IN THE LABORATORY

Inactivation of 2,4-D by Adsorption on Charcoal[1]

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A method has been found which will inactivate some preparations of 2,4-D by adsorption on activated charcoal. This method is important because of its simplicity and its thoroughness of action. Substances and equipment which have been in contact with 2,4-D frequently carry small residues which are injurious to plants. Inhibition and injury of succulent plant tissues such as bean and tomato have been observed to be caused by dilutions as low as ½ ppm, and hence it has been almost impossible to clean adequately equipment which has been used to hold herbicidal preparations. Also, instances may occur where the separation of 2,4-D from other materials is desired.

Experiments have shown that a solution of the water-soluble powder (sodium salt of 2,4-D, as prepared by the Dow Chemical Company) containing 1,000 ppm of the active principle can be safely sprayed on all but very young bean plants after being mixed and shaken with 1 per cent activated charcoal (Norit A). Bean plants sprayed with this material shortly after emergence indicate by a very slight nastic response that the adsorption on the carbon is not complete. However, the amount of active substance not adsorbed is so small that it can be disregarded for all practical purposes. The addition of a larger percentage of charcoal results in complete inactivation.

TABLE 1

QUANTITATIVE ADSORPTION OF 2,4-D ON NORIT A AS ESTIMATED BY RESPONSE OF 10-DAY-OLD BEAN PLANTS

Concentration of 2,4-D (ppm)	Norit A in suspension (%)	Effect of application by	
		Drop method	Spraying
1,000	1	0	0
5,000	3	0	++
5,000	5	0	+
10,000	5	0	++
10,000	10	0	+

0 = no visible effect; + = very slight effect; ++ = slight effect.

A hand sprayer which had been used to apply 2,4-D solution at the excessive concentration of 10,000 ppm was freed from injurious traces by rinsing with a 1 per cent Norit A suspension for 2 minutes. Young bean plants were uninjured by applications of inert solutions made with this same hand sprayer immediately after rinsing as described.

Tests carried out to determine the degree of inactivation have given positive results, as shown in Table 1. These were made by the drop method developed by Mitchell and Hamner (*2*) as well as by spraying entire plants.

It should be emphasized that the carbon treatment inactivated the water-soluble powder. Tests indicate that certain oil preparations, though somewhat affected, are inactivated much less readily. Further tests are being conducted to establish the behavior of other types and grades of carbon preparations.

It appears that the findings here reported may offer an explanation for variable results with soil treatments of 2,4-D (*1*). It had been found that weed seeds were not as readily destroyed in certain muck soils as in sandy soils. Perhaps some muck soils adsorb 2,4-D in the same manner as does charcoal.

References

1. HAMNER, C. L., MOULTON, J. E., and TUKEY, H. B. *Science*, 1946, **104**, 476.
2. MITCHELL, J. W., and HAMNER, C. L. *Bot. Gaz.*, 1944, **105**, 474.

[1] Journal Article No. 859 (n.s.) from the Michigan Agricultural Experiment Station.

Pilometric Measurements and the Rheological Properties of Hair

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In man, various clinical conditions involving the loss of hair are known. Successful therapy, both locally or systemically, to counteract the loss of hair must be based on controlled experimentation. This calls for a clinical test which permits careful measurement of the firmness with which a single hair is attached to the skin and the determination of certain rheological properties (*5*) of the hair, such as its yield value, elasticity, and tensile strength.

An instrument was devised for a study of the effect of a systemic treatment on the firmness of attachment of hair to the scalp in certain clinical conditions.[1] Since then, a second instrument with significant improvements, termed "pilometer," was developed in collaboration with the Friend Laboratories, New York City.

The first device was of simple construction and consisted of a small clamp, a hook, and a ball-bearing pulley fastened to a vertical stand. The clamp was designed to hold the hair and was fastened to a silk cord which went over the pulley. A light-weight tube (Lusteroid) of 100-cc. capacity was hung on the hook attached to the other end of the cord. Clamp, cord, and tube had a total weight of 8 grams. The tube served as a container for weights in grams or water.

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