PESTICIDE POST

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IN THIS ISSUE

TRAGEDIES OF ENDOSULFAN

Several unusual cases of deformities and disorders of the central nervous system are found to be highly prevalent among the people of Padre village in Kasargode district, Kerala for the past ten years. Residents blame aerial spraying of the pesticide Endosulfan as the cause of all these unusual afflictions.

Since 1976 the Plantation Corporation of Kerala (PCK) has been aerially spraying endosulfan on its cashew plantations. Today, PCK's Kasaragod Estate has an area of 2,209 hectares. This insecticide is sprayed to counter the tea mosquito bug (TMB) a major pest of cashew that affects yield.

Widespread media coverage about the unusual diseases from Padre triggered the Centre for Science and Environment (CSE), New Delhi to conduct detailed laboratory tests on samples collected from the village. The alarming results prove that endosulfan was an omnipresent poison in all kinds of samples obtained from the village. The endosulfan content in samples of soil, water and vegetables from Padre far exceeded the Maximum Residue Limit (MRL) for this pesticide. But the shocking evidence was that all the human blood samples tested had endosulfan residues several hundred times the residue limit for water. The CSE reports the presence of endosulfan in the village wells and stream – the only source of drinking water in the area.

Endosulfan is an organochlorine insecticide effective against a wide range of pests of cereals, coffee, cotton, fruits, oilseeds, potato, tea and vegetables. It belongs to highly hazardous category according to the US Environmental Protection Agency (USEPA). Moreover, it is easily absorbed by the stomach, lungs and skin and exposure through any route can be hazardous. Commercially produced endosulfan consists of two isomers α endosulfan and β endosulfan. Both these forms have been proved to be genotoxic to human liver cells.

The main characteristic of Endosulfan poisoning is the stimulation of the central nervous system leading to cerebral palsy and mental retardation. People who consume low protein diet are more sensitive. Studies reveal that long-term exposure of animals to low levels of endosulfan affects the kidney, the developing foetus and the liver. It also causes immuno-suppression (lowering the ability of animals to fight infection). It also causes respiratory disorders, several types of genetic aberrations, epilepsy and skin disorders. Organochlorine compounds also cause deformation of genetalia, increased incidence of prostrate cancer and breast cancer. Besides, it is also teratogenic

causing abnormalities in bone development in the offspring. The mutagenic effects due to long-term exposure of endosulfan in mammals has also been proved.

This chemical is also 'acqua-toxic' and has an immediate effect on fish. The residents of Padre have also reported a sharp decrease in the population of jackals, frogs, fish, crows, snake, fireflies and bees. Even cattle deaths have occurred soon after aerial spraying in this area.

Many countries like Denmark, Argentina, Columbia, Germany, Netherlands, Sweden, Belize, Singapore, Rondonia have totally banned the use of endosulfan. Its usage in rice fields is not allowed in Bangladesh, Indonesia, Korea and Thailand. Whereas in Canada, Finland, Great Britain, Kuwait, Philippines, Russia, Sri Lanka, Thailand and Madagascar, its use is restricted or severely restricted. In the African republic of Benin, at least 37 people died last year due to endosulfan use in cotton fields.

In Kasargode, a local group called the Endosulfan spray protest action committee was formed to create public awareness through the media about the adverse impacts of this pesticide. In July 2001, the National Human Rights Commission (NHRC) took *suo motu* action and issued notices to Chief Secretaries of Kerala, Karnataka, Goa where cashew is grown. Notice was also sent to the Union Ministries of Agriculture, Health and the Director General of the ICMR. ICMR in response to this set up a team to conduct a detailed study of this area. In February 2001, the State Government of Kerala had appointed a committee for investigation. In August 2001, the district magistrate of Kasaragode passed orders prohibiting the aerial spray of Endosulfan by PCK till the result of the study was declared. In September 2001, the Union Health and Family Welfare Minister C P Thakur told the media that the Centre had decided to ban spraying of endosulfan in Kerala based on *prima facie* inquiry in Kasaragod.

At the same time, the Pesticide Manufacturers and Formulators Association of India (PMFAI) led by its President Pradeep Dave have been compaigning strongly to disprove the facts. Their aim is to discredit the CSE study thereby proving that endosulfan is safe and harmless. Even Mr. S.K. Handa, former head of the division of agricultural chemistry at IARI, New Delhi alleges that the study of CSE is inaccurate, contradictory and misleading.

In the meantime, PCK commissioned another study by the Frederick Institute of Plant Protection and Toxicology (FIPPAT), Kancheepuram, Tamil Nadu due to its disbelief in the CST's laboratory capabilities. CSE welcomed the move but asked PCK to disclose the location of samples including names of individuals and the entire report of the study.

Strangely enough, selective extracts from the report of FIPPAT was released by PMFAI at press conferences in Calicut and Thiruvananthapuram. The Frederick Institute has declared that endosulfan is not the cause of congenital anomalies in Padre village. But the report does not reveal any details about the methodology used or the collection of samples. The inhabitants of Padre village confirm that no sample was collected from their village.

The Pesticide Association blames inbreeding or marriage among close relatives as the cause for these strange diseases. On August 14, 2001 at a press conference called by the association, PMFAI declared that Endosulfan is safe.

Endosulfan is sprayed from the air in densely populated regions. According to the Insecticides Rules of 1971, all water bodies should be covered before aerial spraying of any pesticide is undertaken. Of late, PCK has attempted to cover the wells before spraying. But residents of Padre depend on the stream Kodenkiri for drinking water. It is a disputable question if PCK can cover the streams.

After Kerala it is now the turn of neighbouring Karnataka as the clouds of endosulphan continue to blow – spreading disease and hazarding the lives of many more. It has now been brought to light that the Karnataka Cashew Development Corporation (KCDC) has been spraying this pesticide over 500 hectares of cashew plantations in Dakshina Kannada and Udupi districts since 1987.

Source : Down to Earth, February 28, October 15 & October 31, 2001
Compilation - H. Saraswathy

Newsline

Mosquito repellents kill fish

Careless use of pesticides has caused the death of fish in a lake adjoining Indira Gandhi Indoor Stadium in Delhi. A pesticide residue analysis was conducted in the lake by the pollution monitoring laboratory of the Centre for Science and Environment (CSE). The samples contained residues of three organochlorine and two organophosphorous pesticides in concentrations much higher than maximum limits for water prescribed by the U.S. Environment Protection Agency.

The lake is a part of the Indira Gandhi Indoor Stadium and is maintained by the Delhi Government. The Stadium which has a persistent mosquito problem is the venue for the forthcoming Afro Asian Games. The organisers have sprayed mosquito repellents on the lake and adjoining areas. These repellents containing harmful chemicals form an oily film over the water surface. This oily film completely cuts off oxygen supply to the water in the lake thereby causing death of fishes. This fact was also acknowledged by the chairperson of the Central Pollution Control Board.

Source : Down to Earth, August 31, 2001

DDT increases child mortality

Studies conducted by Mathew P. Longnecker of the Epidemiology branch of National Institute of Environmental Health Sciences, U.S.A. has proved that use of pesticides such as DDT (Dichloro Diphenyl Trichloroethane) can increase child mortality. The study involved analysis of serum samples collected during the period of 1959-1966 (when DDT was used extensively to control mosquitoes in U.S.A). Data regarding the serum analysis of 2,380 chidren and their weight at birth were studied. Out of 2,380 children, 221 children were born comparatively underweight and 361 were born prematurely. Sample analysis revealed the presence of DDE (dichloro diphenyl trichloroethylene), a breakdown product of DDT in levels ranging from 3 mcg / L to 178 mcg / L.

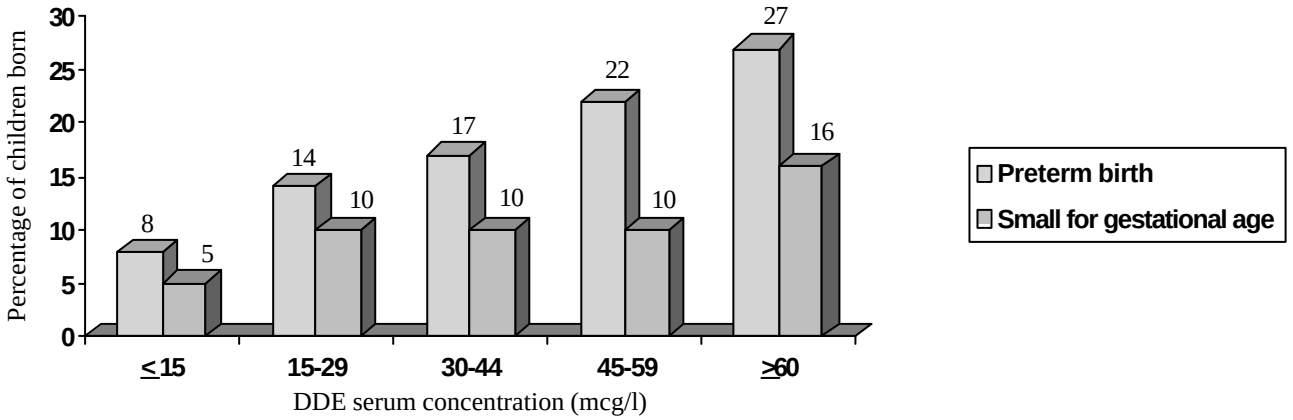
Higher the amount of DDE in the mother's serum, greater are the chances that the babies would be born prematurely or underweight. DDT causes delay in closing of sodium channels in neurons. It also causes the same effect in human placental tissues. A ban was imposed on the use of DDT in U.S.A in 1970. This has considerably reduced the amount of DDE in the serum of present American women.

However, in tropical countries like India large quantities of DDT is still being used. A United Nations sponsored global environment programme has shown that the DDT and BHC residues found in the breast milk of Indian women were at least 4 times higher than in other countries. It has been established that the average daily diet of an Indian contains 0.27 mgs of DDT.

Source : Down to Earth, August 31, 2001

Child Mortality

Rise in DDE level in mother's serum lead to increase in number of preterm and underweight babies



TEST FOR SEED GERMINATION

Tamarind seeds were tested for increasing the germination capacity. Six types of experimental trials were conducted. The details of the experiments and their results are given in the tabular column.

Experiment No.	**1**	**2**	**3**	**4**	**5**	**6**
Treatment	Soaking in boiling water for 5 minutes	Soaking in boiling water for 15 minutes	Soaking in water at normal temp. for 8 hours	Soaking in water at normal temp. for 16 hours	Rubbing the seeds with sand for 2 minutes	Direct sowing
Germination capacity	10%	0%	40%	40%	100%	10%

The results of these experiments reveal that rubbing the seeds with sand for 2 minutes before sowing increases the germination of seeds.

- S. Arumugasamy

PLANT EXTRACT IN PEST CONTROL

Experience at CIKS Research Farm

Epilachna Beetle in Brinjal

The occurrence of *Epilachna* beetle was observed in brinjal plant from the 25th day of transplantation at the CIKS Research Farm. These beetles are yellow or light red in colour with black spots. The grubs are tender and yellow in colour. The grubs and adults scrape the chlorophyll on the undersurface of leaves and consume them. All parts of the leaf except the midrib are consumed.

Army worm in Beans

The leaves of Beans are infested by Army worm during early stages of plant growth. About 25 – 30 worms attack a single leaf. These worms scrape and consume the chlorophyll of leaves. The damaged leaves have a skeleton like appearance.

Preparation of *Andrographis* Extract

1 kg of the root, stem and leaves of *Andrographis paniculata* are taken and 4 times this quantity of water is added (1:4 ratio). It is boiled well and reduced to a quarter (¼) of the original quantity (1 litre). 40 ml of this extract is added to 1 litre of water to obtain a 4% extract.

Control of *Epilachna* beetle in brinjal

4% of this extract can be sprayed to the brinjal plants. Spraying this extract once helped in controlling 60% of spotted beetles. This extract was sprayed a second time after a gap of 5 days. The second spraying helped in complete control of adults and grubs of *Epilachna* beetles.

Control of Armyworm in Beans

Extract was sprayed at 4% concentration to control Army worm. Spraying this extract helped in controlling 70% of Army worms.

- S. Thambidurai, S. Arumugasamy

UNTAPPED POTENTIAL

India with its rich agricultural diversity stretched across 15 different agro-ecological zones and traditions of agricultural practices has tremendous potential in practising organic agriculture. Most Indian farmers are traditional farmers and are organic producers by default as they cannot afford even the subsidised chemical inputs. Sadly, the potential of the small farmer, practising organic agriculture is just not being harnessed. Without support and premium for 'green' crops, there is no alternative but to take the chemical route.

Going organic, in India, is an uphill task. It is all the way bottlenecks and hassles that confront the Indian organic producers. Indian government gives no support to the producers who grow crops organically. Worse, there is neither any legislation recognising organic farming nor accredited certification agencies.

For an Indian farmer to turn 'organic', the road is long and lonely with an uncertain future. The domestic market is weak as the Indian consumer is unconvinced about the benefit of organic produce. On the other hand, making inroads into importing countries is hard.

Though Indian standards for organic foods were introduced in March 2000, these are not mandatory. The government has taken no concrete step to encourage organic agriculture. There are neither subsidies for organic cultivators nor any incentives to practice organic cultivation. As yet, India neither has legislation nor any mechanism to certify the products as organic. The National Programme for Organic Production (NPOP), like any other government programme has got bogged down in committees.

Indian farmers interested in exporting their produce have to run from pillar to post, yet the net result is zero. The standards are based on the requirements of the buyer and not the producer. Organic products from developing countries may also be subject to tariff & non-tariff obstacles. The lack of awareness among people is a hurdle in selling organic products. There is also a great problem of sourcing.

To put it in a nutshell, the factors that have contributed to the lack of development of organic market in India include low awareness, high prices, lack of consumer confidence and erratic supply of organic food. As for gaining access to the protectionist European market, weak research and development, lack of financial assistance, poor post harvest technologies and infrastructures, exporting rules, trade specifications have contributed in damaging the potential export boom.

The Silver Line

A master plan for the production of organic coffee has been formulated by the coffee board. Organic tea production is also gaining momentum. Darjeeling tea gardens have also turned organic after some consignments of tea were rejected by Germany in 1993 because of high pesticide content. India's organic trade in spices is fast picking up. Vermiculture, intercropping and legume cultivation are promoted. A few Indian organic food companies have ventured into organic commodities like basmati and other varieties of rice, tea, lentils, grains & sugarcane. 'Anupaan' an organic vitaliser has also been developed. Reports reveal that practising organic farming gives higher yield. Success comes slowly but steadily to those practicing and exporting organic products.

The way ahead

The Indian farmer is 'naturally' organic. 60% of India's arable land is under traditional agriculture and there is an urgent need to ensure high premium for the produce grown in these regions. If attempts are made to classify the farming practices as organic, the poor farmers will get a premium price for their low yield. This will also go a long way in alleviating poverty and raising the living standards of the poor villagers.

Source : Down to Earth
September 15, 2001
Compilation - Nirmala Arunkumar

Green Manure Plants for Increasing Soil Fertility

1. Dainchaa - *(Sesbania aculeata)*

This plant is commonly called Dainchaa or Prickly Sesbania. This plant is capable of growing fast. It can also decompose very easily. It requires low water content. It provides maximum amount of organic matter and nitrogen to the soil. This plant can grow in all seasons and in all kinds of soil. This plant can withstand alkalinity, drought and water logging conditions. It is a good crop for clayey soil. The stem of this plant decomposes quickly after it is ploughed in. The flowers are yellow in colour. The seeds are circular and brown in colour. The seed rate is 12 - 16 kgs / acre. It can be cultivated before paddy in wetlands. Since the leaves of the plant have high acid content, it is used to reclaim alkaline soils.

2. Sunn Hemp *(Crotalaria juncia)*

This plant is regarded as a good source of green manure because of the presence of a number of root nodules. This helps in retaining the nitrogen content in the soil. By close planting of this crop weeds can be eliminated. Sunn Hemp grows to a height of about 3 metres. The flowers are yellow in colour. These plants last from 75 to 150 days. The seeds are black in colour. Mature plants are used to produce fibre. It is also used as a fodder crop.

This plant can be easily propogated in both wetlands and drylands. The seed rate is 12 - 14 kgs / acre. One acre yields about 6 – 10 tonnes of green manure. Water logging affects the growth of this plant.

Extract to Control Shoot borer in Brinjal

Extract of *Leucas aspera*, Asafoetida and Cow's urine

Mrs. Ponnammal, a farmer in Kattankulathur has established a kitchen garden wherein she had planted indigenous vegetable varieties. She is one of the women farmers conserving indigenous vegetables under CIKS biodiversity seed conservation programme. Last year, she had cultivated brinjal and other vegetables in her garden. She has used the extract detailed below to control infestation of shoot borer in Brinjal. She has also been disseminating this biological method of pest control, to other farmers of her region.

Materials required

Leaves of *Leucas aspera*	50 gms
Asafoetida powder	10 gms
Cow's urine	200 ml

Leaves of *Leucas aspera* were soaked in sufficient quantity of water overnight. The next day, the leaves were ground well. The leaves were squeezed to extract the juice and it was filtered. Water used for soaking the leaves was added to the juice obtained. To this, asafoetida powder and cow's urine were added. The extract thus obtained is a combination of *Leucas aspera*, asafoetida and cow's urine.

Method of Application

100 ml of this extract is mixed with 1 litre of water and 5-10 ml of khadi soap extract. Spraying this extract on brinjal plants once a week either in the morning or evening helps in control of shoot borer. Since cow's urine is a constituent of this extract, it also helps in reducing the incidence of disease in brinjal. Asafoetida helps in preventing flower drop.

Compiled by : K. Subramanian and N. Jayashankar

Effective Microorganisms

Awareness about the beneficial effects of microorganisms, and earthworms is on the increase today. Organic farmers now have the option of using simple and low cost bioformulations that significantly increase the crop yield. The "effective microorganisms" technology developed by Professor Teruo Higa of Japan is a combination of composite microorganisms that boost agricultural and horticultural production. This mixed culture of beneficial microorganisms was found to be more effective in boosting crop growth than any of its constituent species acting in isolation. He named this group of beneficial organisms, consisting of almost hundred organisms as "Effective microorganisms" (EM).

According to Dr. Lucas Dengel of Auroannam at Auroville, EM consists mainly of lacto bacillus, photosynthetic bacteria, yeast, fungi and actinomycetes. It is now becoming popular in India. The use of EM in agriculture and horticulture has not only resulted in increased yields, but has also improved quality and increased shelf-life of the produce. In EM farming practices, special recipes are prepared to manage pests and diseases. EM application demands liberal addition of organic residues as these microbes feast on carbon and the organic wastes also encourage the synergy of all aerobic and anaerobic organisms.

EM counteracts rot, odour and rust, and is hence widely used for treating wastes. EM technology also has applications in dairy, poultry and aquaculture. A number of recipes and application schedules have been developed.

In Auroville, EM was used in a small dairy. It helped in controlling bad odour, flies and general health of the cattle improved. Dr. Dengel also observed that festering wounds in cattle, which defied various kinds of treatments, were healed, and the milk yield increased by 13 percent.

Source : The Hindu, October 4, 2001

Norms for Quality Pesticides

The Government is thinking of prescribing some qualification for pesticide dealers, similar to that for chemists and druggists in order to ensure supply of good quality pesticides.

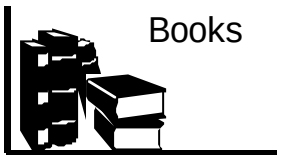
Addressing the members of Pesticides Manufacturers and Formulators Association of India (PMFAI), Mr. B.S. Minhas, Additional Secretary, the Union Ministry of Agriculture and Cooperation urged the industry to ensure that good quality pesticides were supplied to farmers, apart from making reasonable profits. He added that the Government's first priority was to protect farmer's interest on a long-term basis and ensure that agriculture is sustained.

Commenting on the opposition of this association to the World Trade Organisation because of fear of competition from imports, Mr. Minhas asserted that WTO was more of an opportunity rather than a threat. He asked the industry to keep track of import volumes following the removal of quantitative restrictions and bring all relevant information to the notice of the government for corrective action.

Source : Business Line, July 11, 2001

Tips for Gardeners

- **Baking soda** is a good fungicide. 1 tsp baking soda, 1 tsp soft soap, 1 tsp cooking oil and 1 tsp vinegar can be mixed in 1 litre of water and sprayed on the foliage.
- **Eggshells** are a good calcium tonic. They can be crushed and sprinkled around the base of plants. Or the eggshells can be crushed in water, left overnight and sprinkled around the base of plants.
- **Marigolds** can be planted near tomatoes to prevent attack of Nematodes.



VRKSHAYURVEDA : Ayurveda for Plants by *Subhashini Sridhar, S. Arumugasamy, K. Vijayalakshmi & A.V. Balasubramanian, Centre for Indian Knowledge Systems, Chennai, 2001, PP. 47*

This user's manual begins with an introduc-tion to the scope of the subject, lists certain important farmers' practices and provides rationale for these practices based on the theory of vrkshayur veda. An entire section is devoted to specific recipes based on vrkshayurveda for disease treatment, for increasing general resistance to diseases and pests and seed treatment for increasing crop growth and yield. Use of specific growth regulators based on vrkshayurveda is also recommended. The recipes that have been recommended are based on field trials carried out by the centre.

Available from : CIKS, 30, Gandhi Mandapam Road, Kotturpuram, Chennai - 85

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LAW RELATING TO INSECTICIDES IN INDIA As amended by the Insecticides (Amendment) Act, 2000 by M.Narayana swamy;

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Available from : Wadhwa and Company, Wadhwa Sales Corporation, DD-13, Kalkaji Extension, New Delhi – 110 019. Copies also available from the author, 22, Rameswaram Road, T. Nagar, Chennai – 600 017.

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