

Household Pesticides-killer in your homes

Pesticides which can kill pests, can also kill you.....

Household pesticides have become an essential part of modern life. However, the use of pesticides indoors, is particularly risky. This is because people often use these pesticidal products without regard for the proper amount, timing, or safety precautions. Further, ventilation in many homes is relatively poor and people spend many hours a day at home. In contrast to on-the-job exposures, very young, old, sick, and chemically sensitive individuals alike are exposed to the pollutants present in their homes, not just healthy adults.

Major groups of pesticides

Four major groups of insecticides are available for indoor use: ***Organochlorine chemicals (DDT), Organophosphates, Carbamates, and the synthetic pyrethroids.***

Organochlorines: DDT is very persistent and bio-accumulative. It may cause a number of adverse effects in humans ranging from acute toxicity to cancer. Long term exposure to DDT may reduce sperm counts and lower fertility rates and may cause other reproductive problems. It is highly toxic to fish and aquatic species, and moderately toxic to birds. It leads to eggshell thinning among birds. In adult experimental animals, chronic exposure to DDT has led to effects on the liver, kidney, nervous and immune system.

Organophosphates: Malathion for example, has medium to high acute toxicity, is a suspect mutagen and a delayed neurotoxin. Chlorpyrifos has medium to high toxicity and is associated with sterility and impotence among humans/ mammals. In aquatic organisms, it is bio-accumulative and may have long term effects on reproduction and growth of fish and aquatic species.

Carbamates : Propoxur for example, has very high acute toxicity and is a suspected carcinogen, mutagen in humans/ mammals.

Earlier, pyrethrum, extracted out of pyrethrum flowers, was the chief component for the preparation of all insecticides. However, this became so expensive (as pyrethrum flowers grew only in Kenya and Kashmir), that compounds like Allethrin, Deltamethrin, Cypermethrin, Fenvalerate, which are all synthetic pyrethroids began to be used as substitutes.

The ***synthetic pyrethroids*** are not as toxic as the carbamates or organophosphates as they are synthetic analogs of naturally occurring pyrethrins, which are present in the dried chrysanthemum flower extract. Most of the household pesticides contain pyrethrins and pyrethroids, which are generally considered safe for both humans and pets. Despite this, there have been reports of cases of nervous irritability, tremors, and inability to coordinate muscular movements in persons who have had massive inhalation exposure to pyrethrins. Asthmatic wheezing, sudden broncho-spasm, swelling of oral and laryngeal mucous, and shock have also been reported after pyrethrum inhalation.

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Besides irritating the respiratory system, pyrethroids have been suspected of having reproductive and endocrine disruptor effects.

“Endocrine disruptor” chemicals, mimic female and male hormones, modifying development and reproduction. For example, endocrine disruption may endanger populations by affecting their immune systems, preventing recovery from infections. They may also cause abnormal sexual development or behaviour, which in turn prevent reproduction in sufficient numbers to sustain the population.

According to a study published in the journal of Environmental Health Perspective, children exposed prenatally

to household insecticide increased risk of brain cancer later on. This was the finding of a study on 224 children diagnosed with brain tumours between 1984 and 1991 in the Los Angeles County, California. A significant increase in the risk of childhood brain cancers was detected in children with foetal exposure to tick and flea pesticides, especially those diagnosed at age below 5 years. The risk of prenatal exposures was even higher among expectant mothers who were on medication.

Trouble can be smelled in the chemical composition of the household pesticides. Let us look at the composition of main brands of Insecticides available in the market

Category

Of

Pesticide

Brand

Name

Composition Use Toxicity of the Insecticide

Carbamate HIT

Baygon

Propoxur Tech Insecticide

flea

collars

for pets

Isopropyl

Alcohol

Solvent

Petroleum

Distillate

Solvent

Propellant GAS

(LPG)

Disperser

Propoxur: Mild poisoning from Propoxur results in dizziness, fatigue, headache, blurred vision, excessive sweating, vomiting, diarrhoea and stomach cramps.

A chronic exposure results in these symptoms, along with insomnia and a learning disability and disturbances in concentration.

Synthetic

pyrethroid

Pest Seal Cypermethrin

a.l.

Insecticide

Pyrethrin a.l. **Insecticide**

Piperonyl

butoxide

Solvent

Deodorised

kerosene

Solvent

LPG Disperser

Cypermethrin: Dermal exposure in spray applications at upto 46mg/hr leads to 3% being absorbed. Cypermethrin was the first pyrethroid to have caused a human fatality. In Greece a man died 3 hrs after eating a meal cooked in 10% Cypermethrin concentrate used in error instead of oil. Nausea, prolonged vomiting with colic-like pain, tenesmus and diarrhoea began a few minutes after eating the meal, and progressed to convulsions, unconsciousness and coma. Death occurred owing to respiratory failure. Tissue residual of Cypermethrin was below detection levels but 0.7 m remained in the stomach.

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**Synthetic
Pyrethroid**

HEXIT 1.Deltamethrin

Insecticide Deltamethrin is a pyrethroid. Cases of poisoning from this chemical have been reported after agricultural use and further cases of accidental or suicidal poisoning by the oral route at doses estimated at 2-250 mg/kg. Oral ingestion causes epigastric pain, nausea, vomiting, and even coma (within 15 to 20 minutes) followed by death with high doses (100-250 mg/kg). Seizures are poorly controlled by anaesthetics. Less severe systemic poisoning causes EEG waves without motor signs. Workers exposed to Deltamethrin during its manufacture over 7-8 years experienced facial burning, itching and numbness. High levels of exposure through skin contact without adequate protection of gloves and facemasks have resulted in facial burning, itching and numbness.

**Synthetic
pyrethroid**

2.Allethrin Insecticide

Dichloromethane Solvent
Deodorised
Kerosene
Solvent
LPG
Dispenser

Allethrin: Poisoning closely resembles that produced by DDT (a banned

chemical). It involves a development of fine body tremor, exaggerated startle response, twitching of dorsal muscles, hyper-exitability and even death. Allethrin is also suspected to be a mutagen and carcinogen. The United States Environment Protection Agency (USEPA) does not recommend its use indoors, particularly in a closed room, while the WHO has recommended that it be used by trained personnel.

Mats and Coils:

Commonly used coils and mats contain the insecticide allethrin. This is because allethrin targets an enzyme called cholin esterase, which aids oxygen absorption in the body of the mosquitoes. However, its use needs to be controlled as it is fat soluble and can have an adverse effect among humans if used in excess.

Long term exposure to allethrin can disrupt enzymatic functions in humans. Therefore, we should never disregard symptoms of dizziness, nausea and eye or nose irritation while using these products. Particularly dangerous is the common practice of lighting two or more half-used mats and closing all doors and windows while using them. The quick emission of dense fumes from these can prove to be highly toxic to mammals.

Name of the product Main constituent

Baygon Mats Allethrin

Good knight Mosquito mats, HIT, Baygon

Power Mats

D-Allethrin

Tortoise Mosquito

Coil

Pyrethrum

Hexit Deltamethrin

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Case Studies abroad:

Field trials in several villages in El Salvador, Iran and Nigeria reported reactions such as nausea, headache, excessive sweating and general weakness. In Iran, villagers who entered houses during or immediately after spraying or sweeping floors with insufficient amount of water, complained of the above reactions. However, it maybe mentioned that despite a worldwide recognition of pesticide poisoning in developing countries, there are still gaps in the information and data available, and much more research is still required to fill these gaps.

Experts have found that in many cases there is indiscriminate use of spurious chemicals which are extremely harmful for human beings. Compounds like **malathion, benzene hexachloride, DDT**, etc., which are much cheaper (ranging from Rs 30 to Rs 250 a kg) in comparison to the synthetic pyrethroids (ranging from Rs 700 per litre of Cypermethrin to Rs 1400 per litre of Allethrin), are also used. These are more effective in killing mosquitoes but dangerous for inhalation. Most of these being **chlorinated hydrocarbons**, are fat soluble and once absorbed, remain in the body. Others are **sulphur** or **phosphorous** compounds that decompose in our body into toxic by-products.

Alternatives: (Please refer to Toxics Link factsheet no 2, "**Toxics Free Home**")

The use of the pesticides in homes need to be minimized. Besides, safer alternatives (like boric acid), even traditional methods should be used. While these are not always readily available, they are often home remedies that can be conveniently made. Although they may be marginally more time consuming or laborious, they are definitely more benign.

References:

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4. Home Safe Home Fact Sheet on Household Insecticides, Environmental Health Coalition
5. www.epa.gov/ttn/uatw/hlthey/propoxur.html
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