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1 Letters to the Editor

3 **Allele frequencies of fifteen STR loci in a population from Central Brazil**

A B S T R A C T

Keywords:
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Allele frequencies for 15 short tandem repeats included in Powerplex 16 Kit (Penta E, D18S51, D21S11, TH01, D3S1358, FGA, TPOX, D8S1179, vWA, Penta D, CSF1PO, D16S539, D7S820, D13S317 and D5S818) were determined in a sample of 429 unrelated individuals from the population of Goiânia, Goiás, Central Brazil. Determination of the allele frequencies as well as of several commonly used statistics in forensic and paternity testing were defined. The forensic parameters presented high values and the most polymorphic loci were Penta E, following FGA and D18S51. The exact test demonstrated that the fifteen loci analyzed in the population of Goiania have no deviation from Hardy–Weinberg equilibrium ($P > 0.05$).

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4 *Dear Editor,*

5 In this work, we determined the allele frequencies for 15 STR
6 loci included in Powerplex 16 BIO Kit (Penta E, D18S51, D21S11,
7 TH01, D3S1358, FGA, TPOX, D8S1179, vWA, Penta D, CSF1PO,
8 D16S539, D7S820, D13S317 and D5S818) in a sample of 429
9 unrelated healthy individuals of Goiânia, Goiás state, a city located
10 at Central Brazil.

11 Goiânia is the capital and the largest city in the state of Goiás.
12 Goiania is the second largest city in the Central Brazil. The city of
13 Goiania has a population of 1.265394 million people. It is currently
14 listed as the thirteenth largest city in Brazil. The metropolitan area
15 has a total population of 2.063744 million people. Goiânia unlike
16 any other city in Brazil was a completely planned city [1]. This city,
17 as other Brazilian regions, presented high levels of population
18 admixture, which difficult the segregation of ethno groups.

19 Biological samples of 429 individuals were collected, after the
20 signature of a term of consent, from blood cells and DNA was
21 extracted using a commercial DNA extraction Kit (GFX, GE
22 Healthcare, USA) according to manufacturer's procedure. Ampli-
23 fication reaction was prepared according to the manufacturer's
24 instructions (PowerPlex BIO 16, Promega Corporation) using 10 ng
25 of human genomic DNA. Fluorescent PCR products of the 15
26 microsatellite polymorphic markers were separated on the
27 MEGABACE 500 capillary array electrophoresis (CAE) instrument
28 and analyzed with Fragment Profiler software v.1.2.

29 The allele frequencies and other statistics parameters were
30 calculated by Power Stats program v1.2.xls (Promega Corporation,
31 USA). Hardy–Weinberg equilibrium and expected heterozygosity
32 were obtained from Arlequin Software Version. 3.1.1 [2]. Allele
33 frequencies and statistic parameters for the 15 STR loci of the
34 population of Goiânia are summarized in supplementary Table 1.

Table 1

Allele frequencies and statistical parameters regarding the fifteen STR loci in 429 unrelated individuals from Goiânia, Goiás, Brazil Central.

Allele	TPOX	D16S539	D3S1358	FGA	Penta E	D21S11	D8S1179	vWA	Penta D	D18S51	TH01	CSF1PO	D7S820	D13S317	D5S720
2.2	–	–	–	–	–	–	–	–	0.021	–	–	–	–	–	–
3.2	–	–	–	–	–	–	–	–	0.001	–	–	–	–	–	–
4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
5	–	–	–	–	0.057	–	–	–	0.013	–	0.023	–	–	–	–
6	0.017	–	–	–	0.001	–	–	–	–	–	0.245	0.001	0.001	–	–
7	0.002	–	–	–	0.126	–	–	–	0.012	–	0.235	0.018	0.024	–	0.015
8	0.426	0.024	–	–	0.052	–	0.001	–	0.05	–	0.148	0.01	0.153	0.089	0.026
9	0.114	0.0156	–	–	0.033	–	0.002	–	0.174	–	0.191	0.044	0.116	0.104	–
9.3	–	–	–	–	–	–	–	–	–	–	0.157	–	–	–	–
10	0.079	0.094	–	–	0.054	–	0.065	–	0.15	0.011	–	0.234	0.244	0.044	0.08
11	0.303	0.304	–	–	0.105	–	0.081	0.001	0.134	0.005	–	0.317	0.245	0.283	0.341
12	0.055	0.261	0.002	–	0.179	–	0.133	–	0.174	0.113	–	0.290	0.185	0.306	0.312
13	0.002	0.132	0.002	–	0.112	–	0.275	0.008	0.17	0.138	0.001	0.067	0.027	0.126	0.171
14	–	0.027	0.093	–	0.058	–	0.252	0.084	0.066	0.143	–	0.017	0.006	0.046	0.012
15	–	0.002	0.315	–	0.057	–	0.142	0.138	0.023	0.168	–	0.002	–	0.002	0.001
16	–	–	0.254	–	0.067	–	0.045	0.273	0.009	0.138	–	–	–	–	0.001
17	–	–	0.203	0.002	0.038	–	0.005	0.258	–	0.121	–	–	–	–	–
18	0.001	–	0.125	0.017	0.027	–	–	0.161	–	0.175	–	–	–	–	–
19	–	–	0.006	0.06	0.014	–	–	0.063	–	0.041	–	–	–	–	–

Table 1 (Continued)

Allele	TPOX	D16S539	D3S1358	FGA	Penta E	D21S11	D8S1179	vWA	Penta D	D18S51	TH01	CSF1PO	D7S820	D13S317	D5S720
20	-	-	-	0.117	0.006	-	-	0.013	-	0.019	-	-	-	-	-
21	-	-	-	0.149	0.01	-	-	0.001	-	0.015	-	-	-	-	-
22	-	-	-	0.186	0.004	-	-	-	-	0.009	-	-	-	-	-
23	-	-	-	0.166	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	0.132	-	-	-	-	0.001	0.002	-	-	-	-	-
25	-	-	-	0.09	-	-	-	-	-	-	-	-	-	-	-
25.2	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
26	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	0.015	-	0.025	-	-	-	0.001	-	-	-	-	-
28	-	-	-	0.006	-	0.168	-	-	-	-	-	-	-	-	-
28.2	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
29	-	-	-	0.004	-	0.228	-	-	-	-	-	-	-	-	-
30	-	-	-	0.001	-	0.26	-	-	-	-	-	-	-	-	-
30.2	-	-	-	-	-	0.017	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	0.074	-	-	-	-	-	-	-	-	-
31.2	-	-	-	0.001	-	0.082	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	0.036	-	-	-	-	-	-	-	-	-
32.2	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
33.2	-	-	-	-	-	0.013	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	0.007	-	-	-	-	-	-	-	-	-
34.2	-	-	-	-	-	0.009	-	-	-	-	-	-	-	-	-
35	-	-	-	-	-	0.007	-	-	-	-	-	-	-	-	-
36	-	-	-	-	-	0.004	-	-	-	-	-	-	-	-	-
37	-	-	-	-	-	0.001	-	-	-	-	-	-	-	-	-
44.2	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
46.2	-	-	-	0.001	-	-	-	-	-	-	-	-	-	-	-
OH (%)	63.2	69.0	56.3	70.5	69.5	62.4	57.3	64.6	72.3	66.7	58.8	58.4	70.4	73.9	74.3
EH (%)	80.4	80.4	79.1	88.5	85.3	86.2	82.3	81.9	72.1	86.4	78.1	59.3	75.3	73.8	82.4
MP	0.13	0.08	0.093	0.031	0.018	0.048	0.063	0.072	0.038	0.030	0.070	0.107	0.067	0.081	0.113
Exp. as 1 in	7.4	12.9	10.8	32.0	54.9	21.0	15.8	13.8	26.2	33.3	14.2	9.3	14.9	12.3	8.9
PIC	0.66	0.76	0.73	0.86	0.90	0.82	0.78	0.78	0.85	0.86	0.77	0.71	0.75	0.76	0.71
PD	0.86	0.92	0.91	0.97	0.98	0.95	0.94	0.93	0.96	0.97	0.93	0.89	0.93	0.92	0.89
PE	0.45	0.55	0.56	0.65	0.68	0.59	0.57	0.61	0.72	0.77	0.58	0.52	0.61	0.59	0.56
TPI	1.74	2.19	2.23	2.89	3.18	2.46	2.34	2.54	3.64	4.44	2.36	2.05	2.56	2.49	2.29
P	0.90	0.33	1.00	0.76	0.93	0.87	0.60	0.41	1.0	0.94	1.0	1.0	0.12	0.24	0.30

OH, observed heterozygosity; EH, expected heterozygosity; MP, matching probability; PIC, polymorphic information content; PD, power of discrimination; PE, power of exclusion; TPI, typical paternity index; P, probability values of exact tests for Hardy-Weinberg disequilibrium.

35 All the analyzed loci reached the Hardy-Weinberg equilibrium in
36 the population studied ($p > 0.05$). The 15 loci offer a highly
37 discriminating system for paternity and forensic purpose of
38 individuals in such population. No differences with others
39 Brazilians populations [3-5] were detected regarding allele
40 frequencies for the respective consensus loci.

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