



Use of ITK in Plant Protection

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Indigenous technical/traditional knowledge (ITK) is community, local and rural in origin. It is used in weather forecast for good seed germination, soil, water and soil fertility management, management of insect pest and disease of plant and animals, post harvest management etc. there are several indigenous cultivation practices of India. Which are still in vogue in organic agriculture in different states of India which are sustainable, eco-friendly, viable and cost effective.

Introduction

Indigenous Technical Knowledge (ITK) refers to the unique traditional local knowledge existing within and developed around the specific conditions by women and men indigenous to a particular geographic area. This indigenous technical knowledge that people in a given community have developed over time and continue to develop it, is based on human experiences on mass scale, dynamic and changing, tested in most cases over centuries of use, endowed with highest possible adaptability to local culture and environment and put greater weightage on minimizing risks rather than maximizing profit. The indigenous technical knowledge (ITK) covers a wide range of subjects, viz. crop production, livestock rearing, natural resource management, food preparation, healthcare, insect pest management and many other.

The use of non-chemical methods for pest control and crop protection is already gaining importance in several countries including India. The integrated pest management strategies developed and promoted by the Governments is now based on the use of plants extracts. If an effort is made towards production of Indigenous Technical Knowledge (ITK) based products on cottage scale, it can be an economically viable option for sustainable development of eco-friendly pesticides/insecticides.

ITK and plant disease control

Traditional system of crop protection that farmers have learnt from their long association with the land, its flora and fauna were based on eco-friendly systems of suitable cultural practices, judicious rotation of crops and knowledge of pests and their life-cycle

- ✓ In case of bunchy top disease in chilies, dusting of ash, spray of liquid waste of tanned leather in tribal areas.

- ✓ Some farmers used to apply fresh cow dung near the collar region of chilli plant to control fungal disease, viz. damping off and dieback.
- ✓ In case of soil-borne disease, root rot and collar rot were used castor cake, karanj cake and neem cake as control measures.
- ✓ 20 kg of *Casuarina equisetifolia* leaves are boiled in water for 20 min. After cooling, the solution should be filtered. Then the extract is diluted with water and can be given to control some bacterial and fungal disease.
- ✓ Prepare solution from 2 kg fresh leaves of papaya in 3-4 liters of water and keep in overnight. After filtration, this is diluted with 50-60 liters of water and 250ml soap solution added to it, is effective to control brown spot disease of rice.
- ✓ Cultivation of marigold followed by solanaceous vegetable crops is effective to control bacterial diseases.
- ✓ Leaves of khair (*Acacia catechu*) can be put into water channel to control brown spot disease of rice.

ITK and insect-pest control

The application of chemicals for pest control leads to food poisoning, soil, water and environmental pollution. These chemicals create ecological imbalance and allow insect-pest to develop resistance. At these moments, an indigenous knowledge related to plant protection in agriculture would play vital role.

Management of insect pests through ash

Sprinkling of ash over and around the vegetable crops like onion, okra, brinjal, tomato and cucumber and in fields is effective against insect pests viz, beetles (pumpkin beetle, hadda beetle etc.), leaf defoliating insects, leaf miners, thrips and aphids. It is the cheapest practice for small farmers. Ash acts as a detergent. Chewing and sucking type of insects, find it difficult to chew plant parts due to deposition of ash.

Management of insect pests of mustard crops through *Aloe barbadensis* (Gwarpatha) + *Nicotiana tabacum* (tobacco) + *Azadirachta indica* (neem) + *Sapindus trifoliatus* Linn. (Aritha)

The mixture is effectively used against the insect pests of mustard crops. Leaf decoction (1 kg) of Gwarpatha and tobacco powder extract (200 gm) is prepared in 5 liters of water for 3-4 hrs to make a 2 liters solution. Neem leaf extract (200 ml) is added after evaporation process and decoction of 50 gm aritha powder is added to the above solution and mixed thoroughly. This is sprayed on the mustard crop at interval of 2-3 weeks. It is practiced throughout the hilly areas of Mandi district of Himachal Pradesh.

Management of insect pests through cow urine + Vitex negundo (Nirgundi) + Ferula asafoetida (Hing)

These mixtures are very effective, eco-friendly insecticidal treatment against insect pests of wheat crop. It repels the insect pests. Leaf decoction of nirgundi (about 30-40 leaves in 10 liters of water) is prepared till it is left 1 liter. This mixture is filtered properly. About 10 gm hing is mixed in 1 litre water and then above ingredients are mixed in about 5 litres of cow urine and sprayed over affected crops. It is effective for all sowing seasons (early; normal or late sowing seasons) of wheat and paddy crops. It is practiced most in hilly mountain villages of Shimla, Himachal Pradesh

Management of pod borers in gram crop through whey (lassi) + Aloe barbadensis (Gwarpatha) + Nicotiana tabacum (tobacco)

This method is very effective against the pod borers infesting the gram crop.

Tobacco powder (200 gm), lassi (2 litres) and Gwarpatha (2 leaves) are dissolved in 15 liter of water. This solution is left undisturbed for 15 days. It is then filtered with a muslin cloth and the filtrate is sprayed over the infested crop at an interval of 2-3 weeks.

Management of paddy insect pests through Vitex negundo (Nirgundi)

Farmers sweep the paddy field with brooms made up of branches of Vitex negundo, which are known to act as an insecticide and enhance growth of paddy. It is practiced throughout the hilly areas of Himachal Pradesh.

- ✓ 4 kg tobacco leaves and twigs are boiled in 40 liters of water for 40 min. After cooling, 1 kg soap power is mixed and solution is diluted 7-8 times and sprayed to control aphids and white flies in citrus plants.
- ✓ Rice seedlings raised from seed treated with extract of neem kernel are resistant to leaf hopper.
- ✓ For prevention of infestation of shoot borer in mango tree, common salt is mixed with soil near the collar region of tree.
- ✓ In case of insect holes made by shoot borer and bark eaters in mango, jiggery is placed in the holes to attract other predators to feed on the insect present in the holes. Similarly, the practices of pouring kerosene or petrol in holes and blocking holes with mud or cowdung are also common in citrus plant.
- ✓ 1 liter extract of equal quantity of crushed green chilies and garlic mixed with 200 liters of water is effective to control aphids and jassids.
- ✓ Filtrate prepared from a solution of 1 kg Calotropis leaves and 5 liters of water is effective to control leaf sucking pests.
- ✓ An extract of tobacco waste with 250 g of soap solution in 200 liters of water as spray control stem borer.

- ✓ A solution prepared from neem leaf paste in water (10 kg : 2 liter) is effective to control leaf folder in rice.
- ✓ A solution prepared from 100 g tulsi (*Ocimum sp.*) leaves in 1 liter of water with 1 ml soap solution can be used for effective control of aphid, army worm, red cotton bug, mosquito etc. is used to control cotton semilooper, mites, green leaf hopper, aphid etc.

Control of stored grain pests

In Rajasthan, garlic leaves are used for safe storage of food grains.

- ✓ Leaves of *Vitex negundo* (Nirgundi) are incorporated in any pulse seeds for long time preservation
- ✓ There is a common practice of storing food grains like wheat and rice use of neem leaves to prevent storage pest damage.
- ✓ Milled chickpea, green gram and other pulses are stored after thoroughly treated with mustard oil.
- ✓ Green gram can be kept free from any pest infestation by treating with 1% neem leaf powder
- ✓ Seed mixed with *Acorus calamus* (baje) powder in the ratio of 10 kg: 1 kg, would help in preserving the seed free from stored pests for long time.

Traditional storage structures

It has been found that 100% women of Rajasthan use traditional storage structures such as mud bins, stone bins and bamboo bins for storage. Before storage, they used to disinfect the grains with smoke of cowgung cake and neem leaves. In Arunachal Pradesh, the majority of farmers store foodgrains and meat near the kitchen where the smoke of burning firewood penetrates. They also use leaves of neem or tulsi on the storage structure to keep free from insect-pest infestation.

Nishi tribe of Arunachal Pradesh use rat trap called 'gurung'. The trap is made of tauk (thin bamboo) with long internodes. Garo tribes of Meghalaya use grain storage structures made up of thatch grass, bamboo and wooden poles. A traditional system of rat proof storage locally called nahu (granary) can be seen at the one corner of village of Adi tribes in Arunachal Pradesh.

Conclusion

Indigenous technical knowledge provides valuable inputs to make efficient use of natural resources and extends relevant support for sustainable development. Indigenous techniques used in different component of farming system are mostly organic, eco-friendly, sustainable, viable and cost effective. But, there is a need to explore, verify, modify and scientifically validate these practices for their wider use and application.