Technical Papers

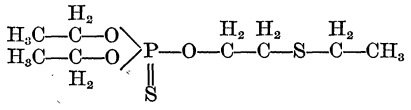
Unusual Protective Action of a New Emulsifier for the Handling of Organic Phosphates

William B. Deichmann, Patricia Brown, and Charles Downing

Division of Pharmacology, Department of Physiology and Pharmacology, Albany Medical College, Albany, New York

Hecht and Wirth (*1*) introduced a new type of emulsifier (No. 8139) with the claim that it would reduce the cutaneous toxicity of Parathion and its dimethyl derivative by half without influencing the insecticidal properties of these organic phosphates. Chemically the emulsifier can be described as a polyethylene oxyphenol of high molecular weight.

Because of the rather generalized interest in the so-called nerve poisons, this preliminary report is to call attention to an unusual protective action afforded by the American equivalent of this emulsifier[1] when mixed in roughly equal proportions with a new systemic organic phosphate insecticide that is being introduced by the Chemagro Corporation as Systox. Chemically this material is



For the study to be reported here the most toxic of several pilot plant preparations of Systox was employed. Various formulations of Systox were placed upon the abdominal skin of each of a group of albino rabbits, from which the hair had previously been removed by clipping. Exposures were limited to one period of 6 hr. After an exposure the Systox formulation was removed by thorough washing of the animal with soap and water under the tap. The animal was subsequently dried with a towel and kept under observation until it died, or for a period of 10 days.

The signs of intoxication observed were like those described for Parathion and related organic phosphates (*2, 3*). The approximate lethal dose (*4*) of undiluted Systox is less than 24 mg/kg (smaller doses could not be applied with accuracy), whereas the approximate lethal dose of Systox when applied as a mixture composed of equal parts of Systox and Emulsifier 42-1A was found to be equal to 620 mg/kg. The protective action of this emulsifier became gradually lost when the 50-50 mixture was diluted with increasing volumes of water. When diluted with approximately 200 volumes (such as are used for spraying), the approximate lethal cutaneous dose, in terms of Systox, was equal to 5 mg/kg. In other words, to induce a similar degree of intoxication in rabbits, more than 100 times as much Systox in Emulsifier 42-1A is required as when applied as undiluted or as highly diluted Systox.

[1] Manufactured by Chemagro Corporation, New York, and identified as "Emulsifier 42-1A."

References

1. Private communication.
2. Report to the Council on Pharmacy and Chemistry. *J. Am. Med. Assoc.*, **144**, 104 (1950).
3. DEICHMANN, W. B., PUGLIESE, W., and CASSIDY, J. *Arch. Ind. Hyg. and Occ. Med.*, **5**, 44 (1952).
4. DEICHMANN, W. B., and LEBLANC, T. J. *J. Ind. Hyg. Toxicol.*, **25**, 415 (1943).

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Scatter-Sounding: A New Technique in Ionospheric Research[1]

Oswald G. Villard, Jr., and Allen M. Peterson

Radio Propagation Laboratory, Stanford University, Stanford, California

The existence of radio-reflecting regions in the ionosphere may be demonstrated, and their characteristics may be studied, by an indirect method of echo-sounding wherein an echo is received not from the layer itself, but rather from those portions of the earth's surface that are illuminated by reflection from the layer. Thus radiofrequencies may be used that are higher than the highest at which a vertical reflection can be obtained.

The signal making up the echo is a result of backscattering when energy from the transmitter, bent downward by the ionosphere, strikes the surface of the ground. Even at frequencies of the order of tens of megacycles, and paths involving highly oblique transmission, roughness of the earth's surface is sufficient to scatter back a readily detectable amount of energy. Furthermore, this roughness appears to a first approximation to be independent of geographical location. For example, there is no noticeable difference in the strength of echoes returned from the sea, as compared with those originating on land.

The transmission mechanism is such that the backscattered energy appears as a broad pip, or clump of echoes, on the timebase of a radar type "A" display. The leading edge of this composite echo is well defined. When a skip zone exists, it is possible to relate the time delay corresponding to this leading edge to the time required for wave travel along the ground from the transmitter to the edge of the skip zone and return. This may be done to a degree of accuracy which depends on the circumstances, but which is very good for reasonably long-distance transmission.

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