

Villa Cardílio (Torres Novas, Portugal), um novo centro produtor de ânforas romanas no Médio Tejo português

VILLA CARDÍLIO (TORRES NOVAS, PORTUGAL), A NEW PRODUCTION CENTER OF ROMAN AMPHORAE IN THE PORTUGUESE MIDDLE TAGUS RIVER

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ANEXO 1

Método Análise	Ca	Fe	Mg	Na	K	Mn	Zn	As	Ba	Co	Cr	Cs	Hf	Ga	Rb	Sb	Sc	Sr	Th	U	Y	Zr
	ICP-MS	AAN	ICP-MS	AAN	ICP-MS	ICP-MS	AAN	AAN	AAN	AAN	AAN	AAN	AAN	ICP-MS	ICP-MS	AAN	AAN	ICP-MS	AAN	AAN	ICP-MS	ICP-MS
	%					mg/kg																
A-1	0.44	4.34	0.56	0.47	2.20	145	82.4	17.0	510	13.0	81.0	13.0	8.00	20.2	174	2.00	13.3	53.3	12.8	2.00	12.9	59.0
A-2	0.62	3.5	0.28	0.44	2.09	145	52.5	15.0	688	7.90	58.0	13.0	9.00	17.9	188	0.70	12.7	68.3	17.0	4.6	18.0	48.0
A-3	0.14	4.45	0.52	0.44	1.65	189	96.5	7.90	364	14.0	60.0	18.0	7.00	21.5	190	1.40	14.1	63.9	15.2	2.70	20.9	55.0
A-4	0.29	3.77	0.47	0.67	1.80	155	52.1	12.0	412	9.20	62.0	9.80	9.00	20.0	167	1.20	12.2	77.7	17.8	2.40	17.2	46.0
A-5	0.27	4.27	0.58	0.36	1.63	170	90.9	25.0	399	14.0	75.0	9.00	3.00	20.4	141	2.30	14.8	43.3	12.9	1.90	14.6	69.0
A-6	0.43	4.61	0.59	0.53	2.03	134	75.8	23.0	485	8.90	82.0	15.0	6.00	21.8	171	2.20	14.1	56.3	12.2	2.00	11.7	72.0
A-7	0.39	4.43	0.6	0.53	2.44	221	93.4	16.0	502	12.0	74.0	14.0	8.00	22.1	196	1.50	15.5	74.8	13.0	1.90	18.7	45.0
A-8	0.58	4.20	0.54	0.29	2.23	306	92.7	15.0	605	17.0	87.0	9.70	6.00	19.6	182	1.80	15.4	50.3	10.9	1.90	14.2	56.0
A-9	0.32	4.58	0.58	0.66	2.67	232	99.2	23.0	466	14.0	84.0	19.0	10.0	23.4	231	1.50	17.0	60.7	16.3	2.10	21.4	34.0
A-10	0.21	3.05	0.32	0.69	1.89	107	52.7	9.60	414	5.90	59.0	14.0	9.00	19.0	189	0.90	11.9	69.0	15.6	2.60	19.2	56.0
A-11	0.27	4.13	0.64	0.38	1.30	144	88.5	20.0	361	8.00	77.0	10.0	6.00	20.3	133	2.10	14.8	44.9	11.2	1.80	11.0	79.0
A-12	0.19	4.77	0.65	0.53	1.66	236	118	10.0	429	16.0	72.0	17.0	8.00	24.8	192	1.50	16.3	67.8	17.0	2.60	30.2	59.0
A-13	0.22	5.18	0.75	0.29	1.72	142	108	25.0	528	9.50	98.0	15.0	6.00	25.5	155	2.20	18.6	54.1	11.9	2.30	16.6	79.0
A-14	0.39	4.88	0.63	0.42	2.08	341	102	19.0	465	70.0	92.0	13.0	9.00	22.1	169	2.00	16.5	46.5	13.8	2.10	15.7	60.0
A-15	0.67	3.83	0.52	0.26	2.05	224	93.3	14.0	587	19.0	80.0	9.70	5.00	18.7	183	1.80	14.3	41.7	9.60	1.80	12.8	69.0
A-16	0.57	4.32	0.48	0.19	2.10	105	78.9	15.0	621	15.0	69.0	9.20	6.00	18.6	172	1.90	14.4	45.2	11.4	1.90	11.4	70.0
A-17	0.23	4.50	0.63	0.49	1.62	156	94.1	7.60	361	17.0	69.0	9.80	8.00	21.0	137	2.30	14.3	49.2	13.4	1.60	12.4	39.0
SA-18	0.39	4.49	0.66	0.54	1.62	193	102	23.0	459	16.0	83.0	15.0	7.00	21.2	149	2.20	15.2	51.2	13.6	2.20	15.3	83.0
A-19	0.42	3.84	0.46	0.24	1.44	141	75.6	16.0	398	8.80	78.0	16.0	6.00	21.2	152	1.60	14.4	42.5	10.6	2.20	12.0	78.0
Tij-20	0.24	4.42	0.40	0.31	1.26	148	75.0	3.50	386	16.0	88.0	14.0	9.00	22.8	159	2.00	15.8	57.4	15.0	2.10	18.7	76.0
D-1	0.33	3.77	0.49	0.31	1.86	177	73.1	17.0	374	22.0	69.0	10.0	7.00	17.9	155	1.90	12.4	40.6	11.5	1.80	13.2	48.0
D-2	0.31	4.46	0.63	0.58	1.94	246	122	13.0	522	27.0	86.0	17.0	8.00	25.1	179	1.20	17.1	74.3	16.8	2.60	19.4	54.0
D-3	0.82	4.09	0.55	0.26	1.78	221	100	14.0	564	15.0	80.0	13.0	6.00	20.4	178	1.50	14.9	50.4	9.70	1.80	16.9	66.0
A-24	0.61	4.26	0.52	0.34	1.38	125	90.2	20.0	462	8.70	76.0	9.90	4.00	19.4	137	1.70	14.1	42.3	10.5	1.90	13.6	89.0
A-25	0.43	4.60	0.67	0.42	1.53	162	98.3	18.0	437	15.0	87.0	15.0	7.00	21.0	144	1.80	14.7	54.8	12.9	2.10	16.1	75.0
CC-1	0.44	5.11	0.7	0.34	1.83	229	96.0	23.0	404	17.0	94.0	15.0	8.00	23.3	154	2.10	15.7	45.3	14.5	1.70	15.6	43.0
CC-2	0.32	3.84	0.84	0.39	1.94	185	103	19.0	405	15.0	67.0	14.0	6.00	22.7	138	1.90	12.9	42.4	12.2	2.30	13.8	49.0
CC-3	0.53	3.52	0.75	0.33	2.10	170	77.9	9.90	383	18.0	68.0	11.0	6.00	20.2	143	1.30	11.7	48.5	11.1	1.70	14.3	45.0
CC-4	0.46	4.35	1.06	0.24	2.48	258	128	20.0	532	20.0	80.0	14.0	3.00	25.2	150	1.70	15.6	39.6	10.8	2.00	16.3	67.0
CC-5	0.30	3.66	0.58	0.31	2.58	114	71.7	16.0	394	7.80	58.0	15.0	8.00	21.8	145	2.20	11.0	45.0	15.0	2.90	11.3	37.0
CC-6	0.22	4.56	0.99	0.52	2.04	215	117	20.0	428	16.0	82.0	14.0	8.00	22.4	121	1.80	14.2	43.8	13.2	2.10	14.1	63.0
Tij-32	0.70	4.35	0.9	0.47	1.87	305	105	27.0	446	14.0	79.0	17.0	7.00	23.0	134	2.20	14.2	48.8	12.3	2.30	13.9	49.0
A-33	0.34	4.38	0.88	0.24	2.51	158	91.8	22.0	472	10.0	96.0	13.0	6.00	23.5	169	1.90	15.9	40.8	12.7	2.40	14.4	45.0
A-34	0.35	3.54	0.37	0.21	2.19	206	82.8	12.0	435	14.0	77.0	13.0	8.00	20.0	159	1.00	14.5	32.2	11.7	1.90	14.1	34.0
A-35	0.33	4.46	0.97	0.45	1.68	521	73.4	9.20	337	31.0	92.0	17.0	6.00	23.2	179	0.90	15.5	64.2	12.9	1.80	44.1	56.0
A-36	0.37	4.62	1.06	0.22	2.20	222	99.2	26.0	440	14.0	90.0	14.0	7.00	23.0	150	1.80	15.6	41.0	12.6	1.80	14.7	35.0
A-37	0.46	3.73	0.39	0.32	1.70	112	65.9	19.0	499	7.40	64.0	8.80	5.00	14.7	132	1.40	12.0	33.9	10.4	1.80	12.6	21.0

Método Análise	Ca	Fe	Mg	Na	K	Mn	Zn	As	Ba	Co	Cr	Cs	Hf	Ga	Rb	Sb	Sc	Sr	Th	U	Y	Zr
	ICP-MS	AAN	ICP-MS	AAN	ICP-MS	ICP-MS	AAN	AAN	AAN	AAN	AAN	AAN	AAN	ICP-MS	ICP-MS	AAN	AAN	ICP-MS	AAN	AAN	ICP-MS	ICP-MS
	%					mg/kg																
A-38	0.28	4.05	0.52	0.41	2.11	133	58.3	14.0	334	6.80	61.0	7.90	5.00	15.8	136	1.90	12.0	37.5	11.3	1.30	10.2	38.0
A-39	11.3	3.15	0.31	0.82	1.41	722	51.5	9.90	707	13.0	35.0	3.30	5.00	1.10	72.7	0.70	10.4	419	10.2	1.90	20.3	81.0
A-40	0.37	4.65	0.89	0.28	2.14	134	89.8	25.0	466	9.50	90.0	9.80	7.00	20.4	139	1.70	15.6	40.4	13.0	2.00	15.7	26.0
A-41	4.62	2.67	0.4	0.32	1.79	408	49.1	3.60	349	9.50	60.0	8.90	6.00	13.3	148	0.70	10.8	47.6	10.2	1.90	22.5	53.0
A-42	0.21	4.38	0.96	0.33	2.06	154	86.5	19.0	426	12.0	89.0	15.0	7.00	22.1	151	1.80	14.5	42.5	11.8	2.10	16.3	51.0
A-43	0.34	4.33	0.54	0.29	1.63	119	87.5	20.0	466	8.30	79.0	9.90	6.00	18.4	125	1.80	14.4	35.3	12.7	2.10	17.0	65.0
A-44	0.18	4.83	1.00	0.24	2.43	123	92.1	20.0	495	8.20	82.0	14.0	2.00	24.2	160	2.10	17.9	39.5	11.7	2.40	13.8	31.0
A-45	0.33	4.63	0.92	0.39	2.20	162	102	22.0	474	12.0	73.0	15.0	7.00	20.9	154	2.20	15.0	44.0	13.0	2.40	14.0	43.0
A-46	0.62	3.98	0.48	0.44	1.40	162	108	15.0	534	7.20	67.0	9.10	9.00	12.9	118	1.60	12.8	37.8	12.2	2.00	12.3	29.0
A-47	0.36	4.37	0.88	0.36	2.08	249	92.2	20.0	507	6.20	78.0	14.0	7.00	18.0	143	1.70	14.6	37.8	12.0	2.10	15.0	50.0
A-48	0.27	3.93	0.6	0.47	1.32	174	79.8	21.0	343	14.0	60.0	9.30	9.00	18.8	110	2.00	13.2	38.4	13.5	2.00	15.3	56.0
A-51	0.24	4.10	0.88	0.43	1.48	112	74.8	18.0	398	7.30	65.0	9.30	8.00	18.1	110	1.70	13.5	40.9	11.8	1.60	13.9	43.0
Arg-49	0.39	2.72	0.42	0.41	1.54	418	59.2	15.0	308	5.00	49.0	8.30	6.00	15.1	132	1.50	9.60	39.2	11.1	1.90	14.2	47.0
Arg-50	2.56	3.88	0.89	0.31	1.71	161	84.7	21.0	391	14.0	65.0	9.70	6.00	18.0	126	2.00	13.5	39.0	11.1	2.10	19.4	84.0
Arg-52	0.87	4.53	1.07	0.2	1.47	346	82.9	20.0	400	18.0	72.0	13.0	5.00	22.9	133	2.00	16.0	37.7	9.80	1.90	27.5	106

	La	Ce	Pr	Nd	Sm	Eu	Gd	Dy	Tb	Er	Yb	Lu	La/Yb	La/Sm	Eu*/Eu	Ce*/Ce
Analysis method	ICP-MS															
	mg/kg															
A-1	33.0	71.3	8.60	31.4	6.00	1.05	4.30	2.80	0.50	1.40	1.40	0.30	16.3	3.45	0.59	1.01
A-2	42.5	88.0	10.8	39.0	7.70	1.15	5.50	3.80	0.80	1.80	1.60	0.30	18.4	3.46	0.49	0.98
A-3	41.2	89.1	10.9	39.8	8.60	1.28	5.90	4.30	0.80	2.20	1.80	0.30	15.9	3.00	0.49	1.01
A-4	39.3	84.0	9.90	34.9	7.30	1.06	5.20	3.70	0.70	1.90	1.50	0.20	18.2	3.38	0.48	1.01
A-5	34.5	75.2	9.10	33.2	5.60	1.11	4.60	3.00	0.60	1.60	1.50	0.20	15.9	3.86	0.64	1.02
A-6	29.5	59.2	7.70	27.5	4.60	0.90	3.80	2.60	0.50	1.50	1.30	0.20	15.7	4.02	0.63	0.94
A-7	39.0	83.7	10.0	36.7	7.80	1.32	5.90	4.10	0.80	1.90	1.70	0.30	15.9	3.13	0.55	1.01
A-8	31.3	68.6	8.00	29.6	6.00	1.06	4.40	3.20	0.60	1.60	1.60	0.30	13.6	3.27	0.58	1.03
A-9	45.3	94.8	11.9	43.1	7.70	1.42	6.60	4.30	0.90	2.00	1.70	0.20	18.5	3.69	0.59	0.98
A-10	44.8	84.3	11.2	39.0	7.20	1.14	5.60	3.90	0.80	2.00	1.70	0.30	18.3	3.90	0.51	0.90
A-11	30.0	63.3	7.60	27.4	4.70	0.92	3.20	2.40	0.50	1.20	1.20	0.20	17.3	4.00	0.63	1.00
A-12	50.7	110	14.1	50.1	10.6	1.73	8.50	6.40	1.20	3.10	2.20	0.40	16.0	3.00	0.52	1.01
A-13	32.1	67.8	8.30	30.7	5.70	1.17	4.70	3.10	0.60	1.70	1.80	0.30	12.4	3.53	0.67	0.99
A-14	38.0	85.7	9.80	35.3	8.00	1.22	5.00	3.30	0.60	1.70	1.50	0.30	17.6	2.98	0.52	1.06
A-15	27.3	60.7	7.40	25.9	4.40	0.90	3.70	2.70	0.50	1.40	1.40	0.20	13.5	3.89	0.66	1.04
A-16	23.8	55.5	6.20	22.7	4.10	0.80	3.40	2.20	0.40	1.20	1.40	0.20	11.8	3.64	0.64	1.09
A-17	39.7	86.0	10.6	36.9	6.90	1.17	4.90	2.90	0.60	1.40	1.00	0.20	27.5	3.61	0.57	1.02
SA-18	38.9	83.3	10.4	37.8	7.50	1.27	5.10	3.60	0.70	2.00	1.70	0.30	15.9	3.25	0.56	1.00

	La	Ce	Pr	Nd	Sm	Eu	Gd	Dy	Tb	Er	Yb	Lu	La/Yb	La/Sm	Eu*/Eu	Ce*/Ce
Analysis method	ICP-MS															
	mg/kg															
A-19	27.1	56.2	7.20	26.2	4.50	0.91	3.50	2.40	0.50	1.40	1.30	0.30	14.4	3.78	0.65	0.97
Tij-20	43.7	88.5	11.0	38.9	7.50	1.22	5.60	3.90	0.70	2.00	1.70	0.30	17.8	3.65	0.54	0.96
D-1	31.5	77.5	8.80	33.1	5.20	1.22	4.70	3.10	0.60	1.60	1.30	0.20	16.8	3.80	0.75	1.13
D-2	47.7	98.3	12.0	44.5	8.10	1.39	6.50	4.20	0.90	2.00	1.90	0.30	17.4	3.69	0.55	0.97
D-3	31.5	81.5	8.40	31.0	6.70	1.18	5.00	3.50	0.60	2.00	1.80	0.30	12.1	2.95	0.59	1.20
A-24	30.0	63.8	7.80	28	6.00	1.02	3.80	2.90	0.50	1.50	1.60	0.30	13.0	3.13	0.57	1.00
A-25	35.2	78.2	9.70	36.2	6.50	1.22	5.00	3.20	0.60	1.70	1.70	0.30	14.3	3.40	0.62	1.02
CC-1	37.0	79.1	10.0	35.7	7.20	1.23	4.80	3.10	0.70	1.70	1.40	0.20	18.3	3.22	0.56	1.00
CC-2	34.6	77.9	9.70	35.0	6.10	1.12	4.80	3.30	0.60	1.60	1.30	0.20	18.4	3.56	0.60	1.04
CC-3	33.7	76.8	9.20	33.1	5.50	1.06	4.40	3.30	0.70	1.60	1.40	0.20	16.7	3.84	0.60	1.06
CC-4	32.1	73.3	8.70	31.8	6.10	1.20	4.80	3.60	0.70	1.90	1.80	0.30	12.4	3.30	0.63	1.06
CC-5	37.0	76.8	9.60	35.6	6.10	0.98	4.60	2.90	0.60	1.30	1.00	0.20	25.6	3.80	0.53	0.97
CC-6	40.2	87.2	10.7	38.0	6.70	1.25	4.90	3.20	0.70	1.60	1.40	0.20	19.9	3.76	0.61	1.02
Tij-32	35.8	77.6	9.60	35.3	6.40	1.19	4.90	3.20	0.70	1.60	1.30	0.20	19.1	3.51	0.60	1.01
A-33	33.4	65.0	8.60	31.4	6.80	1.11	4.20	3.30	0.60	1.50	1.60	0.20	14.5	3.08	0.55	0.91
A-34	35.7	71.2	9.00	32.7	6.70	1.17	4.50	3.30	0.60	1.50	1.40	0.20	17.7	3.34	0.58	0.94
A-35	70.3	94.2	19.0	70.0	15.5	2.88	11.6	8.60	1.50	3.90	3.00	0.40	16.2	2.84	0.61	0.62
A-36	36.1	71.4	9.20	33.5	7.10	1.17	4.50	3.40	0.60	1.60	1.40	0.20	17.9	3.19	0.55	0.93
A-37	28.0	53.9	7.20	26.4	5.10	0.90	3.60	2.80	0.50	1.20	1.50	0.20	12.9	3.44	0.58	0.90
A-38	23.6	45.9	5.90	21.1	4.50	0.74	2.80	2.30	0.40	1.10	0.90	0.10	18.2	3.29	0.55	0.92
A-39	40.2	70.7	8.90	31.6	5.50	1.27	4.80	4.20	0.70	2.00	1.70	0.20	16.4	4.58	0.72	0.85
A-40	33.8	64.0	8.70	31.9	5.10	1.16	4.50	3.30	0.60	1.60	1.70	0.20	13.8	4.16	0.72	0.89
A-41	33.3	65.3	8.30	30.0	6.30	1.10	4.90	4.60	0.70	2.30	2.10	0.30	11.0	3.31	0.56	0.93
A-42	35	68.2	9.00	33.5	7.00	1.19	4.70	3.70	0.60	1.70	1.60	0.20	15.2	3.13	0.57	0.91
A-43	36.9	68.8	9.20	33.6	7.30	1.23	4.60	3.50	0.60	1.80	1.80	0.30	14.2	3.17	0.57	0.88
A-44	29.8	55.8	7.40	27.2	5.50	0.99	3.80	2.90	0.50	1.50	1.30	0.20	15.9	3.40	0.60	0.88
A-45	37.0	73.2	9.30	34.2	6.90	1.11	4.60	3.10	0.60	1.50	1.60	0.20	16.0	3.36	0.54	0.93
A-46	33.8	66.6	8.30	30.7	6.00	1.00	4.00	2.60	0.50	1.30	1.50	0.20	15.6	3.53	0.56	0.93
A-47	34.6	67.5	8.40	32.2	6.70	1.12	4.30	3.00	0.50	1.80	1.80	0.30	13.3	3.24	0.57	0.92
A-48	40.9	81.9	10.3	38.6	7.70	1.26	5.50	3.20	0.60	1.50	1.50	0.20	18.9	3.33	0.56	0.94
A-51	37.8	75.1	9.40	35.0	6.70	1.09	4.80	3.10	0.50	1.40	1.20	0.20	21.8	3.54	0.56	0.93
Arg-49	30.9	62.4	7.70	28.4	5.60	0.95	4.00	2.80	0.50	1.50	1.50	0.20	14.3	3.46	0.57	0.95
Arg-50	33.2	64.2	8.60	32.0	6.90	1.21	5.20	3.80	0.70	2.20	2.10	0.30	11.0	3.02	0.57	0.90
Arg-52	35.2	70.9	9.50	36.3	8.10	1.55	6.60	5.10	0.90	2.90	2.70	0.40	9.03	2.72	0.62	0.93