

Supplementary file

Ensuring quality of the analytical process in a research laboratory

Table S1. Control card Fig. 3 Data: (a) standard solution 0.6 mg/L P2O5.

0.6	mean	0.4110						
	stdev	0.00787						
					UCL		LCL	
Date	1.1	1.2	Average Absorbance	Mean	1s	2s	1s	2s
2/9/2023	0.421		0.4210	0.4110	0.4188	0.4267	0.4031	0.3952
3/6/2023	0.421	0.419	0.4200	0.4110	0.4188	0.4267	0.4031	0.3952
3/18/2023	0.406	0.408	0.4070	0.4110	0.4188	0.4267	0.4031	0.3952
3/20/2023	0.411		0.4110	0.4110	0.4188	0.4267	0.4031	0.3952
3/22/2023	0.41		0.4100	0.4110	0.4188	0.4267	0.4031	0.3952
3/24/2023	0.411		0.4110	0.4110	0.4188	0.4267	0.4031	0.3952
3/31/2023	0.406		0.4060	0.4110	0.4188	0.4267	0.4031	0.3952
4/11/2023	0.404		0.4040	0.4110	0.4188	0.4267	0.4031	0.3952
5/9/2023	0.414		0.4140	0.4110	0.4188	0.4267	0.4031	0.3952
7/14/2023	0.43	0.424	0.4270	0.4110	0.4188	0.4267	0.4031	0.3952
7/17/2023	0.403		0.4030	0.4110	0.4188	0.4267	0.4031	0.3952
7/19/2023	0.414		0.4140	0.4110	0.4188	0.4267	0.4031	0.3952
7/20/2023	0.416	0.413	0.4145	0.4110	0.4188	0.4267	0.4031	0.3952
7/21/2023	0.404		0.4040	0.4110	0.4188	0.4267	0.4031	0.3952
7/24/2023	0.412	0.41	0.4110	0.4110	0.4188	0.4267	0.4031	0.3952
7/25/2023	0.423	0.422	0.4225	0.4110	0.4188	0.4267	0.4031	0.3952
7/26/2023	0.422		0.4220	0.4110	0.4188	0.4267	0.4031	0.3952
7/28/2023	0.415	0.418	0.4165	0.4110	0.4188	0.4267	0.4031	0.3952
7/29/2023	0.412	0.41	0.4110	0.4110	0.4188	0.4267	0.4031	0.3952
7/30/2023	0.395		0.3950	0.4110	0.4188	0.4267	0.4031	0.3952
7/31/2023	0.399		0.3990	0.4110	0.4188	0.4267	0.4031	0.3952
8/1/2023	0.423	0.423	0.4230	0.4110	0.4188	0.4267	0.4031	0.3952
8/2/2023	0.401		0.4010	0.4110	0.4188	0.4267	0.4031	0.3952
8/8/2023	0.396		0.3960	0.4110	0.4188	0.4267	0.4031	0.3952
8/11/2023	0.352	0.432	0.3920	0.4110	0.4188	0.4267	0.4031	0.3952
8/14/2023	0.406	0.404	0.4050	0.4110	0.4188	0.4267	0.4031	0.3952
8/15/2023	0.41	0.407	0.4085	0.4110	0.4188	0.4267	0.4031	0.3952
8/16/2023	0.411	0.409	0.4100	0.4110	0.4188	0.4267	0.4031	0.3952
8/21/2023	0.406	0.404	0.4050	0.4110	0.4188	0.4267	0.4031	0.3952
8/22/2023	0.407	0.406	0.4065	0.4110	0.4188	0.4267	0.4031	0.3952
8/30/2023	0.418	0.418	0.4180	0.4110	0.4188	0.4267	0.4031	0.3952
8/31/2023	0.408	0.407	0.4075	0.4110	0.4188	0.4267	0.4031	0.3952
9/1/2023	0.42	0.418	0.4190	0.4110	0.4188	0.4267	0.4031	0.3952
9/4/2023	0.411	0.408	0.4095	0.4110	0.4188	0.4267	0.4031	0.3952
9/5/2023	0.411	0.41	0.4105	0.4110	0.4188	0.4267	0.4031	0.3952
9/7/2023	0.409	0.41	0.4095	0.4110	0.4188	0.4267	0.4031	0.3952
9/8/2023	0.406	0.406	0.4060	0.4110	0.4188	0.4267	0.4031	0.3952
9/11/2023	0.413	0.413	0.4130	0.4110	0.4188	0.4267	0.4031	0.3952

9/12/2023	0.42		0.4200	0.4110	0.4188	0.4267	0.4031	0.3952
9/13/2023	0.418		0.4180	0.4110	0.4188	0.4267	0.4031	0.3952
9/14/2023	0.412	0.414	0.4130	0.4110	0.4188	0.4267	0.4031	0.3952
9/18/2023	0.413	0.412	0.4125	0.4110	0.4188	0.4267	0.4031	0.3952
9/19/2023	0.407	0.409	0.4080	0.4110	0.4188	0.4267	0.4031	0.3952
9/21/2023	0.419	0.42	0.4195	0.4110	0.4188	0.4267	0.4031	0.3952
10/3/2023	0.419	0.419	0.4190	0.4110	0.4188	0.4267	0.4031	0.3952

Table S2. In-lab control sample – arable soil

			Mean:	6.08				
			stdev:	1.04024				
P2O5, mg/100g					UCL	LCL		
Date	1.1	1.2	Average	Mean	1s	2s	1s	2s
7/31/2023	10.12	7.20	8.66	6.08	7.12	8.16	5.04	4.00
8/1/2023	6.26	5.28	5.77	6.08	7.12	8.16	5.04	4.00
8/2/2023	5.19		5.19	6.08	7.12	8.16	5.04	4.00
8/7/2023	7.12	4.66	5.89	6.08	7.12	8.16	5.04	4.00
8/8/2023	6.23	5.52	5.88	6.08	7.12	8.16	5.04	4.00
8/10/2023	5.04		5.04	6.08	7.12	8.16	5.04	4.00
8/11/2023	5.70		5.70	6.08	7.12	8.16	5.04	4.00
8/14/2023	5.17	5.84	5.51	6.08	7.12	8.16	5.04	4.00
8/15/2023	5.89		5.89	6.08	7.12	8.16	5.04	4.00
8/16/2023	5.57	6.10	5.83	6.08	7.12	8.16	5.04	4.00
8/21/2023	5.85		5.85	6.08	7.12	8.16	5.04	4.00
8/22/2023	5.85	5.15	5.50	6.08	7.12	8.16	5.04	4.00
8/23/2023	5.35	5.20	5.28	6.08	7.12	8.16	5.04	4.00
8/24/2023	4.88	4.39	4.63	6.08	7.12	8.16	5.04	4.00
8/25/2023	7.57		7.57	6.08	7.12	8.16	5.04	4.00
8/28/2023	4.71	4.82	4.77	6.08	7.12	8.16	5.04	4.00
8/29/2023	4.87	4.80	4.84	6.08	7.12	8.16	5.04	4.00
8/30/2023	4.74	5.62	5.18	6.08	7.12	8.16	5.04	4.00
8/31/2023	6.31	6.30	6.31	6.08	7.12	8.16	5.04	4.00
9/1/2023	4.86	4.24	4.55	6.08	7.12	8.16	5.04	4.00
9/4/2023	5.60	6.95	6.27	6.08	7.12	8.16	5.04	4.00
9/5/2023	6.12	5.62	5.87	6.08	7.12	8.16	5.04	4.00
9/7/2023	7.09	5.48	6.28	6.08	7.12	8.16	5.04	4.00
9/8/2023	5.77		5.77	6.08	7.12	8.16	5.04	4.00
9/11/2023	7.98	8.34	8.16	6.08	7.12	8.16	5.04	4.00
9/14/2023	6.53		6.53	6.08	7.12	8.16	5.04	4.00
9/18/2023	7.32	5.28	6.30	6.08	7.12	8.16	5.04	4.00
9/19/2023	5.24	5.19	5.21	6.08	7.12	8.16	5.04	4.00
9/21/2023	5.87	6.06	5.96	6.08	7.12	8.16	5.04	4.00
9/22/2023	6.18		6.18	6.08	7.12	8.16	5.04	4.00
9/25/2023	7.00	8.80	7.90	6.08	7.12	8.16	5.04	4.00
9/26/2023	7.79	7.84	7.82	6.08	7.12	8.16	5.04	4.00
9/27/2023	5.63	5.99	5.81	6.08	7.12	8.16	5.04	4.00
9/29/2023	5.86	5.95	5.91	6.08	7.12	8.16	5.04	4.00
9/30/2023	6.67		6.67	6.08	7.12	8.16	5.04	4.00
10/3/2023	6.29		6.29	6.08	7.12	8.16	5.04	4.00
10/6/2023	6.26		6.26	6.08	7.12	8.16	5.04	4.00
10/9/2023	4.82		4.82	6.08	7.12	8.16	5.04	4.00

#####	6.69	6.69	6.08	7.12	8.16	5.04	4.00
#####	5.01	5.01	6.08	7.12	8.16	5.04	4.00
#####	7.31	7.31	6.08	7.12	8.16	5.04	4.00
#####	8.76	8.76	6.08	7.12	8.16	5.04	4.00
11/6/2023	5.77	5.77	6.08	7.12	8.16	5.04	4.00

Table S3: Density of $(GeTe_4)_{95}In_5$

$(GeTe_4)_{95}In_5$	Masse (g/cm ³)						Average
Sample 1	5,978	5,959	5,978	5,992	5,955	6,030	5,986
Sample 2	5,822	5,827	5,990	5,955	5,823	5,827	5,874
Sample 3	5,919	5,922	5,948	5,920			5,927

Final result: $\rho(GeTe_4)_{95}In_5 = 5993 \text{ kg/m}^3$

Table S4: Density of $(GeTe_4)_{95}In_{10}$

$(GeTe_4)_{90}In_{10}$	Masse (g/cm ³)					Average
Sample 1	5.765	5.746	5.745	5.723	5.743	5.744
Sample 2	5.664	5.723	5.685	5.664		5.684
Sample 3	5.676	5.674	5.674			5.675

Final result: $\rho(GeTe_4)_{90}In_{10} = 5707 \text{ kg/m}^3$

Table S5: Density determined by pycnometer

A)	ρ_0 kg/m ³	m kg. ¹⁰⁻³	m_1 kg. ¹⁰⁻³	m_2 kg. ¹⁰⁻³	ρ kg/m ³
$(GeTe_4)_{95}In_5$	998.62	3.6446	44.6699	47.7003	5926
$(GeTe_4)_{90}In_{10}$	998.43	2.1485	44.6377	46.3985	5533