

PB-225 808

REPORT ON MUSCLE SHOALS GREENHOUSE
EXPERIMENTS 226-C AND 226-D: RESPONSE
OF RICE TO Zn SOURCES

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Tennessee Valley Authority

Prepared for:

Agency for International Development

January 1972

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PB 225 808

633.18-B 497

"Response of Rice to Zn Sources"

JAN. 1972

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TENNESSEE Valley Authority
OFFICE OF AGRIC. & CHEMICAL DEVEL.
MUSCLE SHOALS, ALA. 35660

10. Project/Fund/Work Unit No.

931-17-198-494

11. Contract/Grant No.

PASA RA (QA)5-69

12. Sponsoring Organization Name and Address

Department of State
Agency for International Development
Washington, D.C. 20523

13. Type of Report & Period Covered

RESEARCH PAPER

15. Supplementary Notes

16. Abstracts
Experiment 226-C

Several finely ground sources of Zn were mixed with limed Crowley sil (pH 7.5). Blue-belle rice was grown to maturity under continuous flooding. There was essentially no increase in yield of straw or grain with any source of applied Zn. Also, Zn content of grain was unaffected by Zn application. Only ZnO increased the uptake of Zn by rice straw when applied at a rate of 1 ppm; ZnO·ZnSO₄ (60% H₂O-soluble) also increased uptake when applied at 4 ppm Zn. Despite the poor response to Zn in this experiment, there is further evidence that Zn is probably a superior source of Zn for flooded rice.

Experiment 226-D

Six granular macronutrient fertilizers containing 2% Zn as ZnO were applied to limed Crowley sil (pH 7.5). Direct-seeded Bluebelle rice was grown to maturity under continuous flooding. Although there appeared to be a slight yield response with both straw and grain at the 4 ppm over the 1 ppm rate of Zn, the check values were generally highest. Similarly, Zn uptake by the no-Zn check plants was greater than by the Zn-treated plants. Possibly Zn contamination of the checks may have occurred.

17. Index and Open-Ended Terms

633

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U S Department of Commerce
Springfield VA 22151

17. Report CLASSIFIED
20 security page UNCLASSIFIED

21. No. of pages 5
22. Price \$6.30 - 1.45

Report on Muscle Shoals Greenhouse Experiments 226-C and 226-D:

RESPONSE OF RICE TO Zn SOURCES

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January 1972

SUMMARYExperiment 226-C

Several finely ground sources of Zn were mixed with limed Crowley sil (pH 7.5). Bluebelle rice was grown to maturity under continuous flooding. There was essentially no increase in yield of straw or grain with any source of applied Zn. Also, Zn content of grain was unaffected by Zn application. Only ZnO increased the uptake of Zn by rice straw when applied at a rate of 1 ppm; ZnO·ZnSO₄ (60% H₂O-soluble) also increased uptake when applied at 4 ppm Zn. Despite the poor response to Zn in this experiment, there is further evidence that ZnO is probably a superior source of Zn for flooded rice.

Experiment 226-D

Six granular macronutrient fertilizers containing 2% Zn as ZnO were applied to limed Crowley sil (pH 7.5). Direct-seeded Bluebelle rice was grown to maturity under continuous flooding. Although there appeared to be a slight yield response with both straw and grain at the 4 ppm over the 1 ppm rate of Zn, the check values were generally highest. Similarly, Zn uptake by the no-Zn check plants was greater than by the Zn-treated plants. Possibly Zn contamination of the checks may have occurred.

Yield and Uptake of Zn and P in Straw and Grain of Bluebelle Rice, As Affected by Various Rates and Sources of Zn (Experiment 226-C).

Source of Zn	Rate of Zn, mg/2.5 kg soil	Straw			Grain		
		Yield g/pot	Uptake, mg/pot		Yield g/pot	Uptake, mg/pot	
			Zn	P		Zn	P
ZnO	2.5	35.2	1.30	26	25.9	2.75	102
	10.0	37.6	1.59	24	26.4	2.51	78
ZnSO ₄	2.5	33.8	0.80	25	26.4	2.50	92
	10.0	34.3	1.17	22	27.0	2.76	88
ZnS	2.5	32.7	0.86	22	23.8	2.39	87
	10.0	32.5	0.73	21	25.7	2.28	99
ZnEDTA	2.5	34.2	0.96	24	26.4	2.66	105
	10.0	34.8	0.92	24	27.3	2.24	85
Zn Rayplex	2.5	34.2	0.72	24	25.8	2.70	95
	10.0	34.1	1.11	23	25.9	2.76	100
ZnO·ZnSO ₄ (10% H ₂ O soluble)	2.5	33.4	0.75	25	23.6	2.77	87
	10.0	34.5	1.13	25	27.6	2.57	68
ZnO·ZnSO ₄ (60% H ₂ O soluble)	2.5	32.8	0.89	25	25.3	2.32	99
	10.0	34.3	1.34	24	27.7	2.63	98
No Zn	--	34.2	1.05	28	25.8	2.56	92

Yield and Uptake of Zn and P in Straw and Grain of Bluebelle Rice, As Affected by Various Rates of Zn as ZnO in Macronutrient Fertilizers (Experiment 226-D).

Carrier of Zn*	Rate of Zn, mg/2.5 kg soil	Straw			Grain		
		Yield g/pot	Uptake, mg/pot		Yield g/pot	Uptake, mg/pot	
			Zn	P		Zn	P
UAP (38-13-0)	2.5	31.9	0.82	28	20.3	1.66	62
	10.0	31.7	1.03	27	22.8	2.14	78
UAPP (38-13-0)	2.5	30.8	0.67	25	22.0	1.82	73
	10.0	32.0	0.98	31	23.9	2.02	86
Urea (46-0-0)	2.5	32.1	0.66	27	21.9	1.94	85
	10.0	33.5	0.87	24	24.8	2.35	84
SCU (38-0-0)	2.5	33.1	0.67	30	21.9	1.97	82
	10.0	36.6	0.72	34	25.1	2.25	84
UAS (33-0-0)	2.5	32.0	0.76	25	24.3	2.11	84
	10.0	33.4	0.98	29	25.9	2.24	86
AS (21-0-0)	2.5	33.8	0.98	38	24.6	2.38	85
	10.0	34.2	1.05	32	24.0	2.07	83
No Zn	--	34.2	1.05	28	25.8	2.56	92

*Zn incorporated with carriers to provide 2% Zn.