



**A SURVEY STUDY TO ASSESS THE PRACTICE OF BIO PESTICIDES BY  
TRADITIONAL FARMERS OF GUJARAT, INDIA**

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Article Received on 21/12/2023

Article Revised on 10/01/2024

Article Accepted on 31/01/2024

### ABSTRACT

During the British rule most of agricultural land in India had been destroyed because of compulsion to grow crops like Indigo, eucalyptus, cotton, etc. for Indian farmers. Because, most of the European countries were market for the goods prepared from such raw material. Because of such type of compulsory farming the people of India couldn't get sufficient food. After the independence, the biggest problem against the Government of India was to fulfil the food requirement of the huge population and for that reason the green revolution was promoted wherein, large grains are given MSPs by Govt. and usage of pesticides and chemical based manures was encouraged. As a result of that, India became self-dependent in agriculture and food but by the cost of ever long-term health hazards which increased risk of many life-threatening diseases like cancer and multiple organ failure, infertility etc. At that time this step towards chemical pesticides and manures may be the need of the time but nowadays people are still using such harmful chemical-based pesticides. India has achieved sufficient development at present but poor standards of life for the people of India is still a matter of concern. Such pesticides are present in every food item and even can't be removed by simple methods like washing and cooking or boiling. So, it's a time to switch over herbal pesticides which is a need of present era. There are many medicinal plants which are having antimicrobial property and easily available. Some traditional farmers were interviewed to gather data regarding bio pesticides. The full paper will discuss those bio pesticides. There are many medicinal plants which if used as herbal pesticide or herbicide then the people can be prevented from many deadly diseases caused by chemical pesticide. Many folk practices were famous of herbal pesticides before and many researches also have been carried out with this regard and this is a comprehensive review on traditional as well as contemporary herbal pesticides. Such type of researches will ensure the healthy and disease-free society.

**KEYWORDS:** Herbal pesticides, traditional pesticides, contemporary herbal pesticides.

### INTRODUCTION

Since pre-British era, the major population of India was dependent upon Agriculture. Till today, up to 58% of total working population of India are earning their bread and butter directly by farming. But the farming techniques nowadays have been changed remarkably. Prior, it was completely organic farming but during the green revolution around 1960, the whole scenario was changed. To ensure food safety of huge population the government encouraged use of chemical rich pesticides and manures which will help the farmers to grow more food.

These modifications fulfilled the immediate need of the citizens but at the cost of their health. Chemical enriched fertilizers and pesticides were need of that time but even today they are being used abundantly by most of the

farmers because of the greed to grow more and earn more. Ultimately, it has been resulted in poor life standards and life-threatening health hazards.

India is having huge share in worldwide organic farming. India is home to 30% of world's organic producers<sup>[1]</sup> but the area of organic farming is only 3.92% of total agricultural land<sup>[2]</sup>, which is increased as compared to last year but the figure is still not satisfying.

Before green revolution, the farmers were using various types of bio pesticides made-up of animal products or medicinal plants and such practices should be collected and conserved and also analysed and promoted to other farmers so they can improve the quality of their production and the overall standards of life will improve of every individual.

**MATERIALS AND METHODS****1) Plan of study**

**Participants:** - 15+ traditional and organic farmers have been interviewed.

**Research tool:** - Planned interviews having questions related main agricultural crops season wise and their probable diseases with traditional bio pesticides were conducted for all participants.

**Location of study:** -Traditional farmers of *Saurashtra* region of Gujarat, India were interviewed.

**Randomisation:** - Convenient non randomisation method was adopted for selection of participants.

**Type of study:** - Cross sectional survey study.

**2) OBSERVATIONS**

**Traditional and organic bio pesticides which were collected from survey study**

**1. For all type of sucking caterpillars**

10 Dry ginger + 2 Kg bitter guard powder + 2 kg marigold leaves powder in 6-8 litres water soaked for 24 hours

Then dilute in 200 litres of water to use it per acre.

**2. For *Kukad* (Viral disease of tomato and chilli)**

(a) 2-3 kg Onion paste/200 litre water (Spray it after 24 hrs.).

(b) Take 1 kg *Vitex negundo L.* leaves and 2 litre water and boil it till it remain 1 litre then use this decoction to sprinkle on plants.

(c) Take 250 ml Cow milk + 50 ml Cow urine and 400 gm asafoetida powder and mix it in 100 litre water and use it to sprinkle.

**3. For Mealybug**

Take 200 litre water+ 2 litre Cow urine + 200 gm Indian Babul fruit powder and soak them for 24 hrs. Use it to sprinkle over affected part after filtration.

**4. Anti-fungal spray**

Take 200 gm Dry ginger and 2 litres water. Boil it till it remain 1 litre. Then add 2 litre milk and heat again up to one boil and then dilute the mixture in 20 litres water. Use it to spray over affected part.

**5. Natural Herbicide**

Use jaggery mixed water or Sugarcane juice to spray over weed this will attract ants and thus, ants will eat weed and also the chemicals they release will restricts growth of other pasts.

**6. Neem oil for all type of fungal and bacterial infection**

Take 5-6 drops of pure Neem oil and dilute it in 1 litre water and spray it over affected part.

**Additional information collected during study****a) Season wise important crops**

The main crops grown in Summer season are Great Millet, Pearl millet, Maize, Paddy, Groundnut and in Winter season these are Cotton, Wheat, Mustard, Cumin and Vegetables. Besides, Sugarcane is also grown in some districts.

**b) Classification of plant diseases<sup>[3]</sup>****I. Symptoms they cause**

- (1) Leaf spots
- (2) Root rots
- (3) Cankers
- (4) Scabs etc.

**II. Plant organ they affect**

- (1) Root diseases
- (2) Stem diseases
- (3) Fruit diseases etc.

**III. Type of plant They affect**

- (1) Cereals
- (2) Pulses
- (3) Vegetables
- (4) Fruits & nuts
- (5) Oilseeds etc.

**IV. Type of pathogen**

- (1) Virus
- (2) Bacterium
- (3) Protozoa
- (4) Prion
- (5) Fungus etc.

**Most common plant diseases compiled from reputed agricultural sites and journals.<sup>[4]</sup>**

| Sr. No. | Plant wise Disease       | Type of microbe with mode of transmission     | Probable symptoms   | preventive measures   |
|---------|--------------------------|---|---|---|
| 1.      | Maize Smut               | Fungus spores deposited on fruits (Air borne) | 1) Reduced yield<br>2) Galls on ears, leaves and tarsals, which later turn black            | (i) Destroy diseased plant.<br>(ii) Use resistant varieties.<br>(iii) Seed treatment                  |
| 2.      | Rice Blight              | (Airborne)<br>Fungal spores on leaves         | (i) Small longitudinal red spots on leaves which turn grey or brown.<br>(ii) Reduced yield. | (i) Use clean seeds<br>(ii) Avoid heavy use of nitrogen fertilizers<br>(iii) Use resistant varieties. |
| 3.      | Maize Rust               | (Airborne)<br>Fungal spores on leaves         | (i) Red spots on leaves.<br>(ii) Reduced yield. (iii) Death of the crop.                    | (i) Early planting,<br>(ii) Crop rotation<br>(iii) Use resistant varieties                            |
| 4.      | Cercopora a Leaf spot of | Fungal infection transmitted through Wind     | (i) Reddish brown spots on leaves.  | Crop rotation   |

|    |  |   |  |  |
|----|--|---|--|--|
|    | Cowpea   |   | (ii) Lesions on leaves.<br>(iii) Chlorosis.<br>(iv) Dropping or falling of leaves.   |  |
| 5. | Rosette disease<br>Of Groundnut  | Viral infection   | (i) Yellow leaves with mosaic mottling.<br>(ii) Stunted plant with curled leaves.<br>(iii) Wilting and death of plant.<br>(iv) Shortening of the internodes. | (1) Early planting.<br>(ii) Crop rotation.<br>(iii) Use resistant variety<br>(iv) Uproot and burn infected plants. |
| 6. | Wheat: - ▪ Rust Disease<br>▪ Karnal bunt disease<br>▪ loose smut disease<br>Powdery mildew disease<br>▪ Alternaria leaf blight disease<br>■ Sehun (Tundu) disease<br>Flag smut disease<br>■ Foot rot disease | Viral and fungal  | Various symptoms according to source of infection  | -  |
| 7. | Sorghum and millet   | Helminthosporium fungi<br>Antracnose (Colletotrichum spp)<br>Cercospora sp<br>Flowering rot (Fusarium sp) | Various symptoms according to source of infection  | -  |



Fig.01.



Fig 02.



Fig.03.



Fig 04.



Fig.05.



Fig 06.

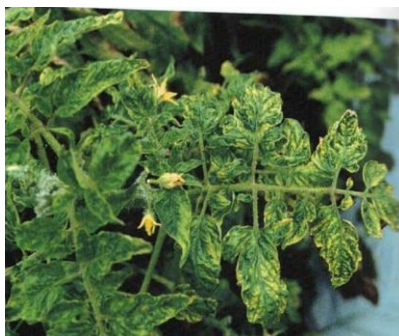


Fig.07.

**Fig. 1: Sucking Caterpillars, 02, 05- Fungal infection, 03 – Mealybug, 04 – Jaggery water, 06 – Neem oil, 07- Viral disease of Chilli and Tomato.**

#### DISCUSSION AND CONCLUSION

In agricultural crops, the most common infection occurs by fungi and most common in humid and tropical districts like Jamnagar, Porbandar, Gir-somnath etc. The main useful medicinal plants are *Vitex negundo L.*, Onion, Dry ginger, Babul, Bitter guard etc.

Neem and *Vitex negundo L.* are having antimicrobial activity because of active phyto-constituents they possess while Onion is having abundant amount of sulphur, which is natural antimicrobial.

Dry ginger is terpene containing drug which restricts growth of microbes because it destroys the cell wall of microbes and thus, they can't survive.

Neem, Bitter guard and Babul are the drugs which are either bitter or astringent in taste which absorbs excessive moisture with tannin and other components and thus, the humid environment which is ideal for fungal growth can't be maintained for long.

Despite of all above mentioned bio pesticides made up by medicinal plants there were many practices of animal products as pesticides also which were found during this study.

#### RESULT

All these remedies are very potent and time tested by various traditional and organic farmers. These organic alternatives are convenient, cheaper and abundantly

available option for farmers. Such type of practices should be promoted by government with the help of awareness programs, agro-help centres and other measures.

These options will help to improve life standards of people of India and can prevent many diseases which are life threatening. This will reduce financial burden of government which it has to spend for raw materials of chemical enriched fertilizers and health related schemes which are free for citizens.

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