

# Recent Studies Show the Beneficial Effects of Including Rock Phosphate in Conventional Fertility Plans

**Blending soluble P fertilizer with rock phosphate is more beneficial than the application of soluble P fertilizer alone.**

Phosphorus fertilizers increase productivity of rice. According to Sarkar, et. al., 2018; Rock Phosphate, applied with SSP fertilizers enhance plant growth and yield in rice on acidic soils (pH 5.5). Rice yield was maximized at T<sub>5</sub>: 50% RP and 50% SSP; and T<sub>6</sub>: 75% RP and 25% SSP.

**Table 1:** Plant height (cm), Number of tillers per hill, Dry matter yield (g hill<sup>-1</sup>) and Grain yield (g hill<sup>-1</sup>) of paddy grown in soil fertilized with single super phosphate and rock phosphate

Treatments	Plant height (cm)					Number of tillers per hill					Dry matter yield (g hill <sup>-1</sup> )					Grain yield (g hill <sup>-1</sup> )
	25 DAT	50 DAT	75 DAT	100 DAT	Harvest	25 DAT	50 DAT	75 DAT	100 DAT	Harvest	25 DAT	50 DAT	75 DAT	100 DAT	Harvest	
T <sub>1</sub>	34	61.7	88.7	92.7	94.3	2	4	7	7	7	6.17	10.47	16.13	23.27	26.83	21.33
T <sub>2</sub>	47.7	79.3	99.7	104.3	104.7	3	5	8	8	8	7.17	12.20	19.57	26.40	29.87	33.33
T <sub>3</sub>	43.7	73.0	96.7	100.0	101.7	3	6	10	10	10	7.60	13.63	20.37	28.17	32.40	25.67
T <sub>4</sub>	44.3	76.3	97.3	101.0	102.3	3	5	8	8	8	8.03	12.80	19.67	27.10	30.53	28.00
T <sub>5</sub>	50	84	105.6	107.2	110.7	4	6	9	9	9	8.17	13.73	19.87	28.23	33.67	36.33
T <sub>6</sub>	48.3	82.0	103.3	105.1	106.9	4	6	10	10	10	7.73	12.83	20.40	28.33	32.57	34.67
S.E.(d±)	0.82	1.41	1.83	1.89	1.92	0.42	0.29	0.39	0.39	0.39	0.14	0.23	0.36	0.50	0.57	0.53
CD(p=0.05)	1.82	3.13	4.07	4.22	4.28	0.94	0.64	0.88	0.88	0.88	0.32	0.52	0.80	1.11	1.27	1.19

T<sub>1</sub>= Control, T<sub>2</sub>= 100% Recommended Dose (RD) of P<sub>2</sub>O<sub>5</sub> from SSP, T<sub>3</sub>= 100% RD of P<sub>2</sub>O<sub>5</sub> from RP, T<sub>4</sub>= 75% RD of P<sub>2</sub>O<sub>5</sub> from SSP + 25% RD of P<sub>2</sub>O<sub>5</sub> from RP, T<sub>5</sub>= 50% RD of P<sub>2</sub>O<sub>5</sub> from SSP + 50% RD of P<sub>2</sub>O<sub>5</sub> from RP, T<sub>6</sub>= 25% RD of P<sub>2</sub>O<sub>5</sub> from SSP + 75% RD of P<sub>2</sub>O<sub>5</sub> from RP, DAT= Days after transplanting

Sudip Sarkar, N Surbala Devi, Abhinandan Singh and I Yimjenjang Longkumer. Effect of single super phosphate and rock phosphate on growth & yield of rice. *Journal of Pharmacognosy and Phytochemistry* 2018; 7(2): 3654-3656

Phosphorus use efficiency ranges from 10-25% in alkaline and calcareous soils. Arfan-ul-Haq, et. al., 2020 show that a blend of 50% composted rock phosphate and manure with phosphate solubilizing bacteria and 50% blend of DAP increased wheat yield 21% over 100% DAP alone on a 7.8 pH soil. This combination also increased N, P and K content of the grain, by 34%, 71% and 29%, respectively and more than doubled total P plant uptake versus 100% DAP alone.

**Table 3(a).** Effect of Combinations of B-RP and DAP on agronomic parameters of wheat.

Treatments	Plant height (cm)	Spike length (cm)	Number of fertile tillers m <sup>-2</sup>	Flag leaf length (cm)	1000 grain weight (g)	Biological yield (kg ha <sup>-1</sup> )	Grain yield (kg ha <sup>-1</sup> )	Straw yield (kg ha <sup>-1</sup> )
Control (00%P)	68.7f	9.0e	175h	12.7e	27.8d	5931g	2414f	3518h
RP (100%P)	72.7f	10.7de	196gh	15.3de	29.4d	6297g	2605f	3692gh
AM (100%P)	82.3e	12.3c-e	241fg	18.7cd	33.2d	7308f	3226e	4083fg
PM (100%P)	90.3de	12.7cd	274ef	19.3cd	34.3d	7594f	3282e	4311ef
B-RP (100%P)	96.7cd	14.3bc	312de	20.7c	41.8c	8662e	3941d	4721de
B-RP (75%P)+DAP (25%P)	104.0bc	15.3bc	352cd	22.3c	45.8bc	9187d	4172cd	5014cd
B-RP (50%P)+DAP (50%P)	120.3a	19.7a	480a	29.7a	55.7a	11495a	5130a	6365a
B-RP (25%P)+DAP (75%P)	113.0ab	17.3ab	425b	27.7ab	50.2ab	10529b	4658b	5871b
DAP (100%P)	106.3b	15.7bc	382bc	23.3bc	48.0bc	9594c	4336bc	5258c
HSD	9.60	3.36	49.96	4.94	7.21	367.9	394.4	422.7

**Table 3(b).** Effect of combinations of B-RP and DAP on NPK contents of wheat grain and straw.

Treatments	Grain N (%)	Grain P (%)	Grain K (%)	Straw N (%)	Straw P (%)	Straw K (%)	Total P-uptake (kg ha <sup>-1</sup> )	PUE / RE (%)
Control (00 % P)	1.083e	0.068f	0.769g	0.750f	0.057e	1.207e	3.65f	0.0f
RP 100 % P)	1.170e	0.076f	0.780g	0.800f	0.077e	1.223e	4.84f	1.3f
AM (100 % P)	1.393d	0.152e	0.934f	1.117e	0.133d	1.467d	10.32e	7.4e
PM (100 % P)	1.570d	0.163de	1.005e	1.240de	0.146d	1.508d	11.64e	8.9e
B-RP (100 % P)	1.767c	0.191d	1.226d	1.333c-e	0.162d	1.907c	16.66d	14.4d
B-RP (75%P)+DAP (25%P)	1.997b	0.228c	1.326c	1.560bc	0.209c	2.120bc	18.93cd	17.0cd
B-RP (50%P)+DAP (50%P)	2.500a	0.399a	1.597a	1.957a	0.343a	2.583a	42.29a	42.9a
B-RP (25%P)+DAP (75%P)	2.357a	0.359b	1.390b	1.727ab	0.287b	2.302b	33.57b	33.2b
DAP (100 % P)	1.863bc	0.233c	1.234d	1.397cd	0.208c	2.063c	21.07c	19.3c
HSD	0.191	0.032	0.039	0.272	0.036	0.234	2.478	2.754

Muhammad Arfan-ul-Haq, \*, Muhammad Yaseen1, Muhammad Naveed1 and Muhammad Shahid. ASSESSMENT OF COMBINATIONS OF BIO-ACTIVATED ROCK-PHOSPHATE AND DI-AMMONIUM PHOSPHATE ON PHOSPHORUS USE EFFICIENCY, GROWTH AND YIELD OF WHEAT (*Triticum aestivum* L.). *Pak. J. Agri. Sci.*, Vol. 57(6), 1521-1528; 2020.