

# **Establishment of Neem/ Tobacco oil Based Pesticide Unit**

## **Neem/ Tobacco oil-based bio-pesticides**

Neem oil pesticides find application in protecting several crops such as rice, red gram, coconut, cotton and grams from insect pest diseases'-based bio-pesticides are economical and effective for crops like cotton, potatoes and other horticulture crops. Target pests include Bollworms, Aphids, Jassids, Thrips, Whitefly, Leaf folder, Pod borer, Fruit borer, Leaf hopper, Diamond back moth. Target crops include Cotton, Rice, Pigeon pea, Chickpea, Safflower, Okra, Cauliflower, Cabbage, Tomato.

Tobacco oil is extracted from Tobacco seeds, which contains approximately 37% oil, and can be extracted using the same facilities used for Neem oil extraction. It is a semi drying oil without toxic substances like Tobacco leaves, but has strong tobacco odor. Refined tobacco oil is colorless, odorless and edible. Unrefined oil can be used for Bio-pesticide manufacturing.



*Neem*



*Tobacco*

## Government incentives

<b>Production</b>	<b>Consumption</b>
<ul style="list-style-type: none"> <li>▶ Central Government provides grant-in-aid of INR4.5 million for building and INR2 million for procuring equipment for Bio-control Laboratories for production of bio-control agents including bio- pesticides to State Governments. Central Government also provides INR2 million as grants- in-aid to State Governments for procuring equipment for Bio-pesticides Testing Laboratories.</li> <li>▶ The Ministry of Agriculture and the Department of Biotechnology are responsible for promoting bio-pesticides, the former via the Central IPM Centre (Faridabad), the National Centre for IPM (NIPM) under the Indian Council for Agricultural Research (ICAR) and the Directorate of Biological Control.</li> <li>▶ Under National Project on Organic Farming (NPOF) scheme, assistance upto 25% and 33% of financial outlay upto a ceiling of INR4 million and INR6 million respectively is provided as back ended subsidy through NABARD for establishment of bio-pesticides/bio-fertilizers production units and agro waste compost production units respectively.</li> </ul>	<ul style="list-style-type: none"> <li>▶ Package of practices for control of pests and diseases in 66 crops have been revised to include techniques to reduce dependence on chemical pesticides and encourage use of bio-pesticides.</li> </ul>

# Manufacturing process

## Neem Oil Pesticides

### Cleaning of neem / tobacco seeds

### Crushing in expellers

Removal of stone and other foreign matter from the fruits/seeds. The kernels are then isolated from the shells with the aid of air classifier.



Cold process of crushing the seed kernels of neem between shaft and blades.



Neem oil is further processed for obtaining Azadirachtin, using Methyl Alcohol as solvent which is recovered after final separation using distillation.

### *Filtration of neem oil*

Further, neem oil passes through filters and sent for packing.

### Azadirachtin extraction

#### Pressing

Grinding neem seeds according to the amount of oil content in the seeds and sizes. Then woven dried seeds are fed into the pressing machine where neem oil is pressed out under high pressure and strong forces.

#### Steam distillation

The dried neem seeds are put into the steam boiler where they get swollen thus making neem oil squeezing easier. This is accompanied by increasing pressure in the boiler which drives the neem oil.

### ***Storage and packing***

Neem oil needs to be stored in a cool dark place if not to be shipped directly as pesticides

Neem Oil is usually sold in bulk in 10 MT road tankers. It is also dispatched in 200 Kg MS barrels, specifically for bulk buyers and export purpose.

200 Liter (Kg) HDPE drums are also used.



## **Tobacco oil pesticides**

### ***Cleaning of tobacco seeds***

Neem seed needs cleaning before processing which involves removing and other foreign matter from the fruits/seeds.

Furthermore, the seeds are isolated from the shells with the aid of a



### ***Crushing in expellers***

In this process the seeds pass through rotating stones OR impact Blades designed specially, which break the shell.



### ***Processing of tobacco oil***

Pyrolysis involves heating tobacco leaves to about 900 degrees

Fahrenheit in a vacuum, to produce an unrefined substance called bio-oil.

### ***Filtration of tobacco oil***

Further, neem oil passes through filters and sent for packing.

### ***Packaging of Bio-pesticide***

### ***Blending of neem and tobacco oil***

Since tobacco is not directly soluble in water, it is mixed with neem oil to enhance usability

## Preparation of some common biopesticides

### **TOBACCO DECOCTION**

#### **Materials required**

Tobacco waste	- 100 g
Bar soap	- 24 g
Water	- 6 litre

#### **Method of preparation**

Soak 100 g of tobacco waste in 900 ml of water for 24 hours. Then squeeze the tobacco waste and remove all debris by filtering the extract through a muslin cloth or a strainer. Slice 24 g of bar soap into thin flakes and dissolve in 100 ml of water in another vessel. Pour the soap solution into the tobacco decoction under violent agitation. Dilute this stock solution by adding 6 litres of water. This can be recommended for managing aphids and other soft bodied insects infesting vegetable crops.

### **NEEM SEED KERNEL EXTRACT (NSKE 3%)**

#### **Materials required**

Neem seed kernel	- 30 g
Water	- 1 litre

#### **Method of preparation**

Grind neem seed kernel into coarse powder and put it in a small muslin cloth bag. Keep it immersed in 1 litre of water in a vessel for 12 hours. Thereafter, squeeze the cloth bag by dipping in water repeatedly till the water coming out from the cloth bag becomes clear. Squeeze the cloth bag thoroughly and then remove it. Now the 3% NSKE is ready for spraying.

### **NEEM OIL GARLIC EMULSION (2%)**

#### **Materials required**

Neem oil	- 200 ml
Bar soap	- 50 g
Garlic	-200 g
Water	-9 litre

## Method of preparation

Slice 50 g bar soap into thin flakes and dissolve in 500 ml of hot water by agitation. Pour the soap solution to 200 ml of neem oil slowly and stir rigorously. Grind 200 g of garlic by adding 300 ml of water. Filter the garlic extract through a muslin cloth and then add to the prepared neem oil soap emulsion. Dilute this one litre stock solution by adding 9 litres of water to get 10 litres of 2% neem oil garlic emulsion.

## Key equipments required

<b>Manufacturing equipment</b>
Vibratory Screen
Conveyors
MS Sheet hopper
Silo-bin with blower
Seed crushing expellers
Horizontal kettle
Electrical insulation
Neem & Tobacco oil - Plat & Frame filter press
Neem cake pulverizer
Azadirachtin extraction plant
MS Extractor Vessels
Steam boiler
Biopesticide blending unit
Bio pesticide liquid filling & packing line
HT/LT Electrification with 120 KVA DG set for standby power

## Estimated manpower requirement

Manpower requirement at the site

**Managers**

3 persons

**Super visors**

3 persons

**Plant operators**

8 persons

**Accountant**

*The total project cost of neem/ tobacco oil pesticide oil unit is approximately INR 11.23 crore*

## **Limitations**

Farmers are used to pesticides which are packaged and available from the shelf. Even though farmers realise the importance of using plant products as alternatives to chemical pesticides, the widespread use of these plant products will take a while to become very popular. One of the ways by which they can be popularised is to process it and make it available to the farmers in a readily usable form.

## **Conclusions**

India's rich bio-diversity is an ace factor, always providing a wide source of bio-pesticides which can be effectively used in agriculture at a large scale. Also increasing health consciousness of Indian citizens have created a demand of organic food. This indicates huge scope for growth of Bio-pesticides sector. The rich traditional knowledge base available with the highly diverse indigenous communities in India may provide valuable clues for developing newer and effective biopesticide. The stress on organic farming and on residue free commodities would certainly warrant increased adoption of biopesticides by the farmers