

U. S. DEPARTMENT OF COMMERCE

National Bureau of Standards

Certificate of Analyses

OF

STANDARD SAMPLE 56a

PHOSPHATE ROCK

(Tennessee Brown)

(All results are based on a sample dried for 1 hour at 105° C^a)

Analyst ^a	P ₂ O ₅	Total Fe ₂ O ₃	Total Al ₂ O ₃	Soluble Fe ₂ O ₃	Soluble Al ₂ O ₃	CaO	MgO	F	SiO ₂	MnO	Na ₂ O	K ₂ O	Total sulfur as SO ₂	TiO ₂
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1	{ 32.90 32.88 32.96	2.14	2.03	2.14	1.77	45.62	0.14	3.49	11.02	0.18	0.30	0.25	0.73	0.09
2	33.20													
3	32.85	2.24	2.12	4.20		45.36	.18		11.50					
4	33.15			2.11	1.88	45.49	.10							
5	33.26			2.17	1.90	45.56								
6	33.12			2.11	1.87	45.48	.12							
7	32.82	2.14	1.98			45.48	.12	3.53	10.92	.18	.24	.31	.73	.08
8	{ 32.90 32.83					45.85	.18							
9	33.17	2.23	2.04	2.12	1.94	45.55	.13	3.66	10.60	.19	.31	.29	.72	.07
10	33.05	2.16	1.93				.12							
Averages	33.01	2.18	2.02	2.13	1.87	45.55	.14	3.56	11.01	.18	.28	.28	.73	.08

^aSeven analysts reported an average of 0.53% of moisture, obtained by drying for 1 hour at 105° C. The results varied from 0.36 to 0.64%. Not much significance is to be attached to these values because the moisture content changes with atmospheric conditions.

^bGravimetric.—Precipitation with molybdate followed by two precipitations with magnesia mixture (J. Assn. Official Agr. Chem. 8, 195 (1924)).

^cGravimetric.—Two precipitations with magnesia mixture without preliminary precipitation with molybdate (J. Research NBS 19, 59 (1937) RP1010).

^dAOAC, volumetric.

^eAOAC, gravimetric.

^fGravimetric.—Single precipitation with magnesia mixture after molybdate precipitation (J. Assn. Official Agr. Chem. 8, 194 (1924)).

^gSpecial work at the National Bureau of Standards, and a careful consideration of all the methods employed indicate that 32.90 should be regarded as the most probable percentage of P₂O₅ in this sample.

^hThe percentages for soluble Fe₂O₃ and Al₂O₃ represent the amounts dissolved by transferring a 2.5-g sample to a 250-ml. flask, adding 50 ml. of diluted HCl (1+1) containing 1-g of H₃BO₃, covering the neck of the flask with a cover glass and boiling vigorously for 30 minutes.

ⁱSpecial work at the National Bureau of Standards indicates that an uncertainty of at least ±0.2% should be assigned to this value.

Analyst 1 also found 0.002% of CuO, 0.0005% of NiO, 0.0002% of MoO₃, 0.001% of SnO₂, 0.001% of Cr₂O₃, and no V₂O₅ in a 10-g sample.

Analyst 7 also reported 0.005% of B₂O₃. B. F. Scribner of the spectroscopy section of the National Bureau of Standards found 0.005% of B₂O₃, spectrochemically. Analyst 9 also reported 1.56% of CO₂, 0.26% of organic matter, 0.0021% of As₂O₃, and 0.39% of combined water.

For additional information on the methods used in the analysis of this material and on the determination of some minor constituents, see an article by James I. Hoffman and G. E. F. Lundell in the Journal of Research of the National Bureau of Standards 20, 607-626 (1938) RP1095.

* LIST OF ANALYSTS

1. James I. Hoffman, National Bureau of Standards, Washington, D. C.
2. E. W. Magruder, Chief Chemist, and W. A. Ryder, F. S. Royster Guano Co., Norfolk, Va.
3. W. Catesby Jones, Chief Chemist, John H. Elder, and James R. Lindsay, Commonwealth of Virginia, Department of Agriculture and Immigration, Richmond, Va.
4. C. A. Butt, Chief Chemist, and C. M. Cartledge, International Agricultural Corporation, East Point, Ga.
5. W. E. Dickinson, Chief Chemist, International Agricultural Corporation, Norfolk, Va.
6. P. McG. Shuey, Shuey & Co., Savannah, Ga.

7. W. L. Hill, L. F. Rader, Jr., T. H. Tremearne, H. L. Marshall, and D. S. Reynolds, phosphate section, Fertilizer Research Division, Bureau of Chemistry and Soils, U. S. Department of Agriculture, Washington, D. C.
8. John B. Smith, Chief Chemist, W. L. Adams, and E. J. Deszyck, Rhode Island State College Agricultural Experiment Station, Kingston, R. I.
9. Egbert Janes, Chief Chemist, and H. H. Edwards, International Agricultural Corporation, Mulberry, Fla.
10. L. E. Dupont, Chief Chemist, International Agricultural Corporation, Wales, Tenn.

Washington, D. C.
April 4, 1939

U. S. GOVERNMENT PRINTING OFFICE 144703

LYMAN J. BRIGGS,
Director.