

Report on Commercial Insecticides and Fungicides

1939

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Agricultural Experiment Station
New Haven

Examination of Insecticides, Fungicides, Etc.

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INTRODUCTION

THE Legislature of 1923 passed an act concerning the manufacture, sale and transportation of adulterated insecticides and fungicides. The text of the law and regulations, made as provided therein for its enforcement, are given in Bulletin 258 issued by the Station in 1924. Both the law and such regulations as have been made are substantially the same as the federal law and regulations so that articles of this class which satisfy the requirements of interstate commerce will be accepted in this State.

The law requires this Station to make analyses of samples which may be collected by the Dairy Commissioner or by our station agent. Evidence of adulteration or misbranding is required to be reported to the Dairy Commissioner who is responsible for enforcement of the law. Analyses and such other information regarding the character, composition and use of these materials as may be of interest are required to be published in bulletins of this Station, either annually or at other intervals as may be advisable. The law carries no specific appropriation for the inspection work and a complete survey of the entire field of insecticides and fungicides each year is not thought to be advisable or necessary.

Prior to 1929 four bulletins [Bulletins 157 (1907); 242 (1922); 258 (1924); 272 (1925)] were published giving analyses of insecticides made by this Station. In 1929 Bulletin 300, which was a compilation of analyses of commercial insecticides and fungicides from all published sources available to us, was issued. This bulletin included analyses made at this Station between 1925 and 1929. Bulletin 346 was issued in 1933 as a supplement to Bulletin 300, and in 1937, as those two bulletins were out of print, they were replaced and brought up to date by Bulletin 398.

The present circular, like the bulletins published prior to Bulletin 300, includes only those analyses made at this Station since 1937. It is issued in order that the results of our analyses during this period may be made available for public use without waiting until such time as it becomes feasible to revise Bulletin 398.

CLASSIFICATION OF MATERIALS

The samples analyzed are classified as follows:

Materials	No. of Samples
Arsenate of Lead	5
Coal Tar Preparations	8
Copper Preparations	3

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Materials	No. of Samples
Fish Oils	2
Lime-Sulphur, Dry	1
Manganous Sulphate	2
Mineral Oils and Mineral Oil Emulsions	3
Nicotine Preparations	9
Pyrethrum	2
Rotenone	15
Soaps	2
Sulphur	4
Zinc Sulphate	1
Miscellaneous	18
Total	62

RESULTS OF INSPECTION AND ANALYSIS

Arsenate of Lead

Five samples of arsenate of lead were examined. Analyses are given in Table I.

TABLE I. ANALYSES OF ARSENATE OF LEAD

Station No.	Manufacturer and Brand	Arsenic Oxide, As ₂ O ₅				Lead Oxide, PbO
		Total		Water-Soluble		Found
		Guaranteed	Found	Guaranteed	Found	
		%	%	%	%	%
6316	Acme White Lead and Color Works, Boston, Mass. <i>Acme, Dry Powdered Form</i>	30.0		1.0	0.47	
5050	General Chemical Co., Baltimore, Md. <i>Orchard Brand Powdered with Deflocculator</i>	30.0	32.17	0.38	0.41	64.33
5853	Grasselli Chemical Co., Inc., New York, N. Y. <i>Grasselli</i>				0.15	
5852	Grasselli Chemical Co., Inc., Toledo, O. <i>Nu Rexform</i>				0.35	
2559	Niagara Sprayer & Chemical Co., Inc., Middleport, N. Y. <i>Niagara Suspension</i>	30.	31.65	0.77	0.41	63.83

Coal Tar Preparations

5979. *Colloidal Cresylic Acid*. Manufacturer unknown. Examined for the Department of Entomology.

Analysis showed the following:

Cresols	95.80 percent
Tar oil	2.21 "
Ash	0.05 "

5039. *Niagara Tar-E-Mul*. Niagara Sprayer & Chemical Co., Middleport, N. Y. Active ingredients claimed coal tar creosote oils from coke oven tar 37 percent, petroleum oils 46 percent; with 17 percent inert matter.

Analysis was as follows:

Phenols	0.19 percent	
Oils	75.87	" "
Sulphonation test on oils	45.7	" unsulphonated

5038. *Niagara Tar Oil Wash Concentrate*. Niagara Sprayer & Chemical Co., Middleport, N. Y. Active ingredients claimed coal tar creosote oils from coke oven tar 83 percent; with 17 percent inert matter.

Analysis showed phenols 1.46 percent, tar oils 83.20 percent.

6146. *Reilly Transote Transparent Penetrating Creosote*. Reilly Tar and Chemical Corp., Indianapolis, Ind. Analysis indicated that the probable composition of this product was gasoline 84 percent and creosote oil 16 percent. Phenols found 3.15 percent.

696. *Straitar*. B. G. Pratt Co., New York

698. *Tarocide B*. Central Chemical Co., Baltimore, Md.

695. *Tar Oil*. Central Chemical Co., Baltimore, Md.

697. *Tar Oil Wash*. Niagara Sprayer & Chemical Co., Middleport, N. Y.

These four samples were examined for their distilling range. Analyses are given in Table II. The fractions boiling below 200° C in Nos. 696, 697 and 698 were mostly water.

TABLE II. DISTILLATION OF TAR OILS

No.	Initial Boiling Point	Percent Distilling					Residue
		Below 200°C	200-230°C	230-250°C	250-300°C	300-355°C	
696	99°	14.1	6.4	26.1	31.7	16.1	5.6
698	99°	16.1	5.3	5.2	12.2	19.6	41.6
695	119°	4.6	15.4	7.8	23.4	25.2	23.6
697	98.5°	19.5	5.7	8.6	18.5	24.5	23.2

Copper Preparations

1950. *Grasselli Copper Compound A*. Grasselli Chemical Co., Inc., New York, N. Y. The estimated composition of this product from the analysis was as follows:

Copper oxychloride (CuCl ₂ ·3CuO·4H ₂ O)	76.80 percent
" carbonate (CuCO ₃ ·Cu(OH) ₂)	5.40 "
Calcium carbonate (CaCO ₃)	15.99 "
Water (by difference)	1.81 "

1798. *Nichols Triangle Brand Z-O Copper Fungicide*. Nichols Copper Co., New York, N. Y. Claimed copper 25 percent, inert matter 75 percent. Copper found 27.36 percent. Estimated composition was as follows:

Copper silicate (CuSiO ₃)	60.09 percent
Aluminum silicate (Al ₂ (SiO ₃) ₂)	4.01 "
" oxide (Al ₂ O ₃)	7.78 "
" sulphate (Al ₂ (SO ₄) ₃)	2.18 "
Calcium " (CaSO ₄)	0.27 "
Sodium " (Na ₂ SO ₄)	4.58 "
Water of crystallization	21.08 "

9935. *25-75 Miller Dust*. Miller Chemical & Fertilizer Corporation, Baltimore, Md. Claimed: active ingredients copper sulphate (as monohydrate) 25 percent, equivalent to not less than 9.0 percent metallic copper; inert ingredients 75.0 percent.

Analysis showed copper 8.70 percent, equivalent to copper sulphate monohydrate 24.30 percent. The inert matter appeared to be air-slaked lime.

Fish Oils

5040. *Light Pressed Menhaden Fish Oil*. Apothecaries Hall, Waterbury, Conn., distributor. Analysis was as follows:

Saponification number	189
Iodine number	169
Specific gravity, 15° C.	0.931
Free fatty acids	1.51 percent

9819. *Menhaden Spray Fish Oil No. S640*. Wilbur-Ellis Co., Inc., New York, N. Y. Free fatty acids found, 1.21 percent.

Lime-Sulphur, Dry

5047. *Grasselli Grade Dry Lime Sulphur*. Grasselli Chemical Co., Inc., New York, N. Y. Analysis was as follows:

	Guaranteed Percent	Found Percent
Free sulphur	10.	10.92
Calcium polysulphide	70.	66.37
" thiosulphate	5.	5.24
" sulphate		0.20

Manganous Sulphate

8687. *Dusting and Spraying Grade 65% Manganese Sulphate*. Apothecaries Hall, Waterbury, Conn., distributor. Found: acid-insoluble matter 6.70 percent; manganous sulphate (MnSO₄) 65.62 percent.

8124. *Manganese Sulfate*. Apothecaries Hall, Waterbury, Conn., distributor. Analysis was as follows:

Manganous sulphate (MnSO ₄ ·4H ₂ O).....	71.50 percent
Sand.....	8.84 "
Ferric sulphate (Fe ₂ (SO ₄) ₃ ·5H ₂ O).....	4.90 "
Zinc " (ZnSO ₄ ·7H ₂ O).....	0.67 "
Sodium " (Na ₂ SO ₄ ·10H ₂ O).....	4.63 "
Calcium " (CaSO ₄ ·2H ₂ O).....	9.46 "
Passing 100 mesh sieve.....	50 "

Mineral Oils and Mineral Oil Emulsions

5977. *Lubricating Oil*. Manufacturer unknown. Examined for the Department of Entomology. Found: viscosity, 100° F., 117 seconds; unsulphonated 66.0 percent.

5981. *Sunoco Self-Emulsifying Spray*. Batch No. 310. Sun Oil Co., Philadelphia, Pa. Analysis showed 67.1 percent of oil with the following constants: specific gravity, 0.828; viscosity, 100° F., 147 seconds; unsulphonated, 58.4 percent.

2288. *Topaz Oil No. 13*. Atlantic Refining Co., Philadelphia, Pa. Analysis was as follows:

Specific gravity, 20° C.....	0.883
Viscosity, 100° F.....	155 seconds
Unsulphonated.....	76.7 percent
Evaporation, 24 hr., 60-65° C.....	2.22 percent
Cold test.....	+ 12° F.

Nicotine Preparations

Nine samples were examined for nicotine content. In the case of some of these, which were examined for growers, the manufacturers' names were not known. Analyses are given in Table III.

TABLE III. ANALYSES OF NICOTINE PREPARATIONS

Station No.	Manufacturer or Distributor and Brand	Nicotine	
		Guaranteed	Found
		%	%
6003	Apothecaries Hall Co., Waterbury, Conn. <i>Ground Tobacco Stems</i>		0.014
5682	John B. Cannon, Granby, Conn. <i>Tobacco Juice</i>		0.10
9898	S. Demontis Insecticide Co., Bridgeport, Conn. <i>Kater-Killer</i>	0.01	0.013
6004	Henry A. Fischel, Inc., Philadelphia, Pa. <i>Coldsmoke Dusting Powder</i>	1.00	1.03
6005	Henry A. Fischel, Inc., Philadelphia, Pa. <i>Florantin (regular)</i>		1.48
6018	Dwight R. Judson Co., Hartford, Conn. <i>Nicotine Sulphate 40%</i>	40	40.52
5983	Manufacturer unknown. <i>Nicotine Sulphate 50%</i>	50	49.10
77	" " <i>Nicotine Sulphate Solution</i> ..	95 ¹	93.18
42	" " <i>Tobacco Dust</i>		0.58

¹Nicotine sulphate.

Pyrethrum Preparations

830. *Cities Service Insecticide*. Cities Service Refining Co., Boston, Mass. This product appeared to be a kerosene extract of pyrethrum containing some methyl salicylate.

8577. *Cocroach Powder*. Manufacturer unknown. Appeared to be a mixture of pyrethrum powder and borax.

Rotenone Preparations

Fifteen samples were examined for rotenone content. Analyses are given in Table IV.

TABLE IV. ANALYSES OF ROTENONE PREPARATIONS

Station No.	Manufacturer or Distributor and Brand	Rotenone	
		Guaranteed	Found
		%	%
1825	Ansbacher-Siegle Corp., Brooklyn, N. Y. <i>Ansbacher's Triangle Brand Liquid Ku-Ba-Tox</i>		0.00
2512	Bonide Chemical Co., Utica, N. Y. <i>Bonox</i>		0.08
2728	Bonide Chemical Co., Utica, N. Y. <i>Bonox</i>		0.13
4509	Chipman Chemical Co., Inc., Bound Brook, N. J. <i>Cubor No. 100 TT Dust</i>		0.83
2057	Chipman Chemical Co., Inc., Bound Brook, N. J. <i>Cubor Rotenone and Pyrethrum Liquid Spray</i>		0.20
6086	General Chemical Co., Baltimore, Md. <i>Rotenone Dust</i>		1.13
6120	General Chemical Co., Baltimore, Md. <i>Rotenone Dust</i>	0.75	0.83
6131	General Chemical Co., Baltimore, Md. <i>Orchard Brand Veget-Aid Dust</i>	0.75	1.03
7011	Hammond Paint and Chemical Co., Beacon, N. Y. <i>Cubé Root Powder</i>		1.17
139	Manufacturer unknown. <i>Rotenone Dust (1% Rotenone)</i>	1	0.46
2729	McCormick & Co., Baltimore, Md. <i>McCormick's Japanese Beetle Spray</i>		3.72
7870	New Haven Coöperative, New Haven, Conn. <i>Rotenone Dust</i>	0.75	1.05
5995	Olds & Whipple, Hartford, Conn. <i>Cubé Dust—1% Rotenone</i>	1	1.00
185	Frank S. Platt Co., New Haven, Conn. <i>Rotenone Dust</i>	1	1.55
2058	Rototox Co., East Williston, N. Y. <i>Rototox Spray</i> ...		0.30

Soaps

5976. *Fish Oil Soap*. Silmo Chemical Co., Vineland, N. J. Found: water 73.3 percent; free fatty acids 0.19 percent.

9494. *Stanlex Spreader Soap*. Standard Chemical Products, Inc., Hoboken, N. J. Analysis showed free fatty acids 1.96 percent.

Sulphur

5974. *Koppers Flotation Sulphur*. Claimed active sulphur content not less than 40 percent. Analysis showed sulphur 47.49 percent.

5049. *Micronized Wettable Sulfur*. Micronizer Processing Co. Inc., Moorestown, N. J. Claimed active sulfur 95 percent. Sulphur found 95.33 percent.

5048. *Orchard Brand Apple Dri-tomic Sulphur with Sticker and Spreader*. General Chemical Co., Baltimore, Md. Analysis was as follows:

	Guaranteed percent	Found percent
Free sulphur	81.00	83.08
Sodium thiosulphate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$)	9.00	8.98

2230. *Sulphur Paste*. Manufacturer unknown. Examined for the Department of Botany. Analysis showed sulphur 76.53 percent.

Zinc Sulphate

5046. *Zinc Sulphate*. Manufacturer unknown. Examined for the Department of Entomology. Analysis showed zinc sulphate (ZnSO_4) 64.22 percent.

Miscellaneous

8101. *Casco Waterproof Glue*. Casein Mfg. Co., New York, N. Y. Analysis showed that this product was a casein glue containing some fluoride. The estimated composition from the analysis was as follows:

Water	8.62 percent
Casein	54.59 "
Calcium hydroxide ($\text{Ca}(\text{OH})_2$)	13.54 "
Trisodium phosphate (Na_3PO_4)	6.05 "
Other ash, including fluorides	8.13 "
Undetermined	9.17 "

7961. *Coc-Ci-Tox*. Ramson Chemical Co., Beaver Falls, Pa. Analysis showed that this product was essentially sodium nitrate colored blue. Found: sodium nitrate 98.19 percent; sodium chloride 0.26 percent; potassium as potassium oxide (K_2O) 0.08 percent.

8102. *Colloidal 77*. Colloidal Products Corporation. Calculated composition from the analysis was as follows:

Water	3.63 percent
Clay	66.04 "
Oil	1.25 "
Soap	13.92 "
Casein-lime	5.23 "
Undetermined	9.93 "

5037. *Dowspray Dormant*. Dow Chemical Co., Midland, Mich. Claimed active ingredients 100 percent; mineral oil not less than 96 percent; 2-4-dinitro-6-cyclohexylphenol not less than 4 percent.

Analysis showed cyclohexyldinitrophenol 3.82 percent; mineral oil 93.16 percent. Sulphonation test on the oil showed 59.4 percent unsulphonated.

5051. *Dowspray Dormant Emulsifier*. Dow Chemical Co., Midland, Mich. This sample was submitted by the Department of Entomology, which suspected it of being sulfite waste. Examination disclosed that it was largely clay. It was, however, similar in appearance to a known sample of sulfite waste; it developed a similar odor on heating; and chloroform extracted from it some brown resinous material (0.89 percent). Sulfite waste may therefore have been present, adsorbed on the clay.

The sample contained total sulphur 3.53 percent, and acid-insoluble ash 38.63 percent. On the basis of an average sulphur content of 6.25 percent for sulfite waste powder [Hurt, *Virginia Agr. Expt. Sta. Bul.* 277, 5 (1931)], the composition of this material may be calculated, with some reserve, as follows:

Sulfite waste	56.49 percent
Clay	38.63 "
Water	4.88 "

862. *E.D.E.* General Chemical Co., New York, N. Y. Claimed ethylene dichloride 85 percent, inert material 15 percent.

Analysis showed ethylene dichloride approximately 92 percent., emulsified with fish oil soap.

2290. *Elgetol*. Standard Chemical Products, Inc., Hoboken, N. J. Claimed active ingredients 34 percent; water 66 percent; "contents cresols".

The estimated composition of this product from the analysis is as follows:

3, 5 Dinitro-o-cresol sodium salt ($\text{C}_7\text{H}_5\text{N}_2\text{O}_5\text{Na}$)	22.29 percent
Sodium chromate ($\text{Na}_2\text{CrO}_4 \cdot 10\text{H}_2\text{O}$)	4.05 "
" sulphate ($\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$)	5.60 "
" carbonate ($\text{Na}_2\text{CO}_3 \cdot \text{H}_2\text{O}$)	1.04 "
Pyridine ($\text{C}_5\text{H}_5\text{N}$)	0.18 "
Water	66.84 "

2489. *Genecide*. General Chemical Co., Baltimore, Md. Analysis showed the following calculated composition for this product:

Water	0.88 percent
Clay	43.32 "
Phenol	trace
Xanthone and pink coloring matter	55.80 "

7902. *Insect Powder*. Anthony Depoto, New Haven, Conn. The composition of this product, calculated from the analysis, was as follows:

Borax	51.40 percent
Sugar	44.02 "
Water	4.58 "

7098. *Naaki*. Agricultural Insect Destruction Corporation, New York, N. Y. This product appeared to be pulverized quartz.

5090. *Sodium Stearyl Alcohol Sulfate*. E. I. duPont de Nemours & Co., Inc., Wilmington, Del. From the analysis the composition of this product was calculated to be as follows:

Sodium stearyl sulphate ($\text{CH}_3(\text{CH}_2)_{16}\text{CH}_2\text{OSO}_3\text{Na}$)..	64.96 percent
“ sulphate (Na_2SO_4).....	19.17 “
Water.....	0.95 “

5973. *Spray Catalizer Spreader-Sticker-Flocculator*. B. G. Pratt Co., New York, N. Y. Claimed active ingredients: sulphur, 61 percent; inert matter, 39 percent.

Analysis showed free sulphur 59.80 percent; manganous sulphate ($\text{MnSO}_4 \cdot 4\text{H}_2\text{O}$) 11.73 percent.

8100. *Spreadol*. Silmo Chemical Co., Vineland, N. J. Analysis showed water 70.8 percent.

9547. *Soap Stock Oil*. Crystal Soap & Chemical Co., Inc., Philadelphia, Pa. Analysis showed free fatty acids 90.64 percent.

9215-9218. *Terminix*. Manufacturers unknown. Flash points were determined for the Department of Entomology as follows:

Station No.	Flash Point
9215.....	126° F
9216.....	126° F
9217.....	136° F
9218.....	126° F