

Agrochemicals – Boon or Curse to the Society - A Review

Dr. Jyoti Chandrashekhar Mane

Lecturer- Department of Agadtantra, Dr.J.J.Magdum Ayurved medical college, Jaysingpur.

Abstract: We all have entered into the new generation where all the developments and innovative are going on very rapidly, so in the field of agriculture use of fertiliser, pesticide etc. ie. Use of agro chemicals has made farmer agriculture a little easier. The use of these agrochemicals are harmful to the farmer himself as well as to the whole society who consumes the products cultivated by using such chemicals. The chemicals used during cultivations may not be in higher dose but consuming chemicals daily above the permissible limits may lead to cumulative toxicity/chronic toxicity. In order to bring down these chemicals to the permissible limits, thorough washing of these veggies, fruits should be carried out before consuming them. There are many alternative pesticides for chemical pesticides available, which are not known to the farmers. Educating them about the hazardous effect of these pesticides to themselves and to the society may keep farmer far from these pesticides.

Keywords: Agrochemicals, ADI values, alternative pesticides. Pesticides, *Vishghna dashemani*

1. Introduction

In present scenario we come across many hazardous chemicals in day to day life viz. The water we drink, the food, the fruits, and the veggies etc. are also contaminated with various preservative, pesticides, insecticides, fungicides etc.

These pesticides, preservatives etc chemicals enter the human being indirectly causing hazardous effect to their health. The world health organisation (WHO) has stated permissible values for all the chemicals and have been termed as ADI ie. Acceptable daily intake. According to this direction the chemicals in any form should not exceed the permissible limits at the time of consuming. Many a times these chemicals enter the human body crossing these ADI values.

Daily intake of chemicals beyond the permissible limits may lead to chronic/cumulative toxicity. Amongst all the chemicals, pesticides are the one which is commonly used over majority of veggies and fruits and frequently used irrespective of age, community, race etc.

All the agro chemicals are neurotoxicants and act directly on nervous system of the target organism. The peripheral nervous system in mammals is very complex when compared to insect, but still similar. So the actions of these agrochemicals are bit similar in mammals only the dosage and duration varies. Most of agrochemicals are reported in developing countries than developed countries. May be lack training how to use, precautions to be taken, dosage, ratio of dilution, their indications contraindications etc.

In agricultural practice, the use of chemical fertilizers, pesticides etc. pollute the land, poison the nearby water source and even leave their residues in the food stuff. By in taking these food products many harmful chemical can enter an individual's body and cause acute and chronic or cumulative toxicity orally, nasally/transdermally.

Aim and objective:-

- 1) To educate the people the hazardous effect of chemicals.
- 2) To promote organic farming and encourage farmers to opt organic farming.
- 3) To avoid usage of chemicals in day to day life as far as possible and live chemical free life.
- 4) Use of house hold ayurvedic solutions to reduce the effect of pesticides in them which are not easily soluble in water.
- 5) Procedure of washing the veggies and fruits to make them pesticide free.
- 6) Promote the usage of herbal pesticides than chemicals ie. alternative pesticides.

2. Materials and Methods

Usually pesticides are not water soluble. However commonly used method for cleaning these vegetables are washing them with tap water, warm water or salt water. Ascertaining which one of these is more efficient requires a complete chemical analysis of both vegetable/fruit itself and the solvent.

A commonly used households washing solvents is salt water. Common salt (NaCl) is hygroscopic in nature. This may help in dissolution of almost all pesticide residues due to its osmotic pressure. In ancient Ayurvedic text like in *Charak samhita acharya Charak* has quoted a group of ten *Vishghana dravyas* and termed them as *Vishghna dashemani*. These ten *Vishghna dravyas* counter act the effect of poison and nullify their effect.

WuËUSiÉ qÉÇÎeÉ,É xÉÑoÉWûÉ xÉÑqÉæsÉÉ mÉÍsÉÇSÎ
cÉÇSIÉ MüiÉMü ÍvÉUÍwÉ| ÍxÉÇKÉÑuÉÉU
vsÉâwqÉÉÇiÉMüÉ CîiÉ SvÉâqÉÉÍIÉ ÌuÉwÉâqÉÉÍIÉ
ÌuÉwÉblÉÉÍIÉ pÉuÉÍliÉ || (cÉ.xÉÔ.4/11)

3. Mode of Action of Pesticides

The pesticides after entering into the body presents its toxic effect is due to inhibition of cholinesterase resulting in accumulation of acetylcholine at synapse. This is the

enzyme responsible to transmit the impulse from one neuron to other and this enzyme is present at the space between the two neurons. This is initially stimulated and later suppressed and paralysed.

Toxic Signs and Symptoms

It can be categorised into two depending upon the dose. If the pesticide is taken in small dose and frequently the it is termed as chronic toxicity/cumulative toxicity, if the pesticide is taken in large dose in single dose then it is termed as acute toxicity.

A] **Acute toxicity:-** It is caused accidentally, exposure in toddlers and small children. The onset of signs and symptoms occur most rapidly after inhalation and least rapidly if absorbed percutaneously. The acute signs and symptoms can be categorised for easy understanding

- 1) Muscarinic features: It can be remembered by acronym SLUDGE ie. Excessive salivation, lacrimation, urination, defaecation, gastrointestinal cramping and emesis. Along with disturbed respiratory function by bronchorrhea and broncho constriction the individual may further land into hypotension and bradycardia.
- 2) Nicotinic features: After the motor nerve is affected the features are grouped under this category. It includes muscular fasciculation, muscle cramps, fatigue, loss of deep tendon reflexes, paralysis, tachycardia and hypotension.
- 3) CNS features: this category includes various neurological features like severe headache, restlessness, tremors, ataxia, generalised weakness, emotional liability, confusion, coma, seizures and depression of cardio respiratory centre.

B] **Chronic/cumulative toxicity:** This is the type we generally face after repeatedly exposure to pesticides. It includes impaired memory and concentration, disorientation, severe depression, irritability, confusion, headache, speech difficulties, delay in response to stimulus, nightmares, sleepwalking, insomnia, influenza-like condition with headache, nausea, weakness, loss of appetite and malaise has also been reported

Diagnosis

- 1) RBC Cholinesterase level < 50% of normal(0.39%1.02%) indicates pesticide toxicity.
- 2) Plasma cholinesterase level < 50% of normal (0.44-1.63) indicates pesticide toxicity.

4. Discussion

Health effects:

Pesticides may cause acute and delayed health effects in those who are exposed. Strong evidence also exists for other negative outcomes from pesticide exposure. Including neurological, birth defects, fetal death, and neurodevelopment disorder

Alternative to pesticides

Alternatives to pesticides are available and include methods of cultivation, use of biological pest control (Such as pheromoms and microbial pesticides). Application of composted yard waste has also been used as a way of

controlling pests. Release of other organisms that fight the pest is another example of an alternative to pesticide use. These organisms can include natural predators or parasites of pests.

Another alternative to pesticides is the thermal treatment of soil through steam. Soil steaming kills pest and increases soil health.

In India, traditional pest control methods include using panchagavya, the mixture of five products obtained from cow.

The American medical association recommends limiting exposure to pesticides and using safer alternatives particular uncertainty exist regarding the long term of low-dose pesticide exposures. It is prudent.....to limit pesticide exposures and to use the least toxic chemical pesticide or non chemical alternative.

Possible precautions to be taken:

- 1) To use the pesticide free veggies/fruits.
- 2) To promote the farmers to use alternatives of pesticides.
- 3) To use veggies/fruits after thorough washing
- 4) Washing of veggies/fruits under tap water, salt water or water mixed with turmeric powder (Turmeric solution) which is easily available in kitchen and also mentioned in *vishghana deshmani* by ancient *acharyas*.
- 5) Another method of washing is soaking the veggies/fruits in above mentioned solutions for at least 5 min so that the residue pesticides dissolve in solution

5. Conclusion

We cannot avoid farmer from using the pesticides, but proper washing procedure by proper solvents may reduce the concentration of the pesticide over the veggies/fruits. Not only pesticides one has to avoid exposure to chemicals at each and every step

6. Future Scope

- 1) There are many studies to prove use of distilled water for washing which in turn reduces some pesticides.
- 2) The solutions of *dravyas* mentioned in *charak samhita* under *vishaghna dashemani* can be used regularly for washing as per easy availability.
- 3) Promote farmers to use alternative pesticides so as to prevent him from direct exposure while spraying.
- 4) While preserving the grains we can prefer *Neem* leaves instead of chemicals.

By involving the nature in our daily routine life ie. herbs instead of chemicals may certainly prevent us from being toxicated by harmful chemicals in turn preventing ourselves from cumulative poisoning.

References

- [1] Charak samhita, R.K.Sharma, Bhagwan Das, Chaukhambha Sanskrit series, Varanasi, 2nd edition, 2000.

- [2] Forensic medicine and toxicology, Krishnan Vij, Elsevier publication, New Delhi, 3rd edition, 2005.
- [3] Textbook of forensic medicine and toxicology, V.V.Pillay, Paras medical publisher 14th edition, Rep-2007
- [4] API Textbook of medicine, Siddarth N.Shah, 7th edition, 2003.
- [5] www.who.int/ceh
- [6] www.fao.org/documents/pds/pdsother/class.pdf

Author Profile



Dr. Mrs. Jyoti Chandrashekar Mane, completed graduation in Ayurved (B.A.M.S.) from gulburga university, Karnataka and postgraduation (M.D.) in the subject of Agadtantra from Bharti vidhyapeeth pune, Maharashtra. I am presently working as assistant professor in the department of Agadtantra at Dr.J.J.Magdum Ayu.Medical college, Jaysingpur with 5 years of teaching experience.