

GUIDELINES ON PROPER STORAGE, SAFE HANDLING AND DISPOSAL OF INSECTICIDES

Introduction

The NVBDCP aims to achieve effective vector control by the appropriate biological, chemical and environmental interventions of proven efficacy, separately or in combination as appropriate to the area through the optimal use of resources. Integration of Integrated Vector Management (IVM) is done by using identical vector control methods to control malaria and leishmaniasis in rural areas, and malaria and dengue in urban areas to achieve cost-effectiveness and synergy. The measures of vector control and protection include:

1. Measures to control adult mosquitoes: Indoor Residual Spray (IRS)
2. Anti-larval measures: chemical, biological and environmental
3. Personal protection: use of bed nets, including insecticide treated nets (ITNs) and Long Lasting Treated Nets (LLINs)

The national malaria control program is currently using IRS as the primary method of vector control in rural settings, and anti-larval measures in the urban areas. Insecticides like DDT, Malathion and Synthetic Pyrethroids are recommended in the programme for IRS. The state health services will be responsible for safe disposal of DDT and other insecticides. General safety precautions while handling insecticides and guidelines for proper storage, transportation and safe disposal of insecticides and insecticide containers are mentioned below for further reference.

General safety precautions while handling insecticides

Exposure to insecticides may occur when handling and spraying insecticides. The exposures to insecticides may occur in following situations:

- When handling the insecticide product during opening of the package, mixing and preparation of the spray.
- When spraying the insecticide.
- When disposing the insecticide solution and containers

General precautions:

1. The operator should also wear a protective hat and face shield or goggles.
2. Do not eat, drink or smoke while working.
3. Wash hands and face with soap and water after spraying and before eating, smoking or drinking.
4. Shower or bath at the end of every day's work and wear new clean clothes.
5. Wash overalls and other protective clothing at the end of every working day in soap and water and keep them separate from the rest of the family's clothes.
6. If the insecticide touches the skin, wash off immediately with soap and water.
7. Change clothes immediately if they become contaminated with insecticides.
8. Inform the supervisor immediately if one feels unwell.

Protective clothing and equipment

Absorption of insecticide occurs mainly through the skin, lungs and mouth. Specific protective clothing and equipment given below must be worn in accordance with the safety instructions on the product label

- Broad-rimmed hat (protects head, face and neck from spray droplets).
- Face-shield or goggles (protects face and eyes against spray fall-out).
- Face mask (protects nose and mouth from airborne particles).
- Long-sleeved overalls (worn outside of boots).
- Rubber gloves.
- Boots.

Storage

1. Insecticide storehouses must be located away from areas where people or animals are housed and away from water sources, wells, and canals.
2. They should be located on high ground and fenced, with access only for authorized persons. However, there should be easy access for insecticide delivery vehicles and, ideally access on at least three sides of the building for fire-fighting vehicles and equipment in case of emergency.
3. Insecticides must NOT be kept where they would be exposed to sunlight, water, or moisture which could affect their stability.
4. Storehouses should be secure and well ventilated.
5. Containers, bags or boxes should be well stacked to avoid possibility of spillage. The principle of '**first expiry first out**' should be followed.
6. Stock and issue registers should be kept upto date. Access to the insecticides should be limited to authorized personnel only.
7. The store room should have a prominently displayed mark of caution used for poisonous or hazardous substances. It should be kept locked.
8. Containers should be arranged to minimize handling and thus avoid mechanical damage which could give rise to leaks. Containers and cartons should be stacked safely, with the height of stacks limited to ensure stability.

Transportation

1. Insecticides should be transported in well sealed and labeled containers, boxes or bags.
2. Insecticides should be transported separately. It should NOT be transported in the same vehicle as items such as agricultural produce, food, clothing, drugs, toys, and cosmetics that could become hazardous if contaminated.
3. Pesticide containers should be loaded in such a way that they will not be damaged during transport, their labels will not be rubbed off and they will not shift and fall off the transport vehicle onto rough road surfaces.
4. Vehicles transporting pesticides should carry prominently displayed warning notices.
5. The pesticide load should be checked at intervals during transportation, and any leaks, spills, or other contamination should be cleaned up immediately using accepted standard procedures. In the event of leakage while the transport

vehicle is moving, the vehicle should be brought to a halt immediately so that the leak can be stopped and the leaked product cleaned up. Containers should be inspected upon arrival at the receiving station. There should be official reports to the national level and follow-up enquiries in the event of fires, spills, poisonings, and other hazardous events.

Disposal of remains of insecticides and empty packaging

1. At the end of the day's work during IRS activities, the inside of the spray pump should be washed and any residual insecticide should be flushed from the lance and nozzle.
2. The rinsing water should be collected and carefully contained in clearly marked drums with a tightly fitted lid. This should be used to dilute the next day's tank loads or disposed properly by the supervisor at disposal sites like pits or digs.
3. Never pour the remaining insecticide into rivers, pools or drinking-water sources.
4. Decontaminate containers where possible. For glass, plastic or metal containers this can be achieved by triple rinsing, i.e. part-filling the empty container with water three times and emptying into a bucket or sprayer for the next application.
5. All empty packaging should be returned to the supervisor for safe disposal according to national guidelines.
6. Never re-use empty insecticide containers.
7. It shall be the duty of manufacturers, formulators of insecticides and operators to dispose packages or surplus materials and washing in a safe manner so as to prevent environmental or water pollution.
8. The used packages shall not be left outside to prevent their re-use.
9. The packages shall be broken and buried away from habitation.

Disposal of Expired Insecticides

1. Adequate measures should be undertaken to avoid expiry of stocks in storehouses.
2. "First Expiry First Out" principle should be strictly followed during stock movements.
3. Information about near expiry stock, should be provided to Dte. of NVBDCP, Delhi well in time so that the stock can be re-allocated to other locations.
4. The expired stock should be returned to manufacturer for disposal as per guidelines preferably through incineration process.
5. The chemical efficacy should be tested before disposal of expired insecticide to find out possibility of usage. The efficacy and active ingredient percentage of insecticide is tested and certified by the authorized testing laboratory. For list of authorized laboratory please refer Central Insecticide Board, Govt. of India website.

Health Monitoring

1. In case of accidental exposures or appearances of symptoms of poisoning, medical advice must be sought immediately.
2. In case of organophosphorus (Malathion), regular monitoring of cholinesterase (CHE) level should be carried out and spraymen showing decline in CHE to 50% should be withdrawn and given rest and if needed medical aid.