

DDT : Myths And Realities

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Zelder received a Ph.D degree from University of Strassburg for the synthesis of DDT, Muller was awarded the 1948 Nobel prize for discovering its insecticidal properties. Dr. Kenneth Mellanby, former Director, Monks Wood Experimental Station, UK, in his lecture during golden jubilee year of DDT discovery celebration concluded

“There is one major use for which, there is at present, no alternative chemical for killing adult mosquitoes placing a residual deposit of DDT on the inside walls of house. This causes minimum or no environmental contamination with the maximum effect on the mosquito population. I hope that this use will be continued and extended.”

DDT was widely used all over the world in public Health programme & in Agriculture. Today DDT is under restricted use only for Public Health Programme, in 21 countries including India, as efforts to ban gathered momentum due to its long persistence nature in environment. Many countries are being forced by multilateral agencies, environmentalist groups to remove one of the most effective weapons against malaria, one of the mans-oldest disease specially in tropical countries like South east Asia, Africa etc. DDT has been classified in POP groups due to its slow rate of degradation from environment.

It is true that within specific countries and climate very large differences are measured in degradation rates of pesticides. Generally appreciably greater pesticide losses have been recorded under tropical climatic condition. Half-life of DDT in Temperate climate is more than 3-4 years where as in tropical climatic condition like India it is 3 months only. The major climatic factor in tropical climate which plays a crucial role in quick degradation of DDT & other designated persistent organic pesticides are sun light particularly Ultra-Violet Light , high temperature in tropics which are more intense in tropical & sub tropical zone than in temperate zone, aggravated pesticide losses much -much faster than temperate climate. Heavy rain and flooding of soil which is a predominant feature of tropical climate favors the development of anaerobic micro organism which accelerate the degradation of persistent organic pesticide like DDT. It is also to be mentioned that unlike other pesticides, DDT shows decrease of Toxicity in elevated temperature, which prevails in tropical climate. This is called Negative Temperature co-efficient.

Rachel Carson wrongly mentioned in her Silent Spring that DDE, the allegedly non- toxic metabolite of DDT, is responsible for egg shell thinning in the peregrine and a number of other species of bird. This conclusion is based on feeding experiments & on analysis of eggs from various areas. The situation is further complicated by the different reaction of different bird species. Fed with DDE the Bengalesefinch actually produces thicker eggshell (Edward, J. G. 1971). The eggshells of gallinaceous species such as quail, pheasant and the domestic hen often used in laboratory experiments are relatively unaffected. It has been reported that pollutant like mercury, lead etc are responsible for eggshell thinning in wild, NOT DDT(Tucker, R.K 1971).

Two months feeding of 20 ppm dietary DDT to Albino mice neither produce any change in enzymatic activity of Lactate-dehydrogenase , alkaline-Phosphatase & total protein- nor any Histopathological changes were observed in Liver (Banerjee ,B.D. 1982)

It is perhaps interesting to note that therapeutic uses for DDT have been discovered. A 17 years old patient had suffered from a genetically determined. Jaundice from his 13th year of his age. He was given a daily dose of 90 mg of DDT for six months. His high plasma bilirubin of 6 mg /100 ml fell to 1 mg/100 ml not only during course of treatment, but remain low for nearly 7 months even after it was discontinued. The therapeutic effect of the DDT is apparently operative because it increase the production of the enzyme glucuronyl- transferase, which enables the bilirubin to be conjugated with glucuronide acid and excreted as diglucuronide with the bile. No side effect of the DDT treatment were noticed and liver function tests and routine hematological tests remained normal. The DDT metabolite DDE which is formed in warm blooded organism has also been found valuable in treating the rare disease of inoperable adrenal cortical carcinoma.

Perhaps the most convincing fact, regarding high exposure to DDT is that since 1942, millions of people have been exposed to this insecticide for various public health purposes, without any details or any record of serious illness.

The fact that DDT residue in human milk exceeds that of ADI has no consequences for the health of a child since the intake is limited to the short lactation period and does not continue for life time. There have been reports of DDT being a possible mutagen. In the Ames test, DDT proved completely negative with and without metabolic activation & the same applies to dominant lethal tests in mice. The

General conclusion is that DDT is most unlikely to produce any mutagenic effects (WHO 1979).

Carcinogenicity studies in rats gave inconclusive result and were negative in Hamsters even high doses (Agthe et.al 1970 & Cabral et.al 1982). During the period when DDT was widely used in USA the total rate of Liver Cancer deaths fell and not increased. The situation is similar in other countries where DDT is being extensively used. There has been no increase in worldwide liver injuries or of liver Cancer. Based on an evaluation of all available data from animal studies, observations in man, epidemiological studies and Cancer statistics, an expert group of WHO came to the conclusion that after so many years of introduction of DDT there is no evidence, what so ever, that DDT is carcinogenic in man (WHO 1979).

Three generation of reproductive studies on Dogs fed with DDT found no significant differences between control & treated at length of gestation period, fertility, success of pregnancy, sizes of litter, lactation ability of mother, viability at birth, sex distribution, growth of pups, morbidity, mortality, organ/body wt ratio and histological abnormalities in all the animals studied. Only difference was that DDT treated females had their first oestrus two to three months earlier the control animal (Ottoboni et.al. 1977)

DDT is considered as the best tool used in anti-malaria campaigns and other vector control programme throughout the world. It saves millions of people from getting malaria every year. DDT is still the safest & least hazardous insecticide in handling & its application. All the criticism alleging that DDT has had an alarming impact on the environment, including human is completely unrealistic.

World Health Organization(WHO) expert committee report on DDT found no convincing evidence of long term adverse effect of DDT exposure as a result of Indoor Residual Spray and also there is no conclusive scientific report on adverse effect of DDT on human health. WHO in their recent announcement called for malaria endemic countries to use DDT more in malaria fight.

Lastly it is important to quote the statement of Dr. Arata Kochi, WHO's malaria chief "We must take a position based on the science and the data. One of the best tools we have against malaria is indoor residual housing spraying. Of the dozen insecticides WHO has approved as safe for house spraying, the most effective is DDT".

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