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Connecticut Agricultural Experiment Station

New Haven, Connecticut

Report on Commercial Insecticides and Fungicides 1925

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December, 1925

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Examination of Insecticides, Fungicides, Etc.

E. M. Bailey*

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.

During the past year our agent has collected samples of lead arsenate and other arsenicals, and miscellaneous materials; examinations have been made also of products submitted from time to time by the Department of Entomology, and the Department of Botany of this station.

CLASSIFICATION OF MATERIALS.

The samples analyzed may be classified as follows:

Materials	No. of samples
Lead Arsenate	15
Bordeaux-Lead Mixtures	5
Sulphur Preparations	6
Nicotine Preparations	7
Emulsions	3
Miscellaneous (including A. O. A. C. collaborative samples)	13

* Analytical data are by Messrs. Andrew and Fisher. Inspection and sampling by Mr. Churchill.

METHODS OF ANALYSIS.

The methods of analysis employed are those authorized by the Association of Official Agricultural Chemists unless otherwise stated.

RESULTS OF INSPECTION AND ANALYSIS.

Arsenate of Lead.

The specifications for arsenate of lead as defined in the law of this State are the same as those required by the Federal Insecticide Act.

Dry arsenate of lead must contain not less than twenty-five per cent of total arsenic oxide (As_2O_5), and arsenic in water-soluble forms not exceeding one and one-half per cent.

Arsenate of lead, not dry or powdered, may contain not more than fifty per cent of water; not more than seventy-five one-hundredths per cent of arsenic in water-soluble forms, expressed as arsenic oxide (As_2O_5); and not less than twelve and one-half per cent of total arsenic oxide (As_2O_5).

Analyses of the products examined are given in Table I.

TABLE I. *Analyses of Arsenate of Lead.*

Station No.	Brand, Manufacturer or Distributor.	Water.		Arsenic Oxide, As_2O_5				Lead-Oxide, PbO.		Station No.
				Total.		Water-Soluble.				
		Found.	Guaranteed not more than.	Found.	Guaranteed not less than.	Found.	Guaranteed not more than.	Found.	Guaranteed not less than.	
	Sampled by Station Agent.	%	%	%	%	%	%	%	%	
2479	Bowker's Insecticide Co., New York. *Bowker*	49.45	50.00	15.60	15.00	0.09	0.60	32.37	....	2479
2480	Chipman Chemical Eng. Co., New York. *Chipman* ..	....	....	31.10	30.00	0.23	1.07[1]	63.80	....	2480
2483	Chipman Chemical Eng. Co., New York. *Chipman* ..	....	....	30.89	30.00	0.18	1.07[1]	64.10	....	2483
2474	Grasselli Chem. Co., New York	....	....	31.32	31.00	0.18	1.15[1]	61.15	....	2474
2478	Grasselli Chem. Co., New York	....	....	30.67	31.00	0.14	1.15[1]	64.15	....	2478
2477	Interstate Chem. Co., Jersey City, N. J. *Key-Dry* ...	....	....	30.02	30.00	0.18	0.75	64.50	....	2477
2484	The Kil-tone Company, Vineland, N. J.	....	....	30.24	30.00	0.18	1.15[1]	63.55	....	2484
2464	Niagara Sprayer Co., Middleport, N. Y. *Niagara* ...	....	....	31.54	30.00	0.18	1.15[1]	64.35	....	2464
2470	Nitrate Agencies Co., New York. *Naco*	....	....	30.24	30.00	0.37	1.00	65.95	62.00	2470
2525	Pittsburgh Plate Glass Co., Newark, N. J. *Corona Dry*	....	....	31.86	....	0.14	...	65.65	....	2525
2471	Riches Piver & Co., New York	35.17	50.00	20.02	15.00	0.18	0.50	41.80	31.00	2471
2473	Sherwin-Williams Co., Cleveland, Ohio	....	....	31.86	30.00	0.18	1.00	65.00	....	2473
2472	D. B. Smith & Co., Utica, N. Y. *Lightening*	....	....	31.05	30.00	0.18	0.77[1]	63.30	....	2472
	Sampled by Purchaser or Manufacturer.									
2482	Vreeland Chemical Mfg. Co., Little Falls, N. Y. *Electro.* Mfr's sample	....	....	30.24	30.00	0.18	0.77[1]	64.40	....	2482
2390	G. A. Clyne, Waterbury. Purchaser's sample	....	....	....	....	0.11	...	....	....	2390

[1] Calculated from amount guaranteed as metallic arsenic.

Bordeaux-Lead Arsenate, etc.

2465. *Pyrox.* Bowker Chemical Co., New York.

2467. *Bordo-Lead.* Chipman Chemical and Engineering Co., New York.

2481. *Bordo-Arsenate.* Glidden Co., Cleveland, Ohio.

2468. *Hexpo.* H. J. Smith Co., Utica, N. Y.

2466. *Bordo-Lead Mixture.* Vreeland Chemical Mfg. Co., New York.

Analyses are given in Table II.

Table II. *Analyses of Bordeaux-Lead Arsenate, etc.*

No.	Condition.	Water.	Arsenic Oxide, As_2O_5.				Copper Oxide, CuO.	Lead Oxide, PbO.
			Total.		Water-Soluble.			
			Found.	Guaranteed, not less than.	Found.	Guaranteed, not more than.		
		%	%	%	%	%	%	%
2465	Paste	65.95	5.57	5.00[1]	0.06	0.46[1]	8.39	1.28
2467	Dry	....	8.73	7.29[1]	0.18	0.38[1]	20.62	15.24
2481	Dry	....	14.77	5.90	0.18	0.50[1]	16.66	26.64
2468	Dry	....	8.37	6.90	0.28	0.50[1]	22.62	18.89
2466	Paste	44.23	8.91	5.58	0.11	0.78[1]	3.22	18.32

[1] Calculated from amount guaranteed as metallic arsenic.

Sulphur Preparations.

2506. *Sulfocide.* B. S. Pratt Co., New York. This product was labeled: Sodium polysulphide 39-40 per cent; sodium thiosulphate 1-2 per cent; inert ingredients 58-60 per cent.

Analysis showed the following composition:

Total sulphur	33.78	per cent
Sulphur as monosulphide	7.79	" "
Sulphur as thiosulphate	2.56	" "
Sulphur as sulphate	0.25	" "
Polysulphide sulphur (by difference)	23.18	" "
Equivalent to sodium polysulphide	38.48	" "

Sodium polysulphide is assumed to be the pentasulphide in the above calculation.

2518. *Niagara Pomodust.* Niagara Sprayer Co., Middleport, N. Y. The active ingredients claimed are sulphur not less than 87 per cent; arsenic (metallic), not less than 1.76 per cent; arsenic, water-soluble (metallic), not more than 0.50 per cent.

Analysis showed the following:

Total arsenic (metallic)	1.84	per cent
Water soluble arsenic (metallic)	0.12	" "
Total sulphur	89.73	" "

22695. *Sulphur-Arsenate Dust* 90-10; and **22696**, *Sulphur-Arsenate Dust* 83-15. John Bacon, Gasport, N. Y.

Analyses were made as follows:

	22695		22696	
	Found.	Guaranteed.	Found.	Guaranteed.
	%	%	%	%
Total arsenic as As_2O_5	2.85	....	3.74	....
as As	1.86	1.90	2.44	2.80
Water sol. arsenic as As_2O_5	0.17	....	0.22	....
as As	0.11	0.10	0.14	0.15
Total sulphur[1]	88.27	88.50	84.75	83.00

[1] Sulphur determined by the U. S. P. method IX, and sulphur in the undissolved residue by the A. O. A. C. method, Sec. 19, p. 20.

2551. *Sulphur Dust.* Sample submitted by Department of Entomology and examined for presence of lead arsenate. Qualitative tests showed presence of both arsenic and lead.

1855. *Lime-sulphur.* (Blanchard's). **1856.** Grasselli's. Samples were submitted by a purchaser and the following determinations were made.

	No. 1855	No. 1856
	%	%
Specific gravity at 22° C.	1.2333	1.3080
Baumé degrees	27.4	34.10
Total sulphur	19.62	26.35

Nicotine Preparations.

2476. *Black Leaf 40.* Tobacco By-Products and Chemical Corporation, Louisville, Ky. Active ingredient nicotine, 40 per cent. Nicotine found 40.93 per cent.

2517. *Niagara A 1 Dust.* Niagara Sprayer Co., Middleport, N. Y. Claimed to contain 2.7 per cent of nicotine. Nicotine found 2.78 per cent.

2469. *Hall's Nicotine Sulphate Solution,* 40 per cent nicotine. Hall Tobacco Chemical Co., St. Louis, Mo. Nicotine found 40.61 per cent.

2919. *Nico Fume* (Liquid). Tobacco By-Products and Chemical Corporation, Inc., Louisville, Ky. Claimed to contain 40 per cent free nicotine. The product contained 42.90 per cent.

2920. *Nico Fume* Tobacco Powder. Tobacco By-Products and Chemical Corporation, Inc., Louisville, Ky. This product was guaranteed to contain 12.5 per cent nicotine and the package was dated to indicate the time after which the above guaranty would not hold. The sample was purchased after the expiration of the period indicated, but attention was called to that fact by the dealer and the article was sold at a reduced price. The nicotine

found was 12.71 per cent, indicating that the precaution on the label gave the manufacturer an ample margin of safety.

22371. *Tobacco Dust.* Submitted by E. M. Ives, Meriden.

Analysis:

Nicotine found	0.71%
Passed 200 mesh	96.00%

1300. Nicotine Dust. (Old Sample.) Submitted by Department of Entomology.

Analysis: Nicotine found 1.96%

Spray Emulsions.

1465. *Soluble Spray Oil* for dormant spraying. Clarkson & Ford, New York. Sample submitted by the Lyman Farm, Middlefield, Conn.

Partial analysis was made as follows:

	%
Specific gravity 25° C.	0.9333
Unsaponifiable	85.10
Rosin	present

The mixture is a light petroleum oil containing a sodium soap, probably sodium rosinate.

2507. *Pratt's Carboleine.* B. G. Pratt, 50 Church St., N. Y. Sample submitted by the Department of Entomology of this Station.

Analysis	Found. %	Guaranteed. %
Oil	88.74	86.00
Phenol	present	3.00
Ash	1.22	....
Water, determined by xylol, 11.17, by difference	10.04	....

The product was claimed to contain 83 per cent mineral oil and 3 per cent saponifiable oil. Potassium oxide was claimed to be 1 per cent.

2508. *Anthracine Oil Emulsion.* The Sherwin-Williams Co. Sample submitted by Department of Entomology. Claimed to contain anthracene oil 75 per cent, fish oil soap 3 per cent, water 22 per cent.

Analysis:

Total oil	72.63 per cent
Water (xylol method)	25.08 " "
Soap and undetermined	2.29 " "

MISCELLANEOUS.

2475. *Kayso.* Golden State Sales Corp., New York.

Analysis:

Nitrogen	3.30%
Casein (N x 6.38)	21.05
Lime (CaO)	44.32

1600. *Lead arsenate* coated with lead stearate for experimental purposes (by Department of Entomology) was found not to have increased in water-soluble arsenic during the period of one year. At the two intervals the results for water-soluble arsenic (as As_2O_5) found were 0.09 in both cases.

2514. *Calcium Fluosilicate Compound.* Victor Chemical Works, New York. Submitted by Department of Entomology. Claimed to contain calcium fluosilicate not less than 15 per cent and inert ingredients not over 85 per cent.

Partial analysis was made as follows:

Phosphorus pentoxide (P_2O_5)	28.37%
Calcium oxide (CaO)	21.80
Iron and aluminum oxides ($Al_2O_3Fe_2O_3$)	20.60
Silica (SiO_2)	11.00
Flourine (F)	11.95

2505. *Atlas "A" Weed Killer.* Chipman Chemical Co., New York. Labelled as containing 45 per cent of sodium arsenite equivalent to 4 pounds arsenic trioxide per gallon.

Analysis:

Total arsenic found (as metallic)	23.67%
Calc. as sodium arsenite (Na_2HAsO_3)	53.64

23420, 23421, 23422, 23423 and **23426.** Experimental mixtures examined for the Department of Entomology.

Water-soluble arsenic only was determined.

2591 and **2592,** *Fish Oil Soaps;* and **2593** and **2594,** Engine oil emulsion and Kerosene emulsion respectively. These were examined in collaboration with the A. O. A. C. referee's program for study of methods of analysis.

The results obtained are reported elsewhere[1] but they are summarized here for reference.

	2591	2592
	%	%
Water, Xylol method	29.95	32.66
	29.96	32.49
Official method	30.00	32.06
	29.92	32.08

[1] Proceedings, A. O. A. C. 1925.

	2593	2594
	%	%
Ash	1.04	0.29
	1.08	0.28
Water (xylol method)	33.22	36.71
	33.28	36.93
Total Oil	65.26	63.40
	65.90	62.70
Potash (K_2O)	0.63	....
	0.65	....
Soda (Na_2O)	....	0.14
	....	0.15

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(Including analyses, etc., previous to 1925. Citations are to the annual report of the station for the years indicated.)