REPORT
ON
ENDOSULFAN
(March, 1991)

OF

EXPERT COMMITTEE
TO REVIEW THE CONTINUED USE IN INDIA
OF PESTICIDES, WHICH ARE EITHER BANNED OR RESTRICTED
FOR USE IN OTHER COUNTRIES

CONSTITUTED
BY

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE & CO-OPERATION)
NEW DELHI

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CHAPTER-I GENERAL

1. CONSTITUTION OF THE EXPERT COMMITTEE

1.1 Ministry of Agriculture (Department of Agriculture & Cooperation) had constituted a Committee vide Order No. 17-27/83-PP.I dated 14th August, 1984 under the Chairmanship of Dr. S.N. Banerjee, former Plant Protection Adviser to the Govt. of India to review all the pesticides in use at present in the country with the view to ban the production, import and use of those which are no longer in use in other countries. The Committee reviewed 14 pesticides viz., aldrin, BHC, captafol, chlordane, chlorobenzilate, captan, dibromo chloropropane (DBCP), DDT, dieldrin, EDB, heptachlor, pentachloro nitrobenzene (PCNB), sodium cyanide, toxaphene and submitted its report on these pesticides to Ministry of Agriculture. The Government has already examined these reports and has taken appropriate decisions on the recommendations for most of the pesticides.

1.2 The Ministry of Agriculture vide their Order No. 17-88/88-PP.I dated 23rd October, 1989, re-constituted the Expert Committee under the Chairmanship of Dr. Banerjee to review the use of such 16 more pesticides, viz., aldicarb, aluminium phosphide, carbaryl, dicofol, dimethoate, endosulfan, lindane, methyl parathion, nitrofen, nicotine sulphate, paraquat, phorate, PCP., tetradifon, 2,4-D and zinc phosphide (Annexure-1).

1.3 The terms of reference of the Expert Committee laid down by the Govt. are as follows :

(i) The Expert Committee will examine under Indian conditions the safety of pesticides, banned or phased out or restricted in use in developed countries, and the need for their continued use in India for different purposes and make appropriate recommendations.

There have been rare cases of human poisoning with endosulfan. However, the symptoms of poisoning include headache, cramps, dizziness, fainting, disorientation, convulsions and unconsciousness generally. General medical treatment in the hospital is usually sufficient and there is no specific antidote like organo-chlorine compounds and pyrethroids. Poisoning during normal applications has rarely been reported in India so far. Longterm observation of workers in Endosulfan production plants in Indiahave shown that the product constitutes no health hazard if the usual safety precautions are observed. The personnel wear the standard recommended working clothes(including shoes); no breathing masks are normally worn. Nevertheless, the use of industrial masks is recommended where high concentrations of dust occur. Accidental poisoning under working conditions is generally occasional and can be managed effectively.

4. STATUS OF BANNING AND RESTRICTION IN USE:

Endosulfan is approved for use in EEC countries, Australia, U.S.A, Japan, USSR, Canada, etc. However, in some countries like Argentina, Denmark, Finland, Hungary, Norway, Philippines,Portugal, Singapore, Yugoslavia, Venezuela and Korea the use is generally limited to some specific areas(4,.35). The reasons for such restrictions are varied and perhaps the specific requirements of eaoh country but not applicable universally. For instance, in Argentiana, the use of endosulfan is prohibited as external application to cattle, while in Portugal, endosulfan and parathion mixtures are disallowed. Both these situations are not applicable to India. Philippines and Singapore have restricted endosulfan use to safeguard water resources due to geographical nature of these countries. Emphasis on proper use as laid down in Norway, Denmark,Finland, Hungary etc. is not in terms of its banning or restricted use. As an overall assessment,

excepting a few cautions, the product is well accepted for use as a part of the total arsenal of insecticides widely employed in agriculture.

A recent 1990 report of US-EPA(5) dealing with restricted use products, does not include endosulfan in this category at all. Regular use of endosulfan in all advanced countries in particular has clearly indicated that there is no need for its banning. The reasons for restriction in a few cases are also not applicable to Indi conditions of use (4,35) and the current use practices are selected for safety.

5. CONCLUSIONS:

5.1Endosulfan at the time of its discovery in 1952 was erroneously classified as a chlorinated hydrocarbon pesticides. However, as the compound also has sulphur and oxygen in its ring, it has been accepted as a sulphur acid ester of a chlorinated cyclic diol. Furthermore, presence of oxygen and sulphur in a functional sulphite group not only makes endosulfan chemically different from DDT, HCH, aldrin, dieldrin, Heptachlor, chlordane etc. but its physiological properties and environmental behaviour is also distinctly separate. In fact endosulfan behaves more like conventional organo-phosphrous group of pesticides which have high activity and fast rate of dissipation.

5.2.Endosulfan has been extensively used against a variet of pests of cereals, vegetables, fruits, oilseeds, cotton tea,cocoa etc. Infact today it is part of a " Market basket of pesticides" which provide effective, safe and economical input in total strategies for" good agricultural practices". Apart from a broad spectrum of activity, endosulfan has also been found safe to the insect predators and parasites in the field, which in turn form a part of Integrated Pest Management technologies. The normal use also poses no problem to honey bees. Thus, problems like white-fly resurgence wit synthetic pyrethroids use and mites increase by

destruction of natural predators by Carbaryl, are not encountered with endosulfan. There has not been any serious problem of resistance and cross-resistance inspite of its wide-spread use in the world. Endosulfan remains a widespectrum insecticide which has its place with conventional pesticides accepted today, for pest control strategies in agriculture.

5.3 Endosulfan persistence and rate of dissipation has been thoroughly studied. Its rapid degradation and small waiting periods have been further confirmed by multilocational trials on wide variety of agricultur produce in India under the All India Co-ordinated Research Programme on Pesticides Rosidues under ICAAR, New Delhi. International and national survey on residues on food as well as extensive diet studies in advanced countries have confirmed that presence of endosulfan residues was either below detectable limit or the amount detected was well within the prescribed safety standards. This also holds goods so far as the environmental impact is concerned. Recommended use of endosulfan today has not resulted in pollution of water bodies including the sea while its presence in soil is also not encountered. In short endosulfan has the requisite margin of safety to the environment and man and not be compared with persistent conventional chlorinated hydrocarbon group of pesticides.

5.4 Endosulfan is classified as " Moderately Hazardous" by WHO classification and the compound has not been reported to be carcinogenic in humans.

Most of the advanced countries have accepted its use normally. However, individual restrictions of specific nature in some smaller countries are either of limited significance or not applicable at all in the Indian context. Endosulfan is not in the list of restricted chemicals by the US-EPA, an agency which is keeping a strict watch on the entire pesticide field.

5.5 Apart from basic merit of endosulfan as a pesticide, this product is today made indigenously at competitive price by several units with total reliance on indigenous technology and most of the raw materials. The Indian product is of an internationally accepted quality and apart from meeting the country's demand, the industry is bringing in foreign exchange worth about Rs.9/- crores annually by exporting endosulfan to both developed and developing countries of the world.

6. RECOMMENDATIONS:

Keeping in view the data discussed and the present status of endosulfan in India and abroad, the following recommendations are made by the Expert Committee:-

6.1. Endosulfan is a broad spectrum, effective and safe pesticide which forms a part of our" market basket of pesticides". It has a favourable cost/ benefit ratio as well. Hence its acceptance and use as per the current approval under the Insecticides Act 1968 be continued.

6.2. Studies on endosulfan residues in food, processed food and diet should be continued systematically as already being programmed under A.I.C.R.P. on pesticides Residues of ICAR.

6.3 The product intrinsically does not justify banning or imposing of any special restriction apart from the approved usages already permitted under the Insecticide Act 1968.

6.4 Since there are reports of misuse of endosulfan for fish killing specially from convenient small packs, it is recommended that it may be sold only in larger packs of not less than 1 litre.

6.5 It is recommended that the Registration Committee should not allow the use of endosulfan near river, lakes, Sea and ponds which are expected to be polluted. This restriction can be put in the Certificate of registration as a condition and a warning thereof on Label and Leaflet accompanying with the endosulfan containers.