



# GUIDELINES FOR USE OF NATURAL PESTICIDES IN HOMEGARDEN VEGETABLE PRODUCTION



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### ***1. What are natural pesticides***

Natural pesticides are comprised of substances that exist naturally in plants and whose main function is to protect the plant from disease and insect attack. In recent years the term natural pesticides has become associated with the development of natural resources for sustainable agricultural products. These newly discovered tools have proven especially successful in the realm of organic farming and are now being used to contain and, in some cases, outright eliminate some of the especially pernicious types of insects, nematodes, fungi and even some strands of complex bacteria of pathogenic origin that are present in many of the farmlands of the world. Natural pesticides are relatively non-toxic to mammals.

### ***2. Plant Extracts***

By studying the diverse chemistries of many different plant species scientists have discovered many useful compounds that can be used as natural pesticides. The different ways in which plant extracts provide pest control include:

- **Fungicidal Control:** Plant extracts can act as contact fungicides by disrupting cell membrane integrity, deactivating key enzymes and interfering with metabolic processes.
- **Plant Growth Regulation:** Some plant extracts can act as effective contact herbicides through a variety of mechanisms, such as disruption of cell membranes in plant tissue or inhibition of amino acid synthesis or enzyme production.
- **Induced Resistance:** Crops treated with some plant extracts produce and accumulate elevated levels of specialized proteins and other compounds that inhibit the development of fungal and bacterial diseases.
- **Insect Growth Regulators:** These extracts prevent insects from reaching the reproductive stage.

### ***3. Natural pesticide market growth***

Due to modern farming's increasing demand for chemical-free crops, there is a significant growth in the global natural pesticide market, generally exceeding the growth rates of traditional chemicals. Consumers and farmers are becoming more aware of the importance of protecting our

environment, and natural pesticides provide significant advantages for the challenges growers are facing today.

#### ***4. Advantages of natural pesticides***

1. No hazardous residues
2. Enable harvest flexibility
3. Effective tool for resistance management
4. Harmless to beneficial insects
5. Ensure worker safety
6. Environmentally friendly
7. Reduce the amount of conventional pesticides needed
8. Accessible to profitable export markets
9. Can be used in conventional and organic agriculture

#### ***5. Use of natural pesticides in vegetable production in Tanzania***

Most of vegetable growers in Tanzania have been using different types of natural pesticides formulation to manage insects and diseases such as aphids, mites, blight, moth, caterpillars, powdery mildew etc. Despite the use of natural pesticides by majority of growers, there is limited research on these formulations and growers are relying of trial and error in applying them.

This document highlights different natural pesticides formulations used to manage pests in the vegetable species found in vegetable seed kits which are being promoted and distributed in the project titled “Training and Evaluation of Demonstration Gardens in Deploying Vegetable Seed Kits to Tackle Malnutrition in Tanzania”.

##### **a) Onion**

Onion fights against aphids, flies, fruit worm, white flies, mites, root knot nematodes and early and late blight in plants. Parts of the crop used are bulbs and leaves

### ***Procedure***

Pound/grind about 100 gram of onions equivalent to 2-3 big onions.

Soak the onions in 0.5 liter water for 24 hrs.

Soak 10gram of soap in water and mix with onion.

Stir and sieve with cloth.

Add water in the mixture at a ratio of 1: 20 and spray.

### ***b). Garlic***

Is used to control nematodes and insects in crops.

Take 85 gram of fine chopped garlic and soak in 1 liter of water for 1 day

Add 10 ml soap, stir, then add 1 liter water and stir.

Add water in the mixture at a ratio of 1: 20 and spray to the plants maximum 2 times

### ***c). Onions and or garlic***

Any type of onion when planted and mixed with other vegetable crops they tends to repels some of insects due to its smell

### ***Remember***

- Onion tastes/flavor can be retained in the vegetable/ product for one month
- Onions intended for use as natural pesticide should not be fertilized as fertilizer reduce the effectiveness of onion against pests' management.

### ***d). Hot pepper spray***

- This natural pesticide repel many of crawling and flying insects in the field. It also controls fungal, bacterial and viral diseases in crops. Both pepper seeds and skins are used as natural materials.

### **Procedures**

- Take 30 to 40 chopped hot peppers or 0.6 liter hot pepper powder into 10 liter warm water (not boiling).
- Let liquid steep for 24 hrs, then filter, dilute with 10 liter cold water.
- Add 20 drops of soap and spray

### **e) Marigold (*Tagetes minuta* )**

#### ***Procedure***

Harvest flowers and leaves of marigold especially during flowering stage

Mix with water in a container at the ratio of 1:1 (1 handful of marigold to 1 liter of water)

Cover the container and leave it for 5-7 days while stirring regularly

Sieve and mix with liquid soap in the ratio of 1:5 then spray

Plant Marigold plants around field as an attractive deterrent crop against flowers and leaf thrips.

Also repels nematodes.

The remains of marigold can be used as mulching material in the field to control nematodes.

### **f) Neem (*Azadirachta indica*)**

Neem fights against several insects attacking crops. The most parts of the plant used are seeds, oil, leaves and seed cakes.

### **g) Neem Seeds**

- Pound 50-70 Neem seed
- Add 1 liter of water and leave for 24 hrs.
- Add 10 gram soap
- Sieve and spray

### **h) Neem oil**

Mix one and half table spoon of neem oil with 1 liter of water and 10 gram soap

Stir and spray the crops.

### **i) Neem leaves**

Harvest 2 kilogram leaves from plant which has not yet started flowering

Pound and add 5 liters water and 10 gm of soap

Allow the mixture to settle for 24 hrs then sieve and add 10-15 liters water. Spray

### **j) Neem seedcake**

For small plots, incorporation of neem seed cake or powder can help to reduce root knot nematode populations.

### **k) Cow Urine**

Cow urine when fermented and sprinkled on the crop can be used as both pesticide and natural fertilizer.

### **Preparation and application**

Collect cow urine which is mixed with small amount of dung

Leave it to ferment for 10-14 days

Sieve, add water in the ratio of 1:6 then add soap and spray

### **Effects and advantages**

Due to high content of urea in it which is toxic to most of the organisms, the pests and insects etc. will not attack the leaves and buds of the crop plants.

Due to pungent and bad smell of the extract most of the pests and insects which are attracted due to nectar and fragrance get repelled, preventing the plant.

### **l) Kitchen ash**

Kitchen ash can be mixed with water or without water. Ash can also be mixed with lime whereby

1 cup of ash is mixed with 1 cup of lime (1:1) and add into 4 liters of water

Leave the mixture for 5 hours then sieve and spray in crops

Kitchen ash is very effective in controlling cut worms in seedlings/plants.

### **m) Baking soda**

Baking soda affects the formation and development of fungi diseases in plants including powdery mildew.

#### ***Preparation***

Mix 120 grams of baking soda in 10 liters of water.

Add 10 grams of soap

Spray every after 7-14 days depending on weather and disease occurrences

### **n) Soda and vegetable oil**

- ✓ Take 1 table spoon of soda, 1 table spoon of vegetable oil, 4 liter water and ½ table spoon of soap.
- ✓ Use this formulation immediately after preparation
- ✓ Spray the plant to control powdery mildew and blight.

### **o) Soap powder**

- ✓ Take 3 table spoon of soap powder add 4 liters of water.
- ✓ Spray the plant to control mites, bollworm and other soft bodied insects.
- ✓ Only effective during wet weather, not active when dried out. Needs contact with insect.
- ✓ Repeat spray if necessary.
- ✓ Too many repeats may cause phytotoxicity; it will affect the growth of the crop negatively.

### **p) Liquid soap**

- ✓ Mix 3 table spoon of liquid soap and 4 liters of water.
- ✓ Spray the plant to control thrips, white fly, aphids and mites.
- ✓ Only effective during wet weather, not active when dried out.
- ✓ Flat spray that reaches good coverage as it needs contact with insect
- ✓ Repeat spray if necessary but too many repeats may cause phytotoxicity.

### **q) Lemon grass**

Soaks 50 gram ground lemongrass in 2 liter water for 2 hours then filter.

Spray the plant to control bacterial wilt

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