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During the day thermal instability increases, downward transfer of wind energy occurs and eddy motion is promoted, these factors causing greater dispersion and more random aerial distribution of spray clouds.

While maximum stability is to be expected near dawn, the action of the herbicide on weeds may be adversely affected by wind and heat during the day. In some cases, therefore, the optimum time for spraying will be near dusk.

FACTORY AND FIELD HAZARDS IN RELATION TO VARIOUS WEEDICIDES

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Modern weedicides, along with all pesticides, present hazards during their formulation as well as in their field application. Until recent years weedicides have not presented many of the toxicity problems normally associated with groups like the insecticides. Arsenicals, of course, are the exception, having caused many deaths through ingestion and with the use of organic compounds for weed control in the last two decades other toxicity problems have arisen. These are dealt with, in chemical groups, in the paragraphs that follow.

Arsenic

In formulation plants, the oxides of arsenic used are in the form of a fine powder, which can present an inhalation hazard. Exhaust ventilation should be used to control the dust, and respiratory protection (half-face dust respirator) should be used by the operator.

When spraying arsenicals in the field a coarse jet should be used to prevent spray drift. Tests under both factory and field conditions have indicated concentrations of arsenic in air well in excess of the maximum allowable concentration (MAC) of 0.5 mg/m^3 in situations where such control was not implemented. The storage of respirators and gloves in locked boxes containing arsenic has been seen in several local government situations. Pole boring and arsenic application is a hazard to children unless hardwood plugs are driven into the holes after application.

Dermatitis from skin contact with arsenic is fairly common, indicating the need for gloves and protective clothing.

Dipyridyl Compounds

Paraquat and diquat can cause bleeding of the nasal mucosa when spray drift is inhaled. Splashes in the eye have caused conjunctival degeneration, and deaths have resulted from ingestion. Dermal, eye, and respiratory protection is necessary when applying these compounds. Particular care should be taken in formulation plants handling the concentrate.

Creosolic Materials

Materials such as DNOC are toxic by inhalation, ingestion, and skin absorption. Deaths from skin absorption, particularly on scratched skin, have occurred. The cause of death is uncontrolled increase in metabolic rate, with symptoms of pyrexia, raised heart beat, and so on.

Defoliants

(a) Organic phosphates. - while some used on cotton crops are fortunately of low toxicity, they have an unpleasant smell. This has resulted in many complaints of discomfort, but no poisonings have been recorded.

(b) Chlorates. - these present a fire hazard in the formulation stage and on the dried crop. Several years ago a formulation plant was destroyed in a chlorate fire caused by friction on wooden loading pallets. The use of wood or organic material is hazardous in these plants. The latest trend is to isolate such plants in country areas.

Phenoxy Compounds

These are of low toxicity to man but are skin irritants. Unfavourable teratogenic studies in 2,4,5-T were said to be due to an impurity. However, the current trend has been to use women as little as possible in production plants and then only those over 45 years old. Similar precautions with PCNB apply in industry.

The use of exhaust ventilation and protective clothing is essential in 2,4-D and 2,4,5-T manufacture and formulation. Protective clothing is necessary in the field.

Amines

Similar dermal protection as with the phenoxy compounds should be afforded.