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GEN. DEVELOPMENT DEPT.
ST. LOUIS

CONFIDENTIAL

ANNUAL RESEARCH REPORT

1946

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DEVELOPMENT DEPARTMENT

ANNUAL RESEARCH REPORT - 1946

I. SCIENTIFIC-WORLD CONTACT

The practice of visiting outside research organizations, government laboratories, universities, and similar non-profit groups for the purpose of keeping abreast of technological trends and developments has been resumed along the lines that prevailed prior to the war. As a starting point, a list of organizations whose scope of activities are of interest to Monsanto has been drawn up. This list is comprised of all the major groups contacted by the Development Department in the past, many of those of broad interest visited by the divisions, and several with which it seemed advisable to initiate contact. Because of the size of the list and the wide geographical spread of the laboratories, the divisions have agreed to assist this Department in maintaining a broad coverage by assuming the responsibility for calling on certain of the groups at regular intervals. These visits will be made with the over-all interest of Monsanto in mind and reports on the visits circulated to the several divisions.

While this program was directed principally at contacts with government laboratories, universities, and similar non-profit organizations, the value of broad contacts with industrial research organizations is recognized, and it is planned to expand the activities of the Development Department to include coverage of this latter group.

II OLEFINS FOR SANTOMERSE

A study is under way to determine the availability and sources of olefins for Santomerse. The value of C_3 polymer in the C_{12} range has been established, and the entire oil industry is being contacted by personal calls to locate sources of this material. Dayton is undertaking a study to determine the value of normal butylene polymers in the C_{12} range for Santomerse.

III. AROMATIC CHEMICAL RAW MATERIAL SURVEY

With the forecasted shortage of most aromatic chemicals basic to our operations, we have initiated, at the request of the Purchasing Department, a survey to locate either new sources of raw materials or suitable substitutes. We are particularly interested

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IV. SPECIAL PRODUCTS (BIOLOGICAL CHEMICALS)

INSECTICIDES

A. Santobane

Considerable time was given to developing utility compositions of Santobane to meet trade requirements. The emulsifiable formulation was outstanding and as yet no competitive product has been found equal to it. The preparation of the oil solution was based upon the determination of the solubility of DDT in approximately one-hundred and fifty solvents and this concentrate has also been found very satisfactory.

Although work was done in the development of satisfactory dusts, Monsanto was not prepared to manufacture these materials and the consummation of this work is still in the future.

A partial tabulation shows that between January 1 and July 1, 1946, approximately 928,000 pounds of Santobane formulation were sold. This quantity of solution represented approximately 309,000 pounds of DDT, which was sold at a greater profit than had it been possible to move the product as the straight chemical.

Extensive field tests at Stuttgart, Arkansas indicated that Santobane applied in various ways was not effective in the control of rice root maggot.

B. Hexaethyl Tetraphosphate

The objective was to test as an insecticide what appeared to be a potentially promising chemical; and on the basis of these tests to undertake and arrange for research, application research, small- and large-scale testing and Sales Development of this product.

All objectives mentioned have been achieved. Hexaethyl Tetraphosphate has moved from the test tube to carlot scale in the space of six months.

Monsanto succeeded in placing this chemical on the American market first and is still the chief and most widely advertised producer. It has been found that the prestige of the Company has been measurably increased in the minds of all the companies concerned in the insecticide business.

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Santobrite and Santomerse D.T. (Lorol diethylene triamine)

Field development studies are planned for the coming year.

3. Customer Service

Customer service work on germicide formulations and treated textiles has been continued during the year.

4. Screening Tests

Approximately one-hundred and fifty chemicals were screened for fungistatic and bactericidal properties during 1946. From this group twenty-one compounds evidenced fungistatis properties, with 4 showing sufficient promise for additional development work. These compounds were as follows:

1-Dodecyl-8-OH quinolinium bromide
N,N-dibutyl ethylene thiourea
alpha beta dichloro gamma crotonolactone
3-Methyl-3, 6-endoxy-1,2,3,6-tetrahydrophthalonitrile

Ten compounds showed some germicidal activity, with three evidencing sufficient merit for further development studies. These materials were as follows:

ortho-phenethylphenol
1-tetradecyl-2-methyl imidazole
1-decyl-2-methyl imidazole

WOOD PRESERVATION

A. Field Inspections

Test plots at Gainesville, Fla., Saucier, Miss., and Crown Point, La., were inspected to determine termite and rot resistance of specimens, some of which are now in the eleventh year.

The "Broach" house at the W. T. Smith Lumber Company, Chapman, Ala., was inspected to determine the state of powder post beetle infestation following treatment 4 years ago.

Reports on all inspections were prepared and circulated. General conclusions are:

Pentachlorophenol treated specimens still good after 10-11 years' exposure.

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Tetrachlorotoluene and Aroclor 1242 appear good as soil poisons.

Wallboard with 1/2% Santobrite resistant to termites and decay after four years.

B. Application Research

Douglas Fir posts were treated with Pentachlorophenol in various oils to establish operating schedules.

Through a series of extensive tests, it was established that Southern Yellow Pine cannot be satisfactorily treated with Santobrite from buffered water solution.

Various woods have been pressure treated to establish the utility of Pentachlorophenol in woods for harbor and dock structures.

Work has been initiated to develop comparative data on Copper Naphthenate, Zinc Naphthenate, Copper Pentachlorophenate, Pentachlorophenol and Naphthenic Acid-Copper Pentachlorophenate as wood preservatives, using the "wood block test".

A survey was conducted looking towards development of wood preservatives (to augment Pentachlorophenol) which could be produced by Monsanto. On the basis of all factors, and taking into consideration the current benzene shortage, it was decided that a chlorinated cresol to be made by hydrolysis of chlorotoluene, would be a suitable product. The chemical aspects of this problem are now being investigated by our Research Department.

C. Publications

Assistance was given in the preparation of the brochure, "Wood Preservation with Santophen 20". This was published in September.

Bulletin 0-44, "Plant Design for Treating Seasoned Wood with Santophen 20 by the Hot-Cold Open Tank Method", is currently in process of preparation, being a combined activity of Development, Sales Development and General Engineering.

D. Association Contacts

To keep abreast of developments in the field of wood preservation, contact was maintained with:

American Society of Testing Materials, Committee D-7,

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