spray. Or, mix five to ten liters per acre with irrigation water.

**Benefits:**

- ✓ It provides all kinds of micro-nutrients, enhances plant growth, repels insects, and helps increase disease resistance in plants.

### 3. COCONUT-BUTTERMILK SOLUTION:



**Ingredients:** Five liters buttermilk, one liter tender coconut, one to two coconuts, 500ml - 1 liter juice from waste fruit (or 500 gms - 1 kg waste fruit, if extracting juice is not easy).

**Preparation:** Break the coconuts and collect the coconut water in a vessel. Add buttermilk to this and mix well. Grate the coconuts, add to the mixture, and let it soak. Or, mix grated coconut and fruit (if not in juice form), put the mixture in a nylon mesh, tie it, and immerse it in the buttermilk solution. This solution ferments well in seven days. The contents of the nylon bag could be reused a few times in subsequent solutions by adding a small quantity of grated coconut every time.

**Applications:** Mix ten liters water with 300-500ml solution and spray. This can also be used in irrigation at the rate of 5-10 liters per acre.

**Benefits:**

- ✓ It is help to enhance plant growth, repels insects, and increases resistance to fungal diseases.
- ✓ It enhances flowering in plants.

**4. GREEN MANURE CROPS:**

Sun hemp 2 kg, Daincha 1 kg, Tephrosia 1 kg, Sesbania 1 kg, Sithagathi 1 kg

Seeds of any four crops of the above mentioned are required @ 20 kg / acre.

45 days prior to the cultivation of Paddy, the above mentioned crops are grown, decomposed for 10 days after which Paddy seedlings can be transplanted

60 days prior to the cultivation of Sugarcane, Banana and Turmeric adequate quantity of FYM / Poultry manure / Vermicompost are applied to the field followed by the sowing of above mentioned crops that can be ploughed insitu. Through this practice, 25 – 35 tonnes of green manure is incorporated to the field. This will improve the physical condition of the soil.

During the cultivation of Sugarcane, Banana and Turmeric the first weeding operation could be followed by the raising of green manure crops and insitu mulching is done in alternative rows

With respect to Banana cultivation, within 5 months of planting, the crops are grown twice; they are cut and are evenly spread in between the rows of Banana. This practice will suppress the weed growth.

In order to enhance the crop growth as mentioned above, 100 litres of cow dung solution is mixed with 50 litres of starter solution and can be applied for 1 acre twice in a month during irrigating the crop. This solution will increase the beneficial microorganisms in the soil through which, the process of decomposition of the materials become faster. Hence crop growth gets enhanced. Moreover consistency of the soil will increase by which the crops could obtain all types of nutrients.

## Green Leaf Manure Crops



### 5. SEEDS AND SEED TREATMENT

Seeds of traditional and improved cultivars have to be selected. Reason for avoiding the hybrid seeds is that they cannot be multiplied in future generation as that of traditional one.



The selected one should be free from pest and disease.

Selected seeds can be treated with 3-4ml of Panchakavya and 3-4gm of

Pseudomonas/kg of seeds, kept for 24 hours and used for sowing.

**6. STARTER SOLUTION:**

20 kg of cow dung, 20 litres of cow urine, 3-4 kg of Jaggery are to be mixed in 200 litres of water. After 24 hours, the solution is applied to crops by mixing it with irrigation water (1:10). This solution could convert the infertile soil into a productive one.

The solution is applied 2-3 times for 3-4 months old crop and for long duration crops, this applied twice in a month. Along with this solution, water may also be mixed and is sprayed over the crops.

**7. AMARA LEAF EXTRACT:**

1 kg of leaf is to be mixed with 5 litres of buttermilk and is kept for 7 days. 1 litre of this solution is mixed with 10 litres of water and can be applied to the crops as foliar spray.

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## Chapter - 10

# ORGANIC PEST CONTROL METHODS (CULTURAL AND BIOLOGICAL METHODS)

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### 1. POLY CULTURE

Usually single type of fruits is grown in farms. Hence only one crop is harvested in a year. Too much production of a single type of fruit do not fetch good price. Incidence of pests and diseases will be more in mono cropping. Subsequently yield gets reduced and inputs cost also increases.

By planting multi-purpose trees in a farm, income is earned throughout the year. If one crop fails, income earned from other crops can compensate the loss.

After selecting long duration fruit trees as main crop, they are planted at a distance of 10-12 m in square form. Short duration fruit trees are planted in between the space of long duration fruit trees. Long duration timber trees are planted along the borders.

Several types of Nitrogen fixing trees (*Sesbania* sp.) are planted in field borders and in between fruit trees. This will provide green manure and also fixes atmospheric nitrogen. Also acts as feed for livestock.

By growing creeping vegetables along the borders in the fencing, the vegetable requirement of household gets fulfilled.

Before planting different fruit trees, soil fertility, soil type, temperature conditions, water facility and marketing facility are all to be taken into consideration.

#### **BENEFITS:**

1. Good environmental condition is created.
2. If one crop fails, income from other crops can compensate the loss.

3. One crop acts as a trap crop for others which will control the pests and diseases naturally.
4. Income is obtained for several months in a year.
5. Nutrients required for crop growth are available naturally.
6. Dried leaves required for composting are easily available.
7. Feed for livestock are also available.

## 2. INTERCROPPING:

Cultivating companion crops in between main crops. Space in between main crops are utilised judiciously. The intercrops should be selected such that they should be fast growing than main crop. Inter crops should not compete with main crop. Also they should fix atmospheric nitrogen.

### E.g.

1. In rain fed lands, when ground nut is grown as a main crop, green gram, black gram and red gram are grown as inter crops.
2. Banana, Tapioco and Turmeric are grown as inter crops in Coconut
3. Onion, Chillies, Yam, creeping vegetables and Castor are grown as inter crops in



Turmeric.

### BENEFITS:

- ✓ Increase crop yield
- ✓ Fixes atmospheric nitrogen and makes it available to other crops
- ✓ Inter crops acts as trap crop for main crop
- ✓ Controls weed growth
- ✓ It does not allow the penetration of sunlight deep inside the soil. Hence soil gets protected.

## 3. TRAP CROP:

It is a usual practice for farmers cultivating some crops as inter crops in between the main crop. These inter crops act as trap crop by helping the main crop in controlling their major pests. Following are the examples.

<b>Main Crop</b>	<b>Trap Crop</b>	<b>Pests Controlled</b>
Bhendi	Bitter Gourd (emits a bitter substance momordicin)	All pests
Pulses	Sun hemp Castor	Beetles Spodoptera and Hairy caterpillar
Crosandra	Castor	All pests
Cabbage*	Mustard *(1 row of mustard for every 25 rows of cabbage)	Diamond Back Moth*
General	Marigold	Nematodes
Vegetables	Onion (emits allicin compound which irritates the pest)	All pests
Paddy	Live fencing of Vitexnegunda	Stem borer & Earhead bug
Red gram	Marigold	Fruit borer
Tomato	Marigold (1 row of marigold for every 16 rows of Tomato)	Fruit borer

#### **4. LIGHT TRAP:**

Light trap should be placed in the centre of the cropped field. In the evening time, female adults used to roam about here and there in search of males for mating. Plastic bucket or Plastic plate filled with water and 200 ml Kerosene is placed at the bottom of light trap. It is placed in the field in the evening from 6 pm till 10 pm. This will attract the adult insects.

#### **5. PARASITOIDS & PREDATORS:**

Two types of pests are there:

1. Beneficial to crops.
2. Harmful to crops.

When the beneficial pests are made to control the harmful pests such method is known as Biological control. Especially in crops like Sugarcane and Coconut, spray of chemicals becomes difficult because of their height. This method becomes the only alternative.

Beneficial pests are classified as Parasitoid and Predators.

**Parasitoid** – They will live over the body of the harmful pests for some days subsequently killing the pest.

**Predators** – They will eat the smaller insects.



- **Parasitoids**

6. Parasitoids such as wasps and flies live on other insect's eggs, larvae & pupa ultimately leading to their death

**1. Egg Parasitoid:**

Parasitoid will search and oviposit on the harmful insects eggs thereby eating the egg's yolk of the host

**E.g.** Sugarcane Internode borer, Paddy stem borer, Tomato and cotton fruit borer  
The eggs of these are destroyed by an egg Parasitoid – Trichogramma

**2. Larval Parasitoid:**

Parasitoids will lay their eggs directly on larvae, by which the parasite starts growing thereby killing the larvae

**E.g.** Coconut Black headed Caterpillar

This is controlled by Ichneumonid, Braconid and Bethyloid species

**3. Pupal Parasitoid:**

These Parasitoid will catch the pupa of harmful pests and will oviposit on it. So the adults will not emerge and thus get killed.

**E.g.** Coconut Black headed Caterpillar

This is controlled by Tetracardikus and Trichospilus

- **Predators**

- ✓ Brown plant hopper affecting Paddy will be eaten by Tortoise Beetle and Spiders.
- ✓ Aphids affecting cotton, lablab and cowpea are eaten by *Chrysopa*.
- ✓ Wasps will carry the larvae of other insects, keep them in their nests and feed their young.
- ✓ Spiders, Preying mantids, ants, dragon fly and some flees will eat the harmful pests.

## 7. MICRO-ORGANISMS:

### **Multiplication of Microorganisms**

1 kg each of *Azospirillum*, *Phospobacterium*, *Trichoderma viridi* and *Pseudomonas florescence* are mixed with 100 kg FYM, over which water mixed with 1 kg Jaggery is sprinkled.

While stirring this, it is advisable to check for the presence of sufficient amount of moisture. This FYM mixture is covered with wet gunny bag or sugarcane trash over which water has to be sprinkled every day. Heaped FYM is stirred once in 5 days and again covered with wet gunny bag or sugarcane trash. This will facilitate the multiplication of micro organisms.

Half the amount of this enriched FYM mixture is used during planting, the remaining portion is applied evenly 15 days after planting in 1 acre of land during irrigation. This will enhance the crop growth. I.e. this will absorb the Nitrogen present in air and will also convert the insoluble form of Phosphorus present in soil into soluble form. It will also control the diseases such as root and rhizome rot.

## 8. N P. VIRUS SPRAY:

Nuclear Polyheterosis Virus infested larvae's bottom portion of the body will turn to red colour. Larvae feel difficulty in eating. Before dying, larvae will climb to the top portion of trees and hang upside down and will die after which mucous like liquid will emanate from the body surface. This is collected and sprayed to crops.

### **Two types of N. P. Virus**

1. *Protinea*
2. *Helicoverpa*

*Protinea* is used against the pests of Cotton, Tomato, Castor, Sunflower, Tobacco and cowpea.

For 1 acre, 1 litre of N .P. virus solution is used. 2 kg Jaggery is solubilized in 2 litres of water. This is again added to 100 litres of water and is sprayed in the evening time.

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## Chapter - 11

# ORGANIC METHODS TO CONTROL PEST AND DISEASES FOR VEGETABLES

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### BRINJAL:

- Cow dung and poultry manure mixed in 1:1 ratio if applied to brinjal garden during land preparation, gives more yields.
- Growing castor in brinjal fields as border crop acts as a trap crop for insects.
- Growing onion / garlic as intercrop in brinjal helps to control many pests including fruit borers
- Cultivation of Dill (*Anethum sowa*) in Brinjal controls fruit borer in Brinjal. *Anethum sowa* odour repels fruit borer
- Grinding 40 kg of Neem seeds and applying to one acre on 50 days old plants, helps in obtaining higher yield.
- Neem cake 4 kgs (Powdered), and *Aloe vera* 4 Kgs (chopped and crushed finely) are soaked in 100 liters of water and the above mixture is stored in a container closed with lid. After 10 days, the contents are filtered and sprayed to control thrips in one acre of brinjal.
- Ash and turmeric powder are mixed in 1:1 ratio and sprinkled to control aphids in the morning hours, when the due moisture is there on the leaves.
- Sprinkling of lime powder helps to control mealy bugs.
- Cow urine, neem oil and tobacco decoction are mixed in 1:1:1 ratio in one litre of water and sprayed to control all sucking pests.
- Placing one spoon of neem cake at the root zone helps to control shoot borer and stem rot. 11. Spray neem cake extract to control mites and the spotted beetle (*Epilachanao ctopunctata*) in brinjal

- Brinjal fruits are harvested for market before their stalks change from green to brown in colour.



- For seed extraction in brinjal, medium sized fully ripened fruits which are bright yellow in colour are harvested. Then they are cut into 4-6 pieces and softened by soaking in water overnight. Next day, the seeds are removed and washed well with water. After washing add little quantity of wood ash. Dry it in the shade and preserve in a cloth / mud pot.
- Well matured and ripen brinjal fruits are cut with some portion of the stem. And cut the brinjal into 4 parts and tie it with the thread and hang it (8 to 10 feet) above the chullah (chimney). Smoke from the chullah will help the seeds to dry naturally. Extracted seeds are mixed with wood ash and shade dried for 2-3 days and stored upto six months.
- Take ½ kg cakes of each are soaked overnight in enough water to submerge them. (This quantity is sufficient for an area of 50 sq. meters). The soaked cake should be broadcasted and mixed well with the soil in early morning. It gives good yield and reduces the population of all major brinjal pests like root aphids, fruit and shoot borer, Epilachna beetle and other major pests.
- 1 Kg of fresh custard apple leaves and 1 kg of neem cake soaked in 2.5 litre of cow's urine overnight, then filtered. The filtered solution is diluted with water in a ratio of 1:3 and 4 sprayed on foliage. It gives the effect in controlling the pests of Brown hairy caterpillar.
- Take 1 kg of fresh custard apple leaves and ½ kg of Neem cake are soaked in 3 lts of cow's urine overnight. The filtrate is diluted with 8 lts of water and sprayed. It effects against *Epilachna* beetle, and controls Grub and adult.

## **TOMATO:**

- Application of tank silt @ 25 t/ ha to irrigated tomato saves cost on plant protection and supplies micronutrients that build resistance to pests 5.
- Five ml of neem oil, in one litre of water, with one drop of soap liquid (which acts as emulsifier) are mixed thoroughly and sprayed on the plants to control pests attack and also control flower droppings in tomato.
- Dissolve 500 gm wood ash and 500 gm cow dung in 10 litre of water and spray it to reduce flower dropping in tomato. Grow marigold as border crop in tomato fields to prevent fruit borer and leaf miner attack.
- Agriculture and weed waste materials are burnt near the fields along the wind direction, immediately after Sunset, to control many pests, an old practice by the famers.
- To control most of the pests in tomato, 1½ kg. of pungam (*Pongamia pinnata*) leaves, 1½ kg of Nochi (*Vitex negundo*) leaves and one kg of neem leaves are cooked in a container for two hours from which decoction is prepared and

dissolved in 20 litres of water and sprayed during evening hours for three or four times at monthly intervals.

- One kg of Asafoetida tied in a cloth is kept in irrigation channel to control fruit borer. It will be sufficient for one acre.
- Two kg of neem kernels are powdered and soaked in five litres of water for 10 days after which it is filtered, mixed with 50 litres of water and sprayed for one acre of tomato crop to control fruit borer, leaf miner and thrips.
- 250 gms of dried tobacco leaves are boiled in 4 litres of water for 30 minutes, allowed to cool, and filtered. The filtrate is diluted with an equal part of water and 30 gms of bar soap is added and sprayed. It effects on diamond back moth and all diamond back die within one day. It effects against aphids also.
- Dust wood ash on the crop in the morning hours to control aphids, thrips etc.



### CHILLI:

- Application of 250 kg of Neem cake per acre results in higher yield.
- Growing castor as a border crop acts as a trap for tobacco cut worms.
- Pruning vegetative branches in chilli enhances plant life and yield and induces fruiting branches.
- Application of 100 kg of Groundnut cake per acre reduces the flower dropping.
- Asafoetida @ 1kg/ac powdered, tied in a cloth and placed in the irrigation channel will act as a pest repellent.
- Grow coriander as intercrop or border crop to act as a repellent in controlling all sucking pests.
- Spray the leaf extract of *Prosopis juliflora* (5kg in 50 litres of water), two months after planting to control leaf spot, powdery mildew and fruit rot in chillies.
- Four Kg of Neem seeds powdered, placed in muslin cloth and tied are soaked in 10 litres of water for 24 hours; the content is filtered and 50 gm of soap powder is added to the filtered extract and diluted with 90 litres of water; and sprayed in the evening times to control many pests of chillies.
- Leaf extract of *Aegle marmelos* is sprayed to control fruit rot in chillies.
- Red earth treatment to Chili – Retention of red color – Acts as insulator against temperature and sunlight .

### BHENDI:

- Application of five tons of Sheep / poultry / farm yard manure per acre gives more yields.
- To control yellowing of fruits, four kg of fresh leaves of *Prosopis juliflora* are grinded well; add two litres of water, boil it for 20-30 minutes; allow to cool for 24



hours which is filtered and diluted with 10 litres of water. Add one litre of cow urine and spray on the crop.

### **ONION:**

- To get bigger sized bulbs in onion, 15 kg of groundnut cake is powdered, placed in muslin cloth, tied and kept in the irrigation water channel.
- . Bunching local small onions and hanging to the roof enhances shelf-life. Hanging prevents rodent damage and the higher temperature and air circulation near the roof have a curing effect.
- Apply two cart loads (300 kg) of wood ash at 25 days after planting to control onion blight.
- Cow dung is dissolved in irrigation water channels to control onion blight.
- Broadcasting of 15 kg rock salt per acre of onion crop will improve the colour of the onion bulbs. This has to be done when the crop is 30 days old.
- Rolling an empty drum of about 10 kg weight in onion field 10- 15 days before harvest facilitates removal of stalk and physical breaking of photosynthesis from the bulb.

### **GARDEN BEAN:**

- After the Lablab vines fully spread on the bower (pandal), tips are clipped off to facilitate more branching and flowering.
- Dust wood ash early in the morning (before sunrise) to control sucking pests like aphids and thrips.
- Dissolve 200 gm of detergent soap in 100 litres of water and mix it thoroughly. Spray the above extract to control mealy bugs.
- One kg leaves of *Prosopis juliflora* is pounded and soaked with one litre of water. After 7 days, filter and dilute with 10 litres of water and spray to control yellow mosaic virus .
- Lablab seeds are mixed with either wood ash or ant hill soil with little moisture to hold the mud to cover the skin of the seeds, and stored upto one year.



### **DRUM STICK**

- Seeds of the drumstick are soaked in the milk and fresh cow dung slurry overnight before planting. This will help to improve the taste and controls soil borne diseases.
- One week old fully fermented buttermilk is poured near the trunk and watered. The taste of the leaves and fruits will improve, it is believed.
- Place a pinch of *Asofoetida* just deep into the soil near the roots of drumstick trees to control hairy caterpillars.

- Crop wastes and other residues are burnt around the base of the drum stick tree to control hairy caterpillars.

### **CUCURBITS:**

- Soaking the seeds of snake gourd in cow dung solution for ½ hour before sowing helps for early germination and withstanding drought conditions.
- Cucumber and beans seeds dipped in kerosene before sowing, keeps ants away from the field. This acts as an ant repellent.
- Ash is sprinkled on cucumber crop (before sunrise) to control aphids and powdery mildew.
- Asafoetida (25 gm) is dissolved in one litre of water. Spraying the contents helps to control flower dropping.
- To avoid coiling and to get straight and elongated fruits in snake gourd, small stones are tied at their bottom with the threads when they are ½ foot long.
- Bitter gourd seeds are pressed on to the cow dung flakes put on mud walls, allowed to dry under the Sun and stored in cool places after drying.
- Fully matured and dried ridge gourd and bottle gourd fruits are collected and hanged in the house for seed preservation.
- Cucumber and Pumpkin seeds are extracted from fully ripened fruits, washed well with water, mixed with wood ash, dried and stored up to one year.

### **POTATO:**

- Before planting potato, seeds are dipped in cow dung slurry for 30 minutes which helps in controlling tuber rot.
- Crop rotation of potato with other crops like Marigold and onion, is practiced to control golden nematode.
- Neem cake powder (150 kg) is broadcasted per acre at planting to control tuber rot.
- Lime (100 kg) is applied to potato fields at planting to reduce acidity in order to control brown rot.
- Four kg of Neem seeds are powdered and dissolved in 100 litres of water and filtered. Add 10 litres of cow urine and mix it with 50 gm of detergent powder. Spraying this extract will control many pests and diseases of potato.



- Forming a trench around the heap freshly harvested potato and filling with water – Enhances shelf – life – Better suberization due to cold storage .

### **COLE GROPS:**

- Grow garlic as an intercrop in cabbage to control diamond back moth attack.
- Grow mustard as an intercrop in cabbage crop at two rows of mustard for every 25 rows of cabbage to control diamond back moth, leaf roller, *Heliothis* worm etc. (also for cauliflower).
- Cauliflower cultivation is avoided during summer months to reduce diamond back moth incidence.
- Cauliflower is cultivated on terraces in sloppy lands to avoid soil erosion.
- Neem oil 100 ml dissolved in 10 litres of water, is mixed with five gm of liquid soap or five gm of detergent powder. Spraying this solution will effectively control diamond back moth in cauliflower.



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