

Indigenous Technical Knowledge: An Alternative Traditional Method in Controlling the Stored Grain Pests

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SUMMARY

Agriculture is the main occupation of the majority of people in India. 70% of the population were depending on agriculture. By increase in the advanced technologies the grain production has been increased. But the post harvest losses of the produce in the storage due to insect pest causing a huge loss to the farmers. Indiscriminate use of chemical insecticides in stored seeds leads to toxic residue in food, insect resurgence and environmental pollution. Thus adopting a traditional method i.e., ITK is a safe alternative practice. The indigenous techniques like mixing of stored seeds with ash, red soil, botanicals, sand, common salt, turmeric, red chilli, lime, coating of seeds with oil etc. They are easily available to the farmers in the developing country. By considering these advantages, the Agricultural Extension workers should encourage in applying the ITK methods in the farming community of the country.

INTRODUCTION

Indian society is the oldest society having rich culture, social and agricultural traditional knowledge practices. Directly or indirectly more than 3/4th of the populations are depending on the agriculture (Thakur et al., 2011). Due to the advance technologies the grain production has been steadily increased. Nearly 60-70% of Farmers as they get yield store their grains in the farmer's level to sell their produce at the perfect time when the minimum support price will be up to their expectations level. According to FAO, the annual loss during storage due to stored grain insect's pest is 10%. The stored grain pest attack the stored products are rice weevil, pulse beetle, lesser grain borer, khapra beetle, Red Flour beetle, potato tuber moth etc. At present the stored grain pest control measures are majorly rely on the synthetic insecticides and fumigants. But their indiscriminate usage leading to major problems like insects resurgence, toxic residue in food, environmental pollution (Fish wick, 1988) and increasing cost of application. In view of these problems together adopting a safe alternative practice i.e., Indigenous Traditional Knowledge for protecting the food grains from the attack of insects pest. It is estimated that 60-70% of food grains produced in the country are stored in indigenous storage structures and the grains are protected home itself by using the Indigenous traditional knowledge practices. Indigenous knowledge is the cluster of ideas, beliefs, values, norms and rituals, which are native and embedded in the mind of people. ITK is unique traditional local knowledge existing within and developed around the specific conditions by women and men indigenous to particular geographic areas (Lal, 2004). ITK is developed by people of a particular region through their own experience (Gadgil et al., 1993). Farmers have tested these traditional technologies in their own fields and developed them in such a way that they are totally self-reliant and sustained with these technologies. Hence the Indigenous Traditional Knowledge should be documented at each and every instance which can be used by the present and next generation.

Type of Storage practices:

Sun drying and packing:

Most of the farmers traditionally follow the sun drying practice before the storage of grains. Traditionally Farmers usually adopt this on a full moon day, as this is thought of belief to reduce the risk of damage by pests and diseases. Sun drying helps to reduce spoilage and also enhance the dormancy period of grains. Optimum grain moisture (10-12%) is necessary for proper storage of food grains/seeds. This method suppresses the internal insect and infestation growth due to periodic drying, but it does not provide protection from external infestation during storage. For all most all the crops this method is adopted.

Mixing of Ash with seeds:

In this process seeds are filled in earthen pots up to 3/4th level while the rest is filled with cow dung/wood ash. The silica in the ash interferes with the insects feeding. It reduces the fungal pathogen multiplication, relative humidity. As the ash covers the seeds, it interferes in the egg laying and larval development of the insect. This method is practiced in many stored seeds. Ash treatment during storage was found effective for controlling the storage losses up to 80%.

Coating of red soil with seeds:

In this method a paste of red soil and water are made on a container and the seeds are transferred in to this red soil pots and mixed well so that the soil adheres the seeds completely. Then the seeds are dried and transferred to the gunny bags. As the red soil completely covers seeds the insects could not able to lay the eggs. The soil around the seed absorbs the moisture from seed and avoids spoilage. This is practiced in seeds like maize, ragi and pulses.

Mixing of the other crop grains:

In this method, pulses are packed in combination with the smaller cereal grains to fill inter granular space to limit the movement and air circulation in the stored grains which would prevent the development and spread of the pulses insects and pests. If the grains quantity is less this practice involves no additional cost. If this is adopted for huge amount of grains some effort are needed to separate the pulses from cereals.

Mixing of botanicals with the grains:

Botanicals are the plants having insecticidal, Microbial properties. They should be added in the storage structures for the prolonged and better storage of the grains. The leaves of the botanicals should be placed in the storage yarns. The botanicals may be used in the powdered form or as an extract form. These leaves belong to Neem (*Azadirachta indica*), Mint (*Mentha piperita*), Tulsi (*Ocimum sanctum*), Dharek (*Melia azedarach*), Datura (*Datura stramonium*), Tobacco (*Nicotiana tabacum*), Nirgandi/Chinese chaste tree (*Vitex nigundo*), Calotropis (*Calotropis gigantea*), Pungam (*Pongamia pinnata*), Eucalyptus (*Eucalyptus globulus*) has very good insecticidal properties and also acts as anti-feedents, repellents and growth inhibitors of storage insect pests.

Oil coating to stored grains:

In this practice the stored grains mainly pulses are coated with a thin layer of edible/ Non edible oils i.e., Mustard (*Brassica nigra*), Neem (*Azadirachta indica* A. Juss.) or Karanja (*Pongamia pinnata* Pierre) oils; to protect them against insect infestation. Coating of edible/non-edible oils to the pulses drastically reduces adult insect laying eggs on the seeds in which eggs slip down due to oily surface on seeds.

Sand mixture method:

In this method a thick layer of the sand is added at the base of the mud pot and the grains which are sun dried are spread over the sand. Again a layer of sand is spread over the grains. This process of sand-seed mixture is continued layer by layer up to reaching the brim level. The container is air tighten by the cow dung. The sand particles act as an abrasive material of insect cuticle and kill the insect pest. It acts as barrier between grains and insects. Cow dung on the top act as a repellent. This practice is mostly practiced for pulse seeds, potatoes.

Storage of seeds with common salt:

In this method common salt about 200grams were mixed manually in one kg of the seeds. Salt has abrasive action on the skin of the insects in which it prevents their movement of insects inside the storage containers. Salt has a hygroscopic and insecticidal property. Salt helps in keeping the grain dry by absorbing the moisture thus

avoiding spoilage and hence aid in safe storage. Red gram, Bengal gram, Black gram, Green gram, other pulses and legumes can be stored for a period of 6-8 months by this technique.

Turmeric application to seeds:

Application of turmeric is the alternative method to prevent the grains from pests and insects. The seeds are mixed with the turmeric powder before storing in the container. Turmerones and arturmerone are the components which act as insect repellent in turmeric. Its strong smell and insecticidal properties keeps the insect away from food grains. This treatment provides protection for up to 6-8 months. The seeds/grains of Pulses and Cereals are stored in this method.

Use of Dried red chillies:

Dried chillies are kept in a container filled with seed bags. Pungency of dried red chillies keeps away the pests.

Use of Lime powder:

In this method Lime (Calcium carbonate) powder is mixed uniformly with grains and stored them in gunny bags at dry place. Generally 10-15 grams of lime is used for 1 kg of grains. The lime has a repellent and anti-feedant property. It also prevents insects to get multiplied. This method is followed mostly in the seeds like Cereals, Pulses and Paddy.

CONCLUSION

From the above discussion it is concluded that Indigenous Technical Knowledge methods for the insect control are easy to apply, ecofriendly, need no formal training, less expensive. Chemical insecticides lead to environmental pollution, adverse effect on the human health and insect resistance. The materials used for protecting the stored seeds are easily available, economically feasible and can be used by the farmers in the developing country. Keeping in this view about the advantages of ITK, the Agricultural Extension works should encourage in the applying the ITK methods in the farming community of the country.

REFERENCES

- Fishwick, F.B. (1988). Pesticide residues in grain arising from post-harvest treatments. *Aspects of Applied Biology*: 17: 37-46.
- Gadgil, M., Becker, F. and Folke, C. (1993). Indigenous knowledge for bio-diversity conservation. *Ambio*: 22: 151- 156.
- Lal, C. (2004). Indigenous Technical Knowledge on Management of Agro biodiversity in Himachal Himalaya with focus on Insect Pest Control. A Ph. D. Thesis, Himachal Pradesh University, Shimla, H.P. (India).
- Thakur, D R., Priti, Damita (2011). Stored grain pests and traditional techniques of their control measures- A case study on Chopal, Shimla (H.P.). *International Journal of Plant Protection*: 4(1): 220-226.