

COMPOSITION OF DDT PRODUCTS

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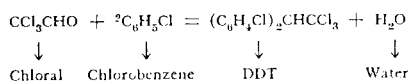
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In view of the recent release of DDT for experimentation and civilian use, mosquito control workers throughout the world became interested in it as a potential mosquitocide. However, considerable confusion prevails concerning the different brands, isomers, solutions, emulsions and dust mixtures supplied by commercial concerns. Another mooted question is the precautions necessary in handling the various DDT preparations without undue

health hazard. It is with the purpose of elucidating on this subject for the benefit of the MOSQUITO NEWS readers that this article was written.

The symbol DDT is an abbreviation of the term dichloro-diphenyl-trichloroethane, $(C_6H_4Cl)_2CHCCl_3$. Since many isomers (compounds which have the same molecular formulas but differ from each other in their physical and chemical properties) of this chemical may be prepared, some

of which possess low toxicity to insects, the name DDT is confined to the compound obtained from the reaction of chloral with chlorobenzene in the presence of sulfuric acid as follows:



The product obtained by this process consists essentially of two isomers namely,

- I Para-Para (P,P') DDT = 70 — 80%
 II Ortho-Para (O,P') DDT = 15 — 20%

and a small amount of impurities. Of these two isomers the P,P'-DDT was found more toxic to mosquitoes and other insects than the O,P'-DDT.

Types of Commercial DDT Products

DDT is now supplied commercially in several forms: powders, dust mixtures, solutions, and concentrated emulsions.

DDT-Powders

At present three grades of DDT powders are specified: technical, purified or aerosol, and pure DDT. The *technical grade* is the commercial product above described. Since its melting point, due to the presence of impurities, is not sharply defined it, is required to possess a minimum "setting point" value of 88° C. The *aerosol grade* is partially refined, containing approximately 97 per cent or more P,P'-DDT and should have a minimum melting point of 103° C. It has been, up till now, used in preparing aerosol bombs for the U. S. armed forces and for experimental work. The *pure grade* is highly refined, consisting entirely of the P,P'-DDT isomer, with a constant melting point of 108.5–109° C., designated chemically as 1-trichloro-2,2-bis (P-chlorophenyl) ethane. It is intended for use as a standard comparison for special chemical and toxicological studies.

DDT-Solutions

The *technical* DDT is naturally the lowest in cost and is the grade generally employed for insecticidal purposes. It is

of light cream color, insoluble in water but readily soluble in a wide variety of organic solvents such as benzene, xylene, cyclohexanone, ethylene dichloride, fuel oils, and many others. In some solvents as much as 50 per cent DDT by weight can be dissolved, whereas other solvents will hold only from 5 to 10 per cent DDT in solution. For mosquito and fly spraying enough of the technical grade can be readily dissolved in kerosene or fuel oil by shaking or mixing.

Solutions containing from 5 to 35 per cent DDT are supplied commercially which may be used instead of the powder in preparing various desired concentrations in oil. Also concentrated emulsions, containing various amounts of DDT, which can be mixed with water to any desired concentration, may be now purchased.

DDT-Dusts

Several brands of *wettable* and *non-wettable* dust mixtures are also available. The *wettable dusts* consist of 20–50 per cent DDT, a small amount of wetting agent and the balance inert carrier such as talc or pyrophyllite. This type of dust disperses in water to form suspension sprays of any desired concentration. The *non-wettable dusts* are not dispersible in water and are prepared for dusting purposes only. They generally contain from 3 to 10 per cent DDT and the remainder inert carriers.

Solutions and dust mixtures, based on actual DDT content, are considerably higher in price than the technical grade of DDT powder, due to the added cost of solvents, carriers, wetting agents, mixing operation and extra freight charges. The writer has observed no difficulties in using DDT powder for making up oil solutions and emulsions, either in the laboratory or in the field for mosquito spraying.

Precautions in Using DDT

Besides being highly toxic to insects DDT is also poisonous to man and higher animals and may, if not properly employed, constitute a health hazard. It

lethal dosages it attacks the nervous system and causes pathological conditions in the liver and other internal organs. In pure or technical powders and in dry dust mixtures DDT is not toxic on contact unless ingested in comparatively large quantities or handled with greasy, oily hands. However, in solutions of oil or other solvents, DDT becomes poisonous on contact and inhalation. In oil solutions it is readily absorbed through the skin and intestines. The following precautions are generally recommended for workers who intend to use DDT to a considerable extent either for experimental or practical application.

When mixing or spraying solutions or emulsions of DDT, wear *neoprene gloves*, *goggles* and a *respirator*. Wear a *wide-brimmed hat* to prevent spray from depositing on head and face. *Do not* allow DDT solution to remain on *skin* or to *saturate clothing*. When accidentally spilt on clothes, change them promptly. If concentrated DDT solution gets on the skin, *wash immediately* with soap and water. *Do not* spray baby beds, children's toys, food, dishes and rooms occupied by sick persons. Cover or remove all food and cooking utensils from room before dusting or spraying. *Do not* store DDT near food supplies.