

# *PESTICIDE RESIDUES*

## **Fears and Facts**

# **What are Pesticides?**

- Pesticide are chemical or biological substances that are used to kill or control pests that harm our crops, food, health or environments.
- Pests include rodents, insects, fungi and weeds, and they cause enormous damage to the crops. Insects like mosquitoes carry and spread diseases like Malaria, Dengue and Chickungunya.

# **What are Pesticide Residues?**

- Pesticide residues are very small amounts of pesticides or their breakdown products that can remain in a crop after harvesting or storage and make their way into the food chain.

# **What are the causes of Pesticide Residues?**

- Persistent nature of Pesticides
- Contamination of water and soil
- Direct application of Pesticides during storage
- Improper dosage and timings of pesticide application

# **Dose decides the toxicity**

- A pesticide or a chemical can't simply be classified as “dangerous” or “safe” : it always depends on the amount or dose, used.
- The effects of a pesticide or chemical or its residue will change with different amounts used.
- The levels of residues are also expressed as  $\mu\text{g}^{-1}$  “parts per million” (ppm) or “parts per billion” (ppb).
- A ppb is roughly equal to 1 second in a life-span of 30 years.

# The dose effect

- As Aspirin tablet is good to reduce headache or pain, whereas 50 tablets could cause acute renal failure, coma, and heart failure from salicylate poisoning.
- Botulinus toxin (botox) is one of the most powerful poisons we know; its use in 'cosmetics' is safe, only because of careful localization. What might kill, you if put into your stomach, can erase your worry-lines. (Sir Colin Berry, Pathologist)

Baxter

R:  
Metronidazole  
Injection IP

5 mg/ml in isotonic Saline  
For Intravenous use

Sterile Non-pyrogenic  
Single Dose Container

Manufactured in India by  
Baxter (India) Pvt. Ltd.  
E-72, SIDCO Pharmaceutical Complex  
Ajithpur - 603115, Tamil Nadu

Baxter

R:  
Metronidazole  
Injection IP

Each 100 ml contains:  
Metronidazole IP 500 mg  
Sodium Chloride IP 0.8 g  
Water for injection IP q.s.  
Infuse 100 ml (500 mg) slowly by  
intravenous route over a period of  
20-30 minutes. To be repeated  
every 8 hours.

WARNING: Metronidazole  
has been shown to be  
carcinogenic in mice and  
possibly carcinogenic in rats.  
Unnecessary use of this drug  
should therefore be avoided.

SCHEDULE H DRUG  
WARNING: To be sold by retail on the  
prescription of a Registered Medical  
Practitioner only.

# Cure for the 'Delhi Belly'

Metronidazole- A carcinogenic (cancer causing) drug at very high dosage, is prescribed as a remedy for 'Delhi Belly' at a very low dosage!

■ Export of the agricultural commodities particularly of fruits and vegetables is on the increase. Even advanced nations in Europe who have very stringent regulations of pesticides use, have found Indian fruits safe, as pesticide residues are well within the permitted levels.

# **What is MRL (maximum Residual Limits)?**

- MRL is the maximum concentration of a possible residue on crop or food commodity resulting from the use of pesticides and is expressed in mg/kg of the commodity.

# **What is ADI (Acceptable Daily Intake)?**

- ❑ This is an estimate of the amount of a chemical in food that can be ingested daily over a lifetime by humans without appreciable health risk.
- ❑ The concept of the ADI has been developed principally by WHO and FAO for additives to foodstuffs, residues of pesticides and veterinary drugs in foods.

# Is there a health risk if residues in food are greater than MRL?

- The MRL is not a health-based exposure limit.
- Exposure to residues in excess of an MRL does not necessarily imply a risk to health.
- MRL is not in itself a safety level and is always set at levels well below those, which would cause potential risks. Therefore the residues. If present below the approved MRLs, are harmless.
- MRLs are set 100 times below ADI (Acceptable Daily Intake)

# **Do pesticide residues degrade?**

- Most pesticides break down with exposure to the weather elements.
- Microbial activity in the plant, soil and environment also reduces or eliminates residues.
- In the process of cleaning, peeling and cooking of vegetables, fruits and food grains most pesticide residues are removed and broken-up.
- The process of digestion and blood cleansing also removes the residues from our body.

# EPILOGUE

- Safe, judicious and technically correct use of pesticides has to be promoted amongst farmers to reduce the 30 to 50% crop losses.
- As long as we use pesticides to control pests and prevent the crop losses, pesticide residues in food is a fact of life. But they are no cause for concern, if the required pesticide is used as directed in the label.

**As per direction of the Delhi High Court, the annual report 2014-15 of MPR NL has been uploaded to the DAC website. The status of pesticide residues in food commodities during 2008-15 are as follows:**

<b>Year</b>	<b>Number of samples analysed</b>	<b>Number of samples detected with residues</b>	<b>Number of samples above MRL</b>
<b>2008-09</b>	<b>13348</b>	<b>N/A</b>	<b>183 (1.4 %)</b>
<b>2009-10</b>	<b>14225</b>	<b>N/A</b>	<b>147 (1.0 %)</b>
<b>2010-11</b>	<b>15321</b>	<b>N/A</b>	<b>154 (1.0%)</b>
<b>2011-12</b>	<b>16948</b>	<b>N/A</b>	<b>270 (1.6%)</b>
<b>2012-13</b>	<b>16494</b>	<b>N/A</b>	<b>403 (2.4 %)</b>
<b>2013-14</b>	<b>16660</b>	<b>2759 (16.6%)</b>	<b>458 (2.7%)</b>
<b>2014-15</b>	<b>20618</b>	<b>3857 (18.7%)</b>	<b>543 (2.6%)</b>

India:

<b>Year</b>	<b>Samples analysed</b>	<b>Samples with Detection</b>	<b>Above MRL</b>
<b>2008-09</b>	<b>6031</b>	<b>714 (11.8 %)</b>	<b>137(2.3 %)</b>
<b>2009-10</b>	<b>6353</b>	<b>604 (9.5 %)</b>	<b>102(1.6 %)</b>
<b>2010-11</b>	<b>7232</b>	<b>738 (10.2 %)</b>	<b>140 (1.8 %)</b>
<b>2011-12</b>	<b>8611</b>	<b>1219 (14.1 %)</b>	<b>220 (2.5 %)</b>
<b>2012-13</b>	<b>9601</b>	<b>1630 (16.9 %)</b>	<b>255 (2.6 %)</b>
<b>2013-14</b>	<b>9772</b>	<b>1809 (18.5%)</b>	<b>260 (2.7%)</b>
<b>2014-15</b>	<b>12832</b>	<b>2674 (20.8%)</b>	<b>346 (2.7%)</b>

Source: <http://www.fda.gov/Food/FoodbornellnessContaminants/Pesticides/ucm2006797.htm>

## United States Food and Drug Administration (US-FDA):

<b>Year</b>	<b>Samples analysed</b>	<b>Samples with Detection</b>	<b>Above MRL</b>
<b>2008-09</b>	<b>1046</b>	<b>431 (41.2 %)</b>	<b>12 (1.1 %)</b>
<b>2009-10</b>	<b>1173</b>	<b>614 (52.3 %)</b>	<b>16 (2 %)</b>
<b>2010-11</b>	<b>1220</b>	<b>472 (38 %)</b>	<b>26 (2.1 %)</b>
<b>2011-12</b>	<b>797</b>	<b>353 (44.2 %)</b>	<b>17 (2.1 %)</b>
<b>2012-13</b>	<b>1906</b>	<b>872 (45.8%)</b>	<b>66 (3.5%)</b>

## United Kingdom(UK):

<b>Year</b>	<b>Samples analysed</b>	<b>Samples with Detection</b>	<b>Above MRL</b>
<b>2008-09</b>	<b>2309</b>	<b>1484 (64.3 %)</b>	<b>49 (2.1 %)</b>
<b>2009-10</b>	<b>1848</b>	<b>1105 (59.8 %)</b>	<b>40 (2.2 %)</b>
<b>2010-11</b>	<b>2048</b>	<b>1205 (58.8 %)</b>	<b>102 (5 %)</b>
<b>2011-12</b>	<b>1926</b>	<b>1250 (65 %)</b>	<b>70 (4 %)</b>
<b>2012-13</b>	<b>1614</b>	<b>849 (53 %)</b>	<b>55 (11.8 %)</b>
<b>2013-14</b>	<b>1993</b>	<b>1195 (59.9%)</b>	<b>78 (6.5%)</b>

## European Union(EU):

<b>Year</b>	<b>Samples analysed</b>	<b>Samples with Detection</b>	<b>Above MRL</b>
<b>2008-09</b>	<b>60805</b>	<b>N/A</b>	<b>2380 (3.9 %)</b>
<b>2009-10</b>	<b>55737</b>	<b>N/A</b>	<b>1890 (3.3%)</b>
<b>2010-11</b>	<b>60449</b>	<b>N/A</b>	<b>2055 (3.4 %)</b>
<b>2011-12</b>	<b>24898</b>	<b>7450 (29.2%)</b>	<b>1247 (5.0%)</b>
<b>2012-13</b>	<b>29310</b>	<b>12805 (43.6%)</b>	<b>1467 (5.0%)</b>

Source: <http://www.efsa.europa.eu/en/pesticides/mrls.htm>

# Losses Caused by Different Pests

Insects  
26%



Weeds  
33%



Diseases  
26%



Rodents & Others  
15%



Per hectare consumption of pesticides in India is one of the lowest, as seen in the Table below:

Country or Area	Pesticide Use (active ingredient kg / ha)
Korea	16.56
Japan	10.8
China	2.0 - 2.5
Europe	1.90
USA	1.50
Thailand	1.37
Indonesia	0.58
<b>INDIA</b>	<b>0.38</b>

Source: 37th Proceeding of Ministry of Chemicals & Petrochemicals. Govt of India, 2002.

# **Crop losses due to pests**

- 50% of total production is lost due to insect, pests, plant pathogens, weeds rodents, birds, nematodes and in storage.

# **Export and import**

- India is the net exporter of agrochemicals  
UK, USA, France, Netherland, Belgium,  
Spain, South Africa, Bangladesh and  
Singapore
- Agrochemicals: Cypermethrin,  
Isoproturon, Endosulphan , Aluminum  
phosphate
- Export consists of all patent products

# **Effect of Pesticide**

- It effects kidney and liver functioning
- Chronic exposure to low levels cause low immunity
- Low learning capacity
- And host of other ailments
- A recent report indicates it for disturbance in sex ratio.

## Corruption the real problem?

The discovery and disclosure by the Agrochemicals Policy Group (APG) of a parallel, flourishing market for spurious pesticides has come as no surprise. Most people have been made aware of this earlier, by the large number of farmers who committed suicides after they incurred crippling crop losses due to the use of costly but ineffectual pesticides. What is astonishing is that the authorities have not taken due notice of this and have allowed this nefarious business to thrive and even expand. The size of the spurious pesticides market is reckoned to have swelled to around Rs 1,200 crore, which, considering the cost-benefit ratio of pesticide use at 1:5, causes a crop production loss worth Rs 6,000 crore annually. The deprivation suffered by unwarly farmers is actually much greater because, in addition to the output loss, their investment (usually with borrowed money) in costly plant protection chemicals is also lost. This is the situation despite having in place an elaborate and well-structured regulatory system for the pesticides sector. The Central Insecticides Board (CIB), created under the Insecticides Act of 1968, and its pesticides registration committee are supposed to lay down and oversee the relevant policies. The state agricultural departments are involved in the enforcement of the law in terms of issuing manufacturing licences, environmental clearances, and monitoring the quality of the products distributed. The circulation of fake and sub-standard plant protection chemicals on such a mammoth scale is, therefore, an unambiguous indictment of this system. The need for urgent corrective action is self-evident.

The strategy to set things right needs necessarily to be multi-pronged. Since the major spurious insecticides manufacturing centres are known — west-

ern Uttar Pradesh, coastal Andhra Pradesh, Karnataka and western Maharashtra — weeding out unscrupulous manufacturers should not be difficult provided, of course, state administrations and the law enforcement agencies are willing to work in tandem. Besides, since the sales hub for such substandard products is also known (a particular market in Delhi), it should be possible to check the menace from the distribution end as well. Down the line, even the retailers of such spurious pesticides are not difficult to identify, because there is mandatory licensing of all pesticide retailers. At yet another level, the pesticides manufacturers whose brands are being imitated and, hence their business stolen from them, can use the services of private agencies to trace the culprits and report their existence to the relevant authorities. Indeed, the fact that there has been no corrective action despite the evident ease with which any or all of these steps can be taken suggests that there is some other problem that exists, and the finger of suspicion points to widespread corruption.

All this apart, the practice of indiscriminately registering pesticide manufacturing should give way to a more discriminating process. No fewer than 1,200 manufacturing registrations have been issued, though there are only around 250 genuine pesticides formulators. Then, the state-level pesticides quality testing laboratories need the latest equipment so as to enable them to undertake incontrovertible quality analysis. Perhaps the law itself needs to be amended to incorporate provisions for punitive action even against officials found guilty of dereliction of their duties and responsibilities. The country can ill-afford to let farmers be cheated and the farm economy to be shortchanged in this manner.

Issued in the interest of indian farmers by :

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HYDERABAD - 500020. AP

Our Farmers lose every year

**Rs. 6000 cr.**

because of **Spurious Pesticides**

### Spurious pesticides destroy crops worth Rs 6,000 crore a year

SURINDER SUD  
New Delhi, 14 September

Spurious and substandard pesticides worth around Rs 1,200 crore are palmed off to unwary farmers every year. This results in a net loss to the farmers of crops worth about Rs 6,000 crore.

These estimates have been compiled by the Agrochemicals Policy Group (APG), a pesticides industry body that aims to promote the safe use of plant protection chemicals.

Indeed, a sizeable number of suicides by cotton growers in the Vidarbha region of Maharashtra, Andhra Pradesh and other states over the past few years have been attributed to the use of spurious pesticides that caused widespread

#### A SIZEABLE NUMBER OF SUICIDES BY COTTON GROWERS IN THE VIDARBHA REGION OF MAHARASHTRA

ANDHRA PRADESH AND OTHER STATES OVER THE PAST FEW YEARS HAVE BEEN ATTRIBUTED TO THE USE OF SPURIOUS PESTICIDES THAT CAUSED WIDESPREAD CROP LOSSES.

According to APG chairman S Kumarasamy, most spurious pesticide-making units are located in western Uttar Pradesh, coastal Andhra Pradesh, Karnataka and western Maharashtra. Indra Mar in Delhi is said to have become the leading centre for the sale and distribution of these fake pesticides.



REUTERS PHOTO

"Spurious products are sold mostly in under-developed markets like eastern Uttar Pradesh, Bihar, Jharkhand, Orissa, Chhattisgarh and the north-east, though one can also easily get such products in developed markets like Nashik, Pune, Bangalore, Guntur or Warangal," Kumarasamy pointed out.

Makers of spurious pesti-

cides usually imitate popular and expensive brands from multi-national and leading Indian manufacturers that have better acceptance among the farmers.

Some counterfeit pesticides do not contain any active plant protection ingredient and largely comprise materials like talcum powder, chalk powder, any odd solvent or just kerosene. Others may contain some active ingredient but only a fraction of that mentioned on the label.

Since most spurious pesticide manufacturing and sale operations are conducted without bills and invoices, the government loses excise revenue of around Rs 158 crore (at the rate of 14 per cent) every year.

Continued on Page 2

श्रीगंगानगर हनुमानगढ़

## कीटनाशकों में सावधानी जरूरी

श्रीगंगानगर, 26 जुलाई

PESTICID VOL. XXXII NO. 6 JUNE 2004

### SPURIOUS PESTICIDES, A GROWING MENACE, RUINING FARMERS' ECONOMY

S. KUMARASAMY  
Chairman, Agrochemicals Policy Group

India, with a sale of about one billion US dollars (Rs 4,000 Cr) accounts for only 3% of the global market for pesticides (30 billion USD), while we account for 17% of the cultivated area in the world. In terms of the area treated with pesticides, we are yet to go a long way, as at present only about 20% of the area under crop protection. The remaining 80% of the area in developing regions like Northeast India, rainfed areas, small holdings etc. do not receive any pesticides treatment. It is estimated that our country is losing annually Rs. 1,40,000 cr. worth of crops to pests, diseases & weeds. We will be able to save substantial part of this loss, if we can extend the area, treated with pesticides. The cost benefit ratio of pesticides usage is about 1:5.

THE FINANCIAL EXPRESS | Mumbai, Friday, June 20, 2004

## Put pesticides industry under GMP: APG

Dhimant Bhatt  
Mumbai, Jun 19

Good Manufacturing Practices (GMP) should be made compulsory for all pesticide manufacturers. APG, the apex industry body, has urged the government to take urgent steps to stop this menace. S Kumarasamy, chairman, (APG) said, APG, the apex industry body, has urged the government to take urgent steps to stop this menace.

Most of the manufacturing units of spurious pesticides appear to be located in western UP, coastal AP, Karnataka and western Maharashtra. Spurious pesticides are sold mostly in under-developed markets like eastern Uttar Pradesh, Bihar, Jharkhand, Orissa, Chhattisgarh and the north-east, though one can also easily get such products in developed markets like Nashik, Pune, Bangalore, Guntur or Warangal.

# Can the Government stop this and save our Farmers ?

Thanks