

[10.1071/SR24008](https://doi.org/10.1071/SR24008)

*Soil Research*

### **Supplementary Material**

#### **Extractant efficacy in assessing bioavailable phosphorus in tropical soils fertilised with alternative sources and cultivated with maize**

*Rodrigo Nogueira de Sousa<sup>A,\*</sup>, and Luís Reynaldo Ferracciú Alleoni<sup>A</sup>*

<sup>A</sup>Department of Soil Science, Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo (USP), Piracicaba, SP 13418-900, Brazil.

\*Correspondence to: Rodrigo Nogueira de Sousa Department of Soil Science, Luiz de Queiroz College of Agriculture (ESALQ), University of São Paulo (USP), Piracicaba, SP 13418-900, Brazil Email: rodrigoagroufv@gmail.com

**Supplementary material**

Table S1. Chemical parameters of the soils after harvest at 1<sup>st</sup> and 2<sup>nd</sup> crop.

Cycle	Soil	Source	pH	pH	K <sup>+</sup>	Ca <sup>2+</sup>	Mg <sup>2+</sup>	Al <sup>3+</sup>	H + Al
			CaCl <sub>2</sub>	H <sub>2</sub> O					
-----mmolc dm <sup>-3</sup> -----									
1 <sup>st</sup> crop	Sandy loamy	Control	5.2 ± 0.03	6.5 ± 0.07	3.5 ± 0.05	14.5 ± 0.08	7.8 ± 0.1	2.3 ± 0.04	94.7 ± 2.0
		OM	5.3 ± 0.02	6.5 ± 0.05	2.4 ± 0.03	19.2 ± 0.05	4.7 ± 0.04	1.9 ± 0.1	85.3 ± 1.6
		Est	5.2 ± 0.06	6.3 ± 0.05	3.2 ± 0.03	14.0 ± 0.1	7.7 ± 0.1	7.4 ± 0.2	91.6 ± 1.8
		ThermoP	5.7 ± 0.02	6.7 ± 0.02	2.5 ± 0.02	19.0 ± 0.01	4.5 ± 0.06	0.8 ± 0.02	56.5 ± 1.2
		TSP	5.0 ± 0.04	6.4 ± 0.04	2.5 ± 0.02	19.2 ± 0.2	4.5 ± 0.07	5.1 ± 0.1	118 ± 1.5
	Clayey	Control	4.7 ± 0.05	5.8 ± 0.02	1.6 ± 0.06	23.5 ± 0.3	7.7 ± 0.03	4.8 ± 0.07	138 ± 2.1
		OM	5.0 ± 0.04	5.8 ± 0.05	1.1 ± 0.03	28.7 ± 0.3	5.2 ± 0.1	5.5 ± 0.05	121 ± 0.2
		Est	5.1 ± 0.03	5.9 ± 0.02	1.0 ± 0.01	27.5 ± 0.2	8.0 ± 0.1	5.3 ± 0.08	109 ± 2.2
		ThermoP	5.1 ± 0.02	6.0 ± 0.06	1.1 ± 0.03	26.0 ± 0.1	7.0 ± 0.08	1.8 ± 0.1	97.6 ± 2.3
		TSP	4.9 ± 0.02	5.9 ± 0.02	0.9 ± 0.01	22.5 ± 0.2	4.9 ± 0.02	10.2 ± 0.08	132 ± 1.4
2 <sup>nd</sup> crop	Sandy loamy	Control	4.3 + 0.08	5.4 + 0.1	0.8 + 0.03	13.5 + 0.1	5.0 + 0.1	2.3 + 0.1	92 + 1.0
		OM	4.4 + 0.04	5.2 + 0.04	0.5 + 0.01	14.5 + 0.1	2.8 + 0.03	1.4 + 0.02	86.2 + 2.6
		Est	4.4 + 0.04	5.2 + 0.04	0.4 + 0.01	10.5 + 0.1	5.0 + 0.03	1.5 + 0.08	87.6 + 1.4
		ThermoP	5.0 + 0.06	6.0 + 0.02	0.4 + 0.01	23.7 + 0.3	5.5 + 0.03	0.9 + 0.06	66.4 + 0.6
		TSP	4.2 + 0.04	4.8 + 0.06	0.4 + 0.01	14.5 + 0.1	3.0 + 0.02	1.5 + 0.02	87.4 + 0.7
	Clayey	Control	4.2 + 0.02	5.0 + 0.04	0.5 + 0.01	21.0 + 0.2	5.2 + 0.03	3.1 + 0.1	113 + 2.6
		OM	4.4 + 0.04	5.0 + 0.02	0.4 + 0.01	26.2 + 0.3	4.5 + 0.08	1.9 + 0.1	86 + 2.8
		Est	4.5 + 0.02	5.2 + 0.08	0.4 + 0.01	23.7 + 0.2	7.5 + 0.09	2.5 + 0.07	83.7 + 1.6
		ThermoP	4.6 + 0.02	5.4 + 0.02	0.4 + 0.01	34.5 + 0.5	6.2 + 0.02	1.3 + 0.04	62.4 + 1.4
		TSP	4.2 + 0.02	5.1 + 0.02	0.4 + 0.03	22.0 + 0.4	4.0 + 0.09	4.6 + 0.08	112.9 + 2.8

Treatments are Control: without P fertilization; OM: Organomineral; Est: Struvite; ThermoP: Thermophosphate and TSP: Triple Superphosphate

**Table S2.** Sorption isotherm parameters of the Freundlich and Langmuir models for phosphorus applied in sandy and clay soils.  $Q_{max}$  = maximum P sorption capacity, and  $K_f$  = P sorption coefficient

Soil texture	Freundlich				Langmuir			
	$K_f$	$1/n$	$R^2$	$p$ -value	$K_l$	$q_{max}$	$R^2$	$p$ -value
	( $\text{mg}^{(1-1/n)} \text{L}^{1/n} \text{kg}^{-1}$ )				( $\text{L kg}^{-1}$ )	( $\text{mg kg}^{-1}$ )		
Sandy	31.87	0.35	0.95	0.0002	18.07	290.25	0.92	0.0007
Clay	106.28	0.30	0.88	0.0017	10.97	515.78	0.95	0.0001