

## PRE-EMERGENCE HERBICIDES

# Preparation of Low-Volatile Esters of 2,4,5-T For Weed Control in Hawaii

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Low-volatile esters of 2,4,5-T, now available commercially, show promise for application in pre-emergence treatments on bare soil to control growth of grass and weeds.

THE LOW-VOLATILE ESTERS of 2,4,5-T (2,4,5-trichlorophenoxy acetic acid) when applied in pre-emergence treatments on bare soil, have shown unusual promise as an effective retardant to the germination of grass from seed and to the appearance of other weed growth.

Up until recently, these esters could not be readily obtained commercially. However, there are now available several first-class esters of 2,4,5-T which may be processed by the addition of a suitable oil-soluble emulsifying agent, together with Diesel oil or an aromatic oil having herbicidal qualities. A very satisfactory concentrate may be produced at a marked saving in cost.

All of the basic constituents may be purchased on the open market. The preparation of the concentrate is easy and simple; no heat or elaborate equipment is needed in its processing. Trained workers are not required to mix the ester, emulsifier, and Diesel oil which form the concentrate. The 2,4,5-T acid equivalent of the ester will appear on the manufacturer's label, or it may be obtained directly from him. As an illustration, the butoxyethoxypropanol ester of 2,4,5-T, as manufactured by the Monsanto Chemical Co., carries 6 pounds of acid equivalent in 1 gallon of pure ester. Hence, the worker has but to use  $\frac{2}{3}$  gallon of the ester in making up 1 gallon of the formulation in order to include 4 pounds of the acid equivalent of the ester.

The concentrate is not corrosive to metal, nor subject to deterioration on standing. For field use, it may be diluted to any convenient volume for application by the addition of Diesel oil or an aromatic herbicide oil. On the other hand, it may be diluted with water, forming an emulsion which may be applied to the bare soil by conventional equipment.

In preparing the emulsion in water, a more stabilized dispersion of the con-

centrate may be obtained by adding just sufficient naphtha to the concentrate, prior to addition of the water. If correctly adjusted, there will be very little, if any, settling of heavier bodied constituents in the mixture, and the tendency for this material to rise to the surface of the suspension will be reduced to a marked degree.

Screening studies made with these low-volatile esters of 2,4,5-T at the Experiment Station of the Hawaiian Sugar Planters' Association, both in the laboratory and in the greenhouse, have shown that, with a per acre application of 4 pounds of the acid equivalent of 2,4,5-T, a control period of from 8 to 10 weeks may be obtained, during which the growth of grasses and of broad-leaved weeds is suspended. A convenient volume to use for knapsack application is about 20 gallons per acre. These findings have been confirmed by large-scale experiments on plantation fields of the sugar industry throughout the territory.

Studies have included the use of the butoxyethoxypropanol ester of 2,4,5-T, the butoxyethanol ester of 2,4,5-T, and the capryl ester of 2,4,5-T.

Instructions for processing and applying one of these low-volatile esters have been issued to all sugar plantations in Hawaii. Attached to the descriptive matter, which carried recommendations and suggestions for employing these new compounds, was a "work sheet," printed on heavy paper and intended for use by the personnel of the herbicide mixing plants on all sugar plantations. The directions contained in this work sheet are concise, and are presented in a manner which renders it simple and expedient for the technician to prepare his concentrate, dilute it, and transport it to the field for application.

### Preparation of Concentrate

Mix in this order:

1. A low-volatile ester of 2,4,5-T, such as the butoxyethoxypropanol ester, from 5 to 5.75 pints, depending on the 2,4,5-T acid equivalent of the ester. Use a volume of the ester which will produce a concentrate carrying 4 pounds of the acid equivalent per gallon of finished concentrate.

2. An oil-soluble emulsifier, 0.5 pint. A satisfactory oil-soluble emulsifier for the purpose is manufactured by the Atlas Powder Co. and marketed as Atlox 1045A.

3. Sufficient Diesel oil to make a total volume of 1 gallon. The purpose of the Diesel oil is to act as a diluent and to compensate for any variability in acid equivalent of the ester.

4. Mix thoroughly.

### Processing Concentrate For Pre-emergence Application

**Dilution with Diesel Oil Or Aromatic Oil** Add either oil to any desired volume for field application. A clear solution is obtained by adding Diesel oil to the concentrate; a slightly turbid solution is usually produced by adding an aromatic herbicide oil.

**Dilution With Water** Select any desired volume of the concentrate and determine by experiment the correct volume of a light naphtha to add in order to produce an emulsion of satisfactory stability. Measure out a desired volume of water, from 5 to 20 gallons, and stir in 1 gallon of the concentrate which has been treated with naphtha. This forms a milky-white emulsion, and is the cheapest and most easily applied dilution of the concentrate that may be made. When this emulsion is applied in the field, its movement in the dispersing equipment during the application is usually sufficient to maintain its uniformity.

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