



## Supplementary or supporting materials

**Table S1.** Total saponin content (mg/g) in *C. quinoa* lines. Table shows the total saponin content and individual sapogenins in *C. quinoa* seeds. Data are presented here as mean  $\pm$  standard deviation (SD) values of independent sample extractions ( $n = 4$ ). A one-way analysis of variance ANOVA was performed and  $p$ -value  $< 0.05$  was considered as a statistically significant difference. A significant difference was found ( $p < 0.001$ ) in relative saponin content. Significant codes: '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 '' 1 OA: oleanolic acid, HD: hederagenin, PA: phytolaccagenic acid.

Quinoa line	OA		HD		PA		Total Saponins	
AZ-1	3.01 $\pm$ 0.14	***	2.55 $\pm$ 0.13	***	ND		5.56 $\pm$ 0.24	***
AZ-2	NA		NA		NA		NA	
AZ-3	4.37 $\pm$ 0.13	***	2.99 $\pm$ 0.05	***	4.95 $\pm$ 0.22	***	12.32 $\pm$ 0.37	***
AZ-4	3.21 $\pm$ 0.10		2.98 $\pm$ 0.05	***	3.05 $\pm$ 0.14	***	9.25 $\pm$ 0.16	***
AZ-5	2.57 $\pm$ 0.36	**	2.83 $\pm$ 0.38	*	ND		5.41 $\pm$ 0.73	
AZ-6	0.99 $\pm$ 0.11	***	1.74 $\pm$ 0.31	***	2.81 $\pm$ 0.55		5.54 $\pm$ 0.94	
AZ-7	3.07 $\pm$ 0.46		2.35 $\pm$ 0.25	.	5.05 $\pm$ 0.53	***	10.47 $\pm$ 1.23	***
AZ-8	2.45 $\pm$ 0.62	***	2.76 $\pm$ 0.58	.	2.20 $\pm$ 0.48	***	7.41 $\pm$ 1.68	***
AZ-9	2.94 $\pm$ 0.21		1.76 $\pm$ 0.10	***	3.08 $\pm$ 0.25	***	7.79 $\pm$ 0.54	***
AZ-10	1.59 $\pm$ 0.12	***	1.34 $\pm$ 0.10	***	1.84 $\pm$ 0.14	***	4.78 $\pm$ 0.35	*
AZ-11	3.15 $\pm$ 0.05		4.01 $\pm$ 0.21	***	4.63 $\pm$ 0.18	***	11.80 $\pm$ 0.43	***
AZ-12	2.71 $\pm$ 0.26	*	2.34 $\pm$ 0.19	.	3.48 $\pm$ 0.14	***	8.55 $\pm$ 0.60	***
AZ-13	2.87 $\pm$ 0.17		1.20 $\pm$ 0.04	***	1.78 $\pm$ 0.10	***	5.86 $\pm$ 0.32	
AZ-14	2.00 $\pm$ 0.05	***	1.69 $\pm$ 0.03	***	3.04 $\pm$ 0.14	***	6.74 $\pm$ 0.16	**
AZ-15	2.66 $\pm$ 0.08	*	2.42 $\pm$ 0.06		3.81 $\pm$ 0.13	***	8.90 $\pm$ 0.27	***
AZ-16	2.15 $\pm$ 0.11	***	1.98 $\pm$ 0.07	***	3.00 $\pm$ 0.17	***	7.14 $\pm$ 0.32	***
AZ-17	0.99 $\pm$ 0.07	***	1.18 $\pm$ 0.06	***	2.24 $\pm$ 0.05	***	4.42 $\pm$ 0.18	**
AZ-18	1.71 $\pm$ 0.17	***	1.49 $\pm$ 0.10	***	2.02 $\pm$ 0.05	***	5.23 $\pm$ 0.23	
AZ-19	2.10 $\pm$ 0.11	***	1.96 $\pm$ 0.06	***	2.29 $\pm$ 0.10	***	6.35 $\pm$ 0.25	*
AZ-20	1.60 $\pm$ 0.08	***	2.42 $\pm$ 0.16		2.69 $\pm$ 0.14	***	6.72 $\pm$ 0.38	**
AZ-21	1.86 $\pm$ 0.07	***	2.02 $\pm$ 0.04	***	2.91 $\pm$ 0.03	***	6.80 $\pm$ 0.10	**
AZ-22	1.66 $\pm$ 0.14	***	1.64 $\pm$ 0.16	***	2.72 $\pm$ 0.29	***	6.03 $\pm$ 0.59	
AZ-23	1.84 $\pm$ 0.04	***	1.33 $\pm$ 0.15	***	2.15 $\pm$ 0.16	***	5.33 $\pm$ 0.32	
AZ-24	1.83 $\pm$ 0.06	***	1.37 $\pm$ 0.08	***	2.23 $\pm$ 0.27	***	5.45 $\pm$ 0.35	
AZ-25	3.94 $\pm$ 0.15	***	2.95 $\pm$ 0.12	***	4.42 $\pm$ 0.30	***	11.32 $\pm$ 0.53	***
AZ-26	2.61 $\pm$ 0.17	**	2.17 $\pm$ 0.13	***	4.62 $\pm$ 0.31	***	9.42 $\pm$ 0.62	***
AZ-27	2.23 $\pm$ 0.04	***	2.10 $\pm$ 0.02	***	3.80 $\pm$ 0.03	***	8.14 $\pm$ 0.05	***
AZ-29	3.54 $\pm$ 0.36	***	2.40 $\pm$ 0.26		4.53 $\pm$ 0.15	***	10.48 $\pm$ 0.78	***
AZ-30	3.18 $\pm$ 0.22		2.11 $\pm$ 0.09	***	3.99 $\pm$ 0.25	***	9.29 $\pm$ 0.57	***
AZ-31	1.63 $\pm$ 0.04	***	1.51 $\pm$ 0.08	***	2.05 $\pm$ 0.07	***	5.20 $\pm$ 0.18	
AZ-32	1.76 $\pm$ 0.17	***	1.51 $\pm$ 0.08	***	2.18 $\pm$ 0.13	***	5.46 $\pm$ 0.35	
AZ-33	1.98 $\pm$ 0.11	***	1.79 $\pm$ 0.04	***	2.08 $\pm$ 0.02	***	5.85 $\pm$ 0.13	
AZ-34	2.64 $\pm$ 0.21	**	2.09 $\pm$ 0.15	***	3.37 $\pm$ 0.42	***	8.11 $\pm$ 0.79	***
AZ-35	2.63 $\pm$ 0.03	**	2.12 $\pm$ 0.01	***	3.32 $\pm$ 0.11	***	8.09 $\pm$ 0.14	***
AZ-36	2.25 $\pm$ 0.22	***	1.75 $\pm$ 0.08	***	2.94 $\pm$ 0.29	***	6.95 $\pm$ 0.60	***
AZ-37	2.12 $\pm$ 0.07	***	1.92 $\pm$ 0.06	***	2.86 $\pm$ 0.04	***	6.91 $\pm$ 0.12	***
AZ-38	2.28 $\pm$ 0.07	***	2.53 $\pm$ 0.04		ND		4.82 $\pm$ 0.11	.
AZ-39	2.05 $\pm$ 0.01	***	2.03 $\pm$ 0.05	***	2.76 $\pm$ 0.07	***	6.85 $\pm$ 0.11	**
AZ-40	2.33 $\pm$ 0.06	***	2.68 $\pm$ 0.08	***	ND		5.01 $\pm$ 0.12	
AZ-41	2.05 $\pm$ 0.19	***	1.63 $\pm$ 0.05		2.45 $\pm$ 0.14	***	6.15 $\pm$ 0.36	
AZ-42	1.61 $\pm$ 0.06	***	1.44 $\pm$ 0.05	***	2.32 $\pm$ 0.17	***	5.38 $\pm$ 0.29	

AZ-43	2.29 ± 0.22	***	2.22 ± 0.18	***	ND		4.52 ± 0.41	**
AZ-44	1.88 ± 0.05	***	1.70 ± 0.07	**	2.76 ± 0.05	***	6.35 ± 0.18	*
AZ-45	1.76 ± 0.12	***	1.45 ± 0.08	***	2.38 ± 0.14	***	5.59 ± 0.35	
AZ-46	2.30 ± 0.04	***	3.38 ± 0.08	***	4.00 ± 0.09	***	9.69 ± 0.22	***
AZ-47	2.10 ± 0.30	***	1.73 ± 0.12	***	2.88 ± 0.12	***	6.72 ± 0.44	**
AZ-48	1.06 ± 0.01	***	2.65 ± 0.07	***	2.78 ± 0.07	***	6.49 ± 0.16	*
AZ-49	1.10 ± 0.01	***	2.89 ± 0.21	**	2.89 ± 0.36	***	6.88 ± 0.57	***
AZ-50	2.01 ± 0.09	***	1.87 ± 0.05		3.25 ± 0.06	***	7.14 ± 0.18	***
AZ-51	3.76 ± 0.88	***	3.00 ± 0.69	***	4.83 ± 1.22	***	11.60 ± 2.80	***
AZ-52	4.49 ± 0.06	***	3.24 ± 0.02	***	5.51 ± 0.08	***	13.25 ± 0.12	***
AZ-53	1.39 ± 0.04	***	1.55 ± 0.09	***	2.24 ± 0.06	***	5.19 ± 0.17	
AZ-54	1.65 ± 0.09	***	1.43 ± 0.04	***	2.08 ± 0.04	***	5.16 ± 0.18	
AZ-55	1.64 ± 0.06	***	1.79 ± 0.06	***	2.18 ± 0.05	***	5.61 ± 0.15	
AZ-56	1.31 ± 0.05	***	1.96 ± 0.09	***	2.24 ± 0.12	***	5.51 ± 0.25	
AZ-57	1.88 ± 0.03	***	2.04 ± 0.15	***	ND		3.92 ± 0.18	***
AZ-58	1.96 ± 0.01	***	1.75 ± 0.02	***	1.91 ± 0.05	***	5.63 ± 0.06	
AZ-59	1.89 ± 0.09	***	1.92 ± 0.04	***	2.44 ± 0.03	***	6.25 ± 0.11	.
AZ-60	2.03 ± 0.03	***	1.66 ± 0.04	***	2.72 ± 0.04	***	6.42 ± 0.10	*
AZ-61	2.34 ± 0.13	***	1.68 ± 0.09	***	2.32 ± 0.08	***	6.35 ± 0.25	*
AZ-62	1.66 ± 0.04	***	1.85 ± 0.07	***	1.83 ± 0.06	***	5.35 ± 0.17	
AZ-63	2.57 ± 0.02	**	1.70 ± 0.05	***	2.79 ± 0.03	***	7.06 ± 0.06	***
AZ-64	NA		NA		NA		NA	
AZ-65	2.42 ± 0.18	***	1.99 ± 0.17	***	2.45 ± 0.16	***	6.87 ± 0.51	***
AZ-66	1.77 ± 0.07	***	1.69 ± 0.05	***	2.35 ± 0.11	***	5.82 ± 0.23	
AZ-67	3.22 ± 0.51		1.80 ± 0.18	***	3.25 ± 0.43	***	8.28 ± 1.12	***
AZ-68	2.99 ± 0.10		1.92 ± 0.03	***	2.94 ± 0.08	***	7.85 ± 0.15	***
AZ-69	1.61 ± 0.02	***	1.36 ± 0.03	***	2.42 ± 0.14	***	5.40 ± 0.20	
AZ-70	1.26 ± 0.07	***	1.32 ± 0.05	***	2.35 ± 0.04	***	4.94 ± 0.16	
AZ-71	2.45 ± 0.06	***	1.54 ± 0.02	***	2.55 ± 0.04	***	6.54 ± 0.12	*
AZ-72	2.37 ± 0.09	***	1.52 ± 0.02	***	2.60 ± 0.07	***	6.50 ± 0.16	*
AZ-73	1.86 ± 0.11	***	1.34 ± 0.05	***	2.26 ± 0.03	***	5.47 ± 0.16	
AZ-74	2.05 ± 0.10	***	3.10 ± 0.16	***	ND		5.16 ± 0.26	
AZ-76	2.07 ± 0.14	***	3.30 ± 0.29	***	0.85 ± 0.00	***	6.24 ± 0.43	.
AZ-77	1.88 ± 0.15	***	1.30 ± 0.07	***	2.15 ± 0.05	***	5.34 ± 0.26	
AZ-78	1.53 ± 0.11	***	1.23 ± 0.04	***	1.73 ± 0.03	***	4.50 ± 0.19	**
AZ-79	0.96 ± 0.21	***	0.97 ± 0.21	***	2.79 ± 1.35	***	4.73 ± 1.78	*
AZ-80	2.42 ± 0.24	***	1.82 ± 0.11	***	2.65 ± 0.15	***	6.90 ± 0.51	***
AZ-81	2.60 ± 0.28	**	1.87 ± 0.14	***	2.25 ± 0.09	***	6.73 ± 0.52	**
AZ-82	1.06 ± 0.00	***	1.39 ± 0.02	***	1.90 ± 0.06	***	4.36 ± 0.08	**
AZ-83	1.54 ± 0.06	***	1.50 ± 0.11	***	2.57 ± 0.32	***	5.62 ± 0.49	
AZ-84	1.48 ± 0.19	***	1.20 ± 0.18	***	2.13 ± 0.54	***	4.82 ± 0.92	.
AZ-85	0.99 ± 0.05	***	1.46 ± 0.06	***	2.65 ± 0.10	***	5.12 ± 0.20	
AZ-86	1.02 ± 0.02	***	1.02 ± 0.01	***	2.69 ± 0.09	***	4.74 ± 0.13	*
AZ-87	0.78 ± 0.04	***	1.08 ± 0.00	***	3.16 ± 0.16	***	5.03 ± 0.12	
AZ-88	1.87 ± 0.02	***	2.18 ± 0.05	***	3.64 ± 0.17	***	7.70 ± 0.24	***
AZ-89	1.84 ± 0.24	***	1.72 ± 0.23	***	2.76 ± 0.44	***	6.33 ± 0.92	.
AZ-91	1.78 ± 0.04	***	1.12 ± 0.04	***	2.45 ± 0.09	***	5.35 ± 0.16	
AZ-92	NA		NA		NA		NA	
AZ-93	1.92 ± 0.03	***	1.10 ± 0.02	***	3.04 ± 0.16	***	6.07 ± 0.20	
AZ-94	2.46 ± 0.07	***	1.45 ± 0.02	***	1.89 ± 0.06	***	5.81 ± 0.11	
AZ-95	2.53 ± 0.07	***	0.88 ± 0.00	***	2.20 ± 0.08	***	5.63 ± 0.06	

AZ-96	2.91 ± 0.22		0.88 ± 0.02	***	2.13 ± 0.04	***	5.93 ± 0.29	
AZ-97	1.00 ± 0.05	***	1.31 ± 0.05	***	3.22 ± 0.11	***	5.54 ± 0.22	
AZ-98	1.56 ± 0.18	***	1.79 ± 0.17	***	3.43 ± 0.21	***	6.79 ± 0.50	
AZ-99	1.39 ± 0.25	***	1.03 ± 0.12	***	1.91 ± 0.36	***	4.33 ± 0.74	
AZ-100	NA		NA		NA		NA	
AZ-101	1.43 ± 0.25	***	1.26 ± 0.18	***	1.08 ± 0.10	***	3.78 ± 0.54	***
AZ-102	0.99 ± 0.11	***	0.89 ± 0.05	***	0.97 ± 0.04	***	2.85 ± 0.21	***
AZ-103	1.56 ± 0.20	***	0.95 ± 0.06	***	1.57 ± 0.17	***	4.08 ± 0.43	***
AZ-104	2.96 ± 0.35		1.94 ± 0.17	***	2.78 ± 0.30	***	7.69 ± 0.83	***
AZ-105	1.78 ± 0.37	***	2.04 ± 0.51	***	1.47 ± 0.27	***	5.30 ± 1.16	
AZ-107	2.69 ± 0.13	*	1.84 ± 0.05	***	3.05 ± 0.22	***	7.59 ± 0.40	***
AZ-108	2.80 ± 0.10		2.05 ± 0.04	***	2.81 ± 0.12	***	7.67 ± 0.25	***
AZ-110	2.37 ± 0.28	***	0.91 ± 0.06	***	3.06 ± 0.13	***	6.34 ± 0.46	*
AZ-111	3.84 ± 0.32	***	1.86 ± 0.13	***	2.66 ± 0.23	***	8.37 ± 0.68	***
AZ-112	2.47 ± 0.05	***	0.76 ± 0.01	***	2.11 ± 0.05	***	5.35 ± 0.12	
AZ-113	3.39 ± 0.14	**	1.79 ± 0.04	***	3.16 ± 0.17	***	8.35 ± 0.30	***
AZ-114	3.28 ± 0.13	*	1.95 ± 0.04	***	2.81 ± 0.08	***	8.05 ± 0.25	***
AZ-115	2.07 ± 0.12	***	2.52 ± 0.15		4.79 ± 0.39	***	9.39 ± 0.66	***
AZ-129	5.10 ± 0.08	***	3.68 ± 0.15	***	5.21 ± 0.27	***	14.00 ± 0.50	***
Cq-1	2.13 ± 0.24	*	2.28 ± 0.27		2.07 ± 0.25	***	6.49 ± 0.76	*
Cq-2	3.96 ± 0.02	*	3.31 ± 0.03	**	7.76 ± 0.11	***	15.04 ± 0.17	***
Cq-3	0.12 ± 0.00	***	0.05 ± 0.00	***	0.04 ± 0.00		0.22 ± 0.006	***

**Table S2.** Tukey's–HSD multiple comparisons for saponin content. Multiple comparisons were carried out for saponin content to evaluate the significant differences. Different letters, small and capital, and also letter combinations indicate significant differences among the *C. quinoa* genotypes. SEM is the standard error of the mean.

Quinoa line	Mean	SEM	Group
Cq-2	15.04301	0.086232	a
AZ-129	14.00729	0.252109	ab
AZ-52	13.25356	0.061921	ab
AZ-3	12.32097	0.188044	abc
AZ-11	11.80002	0.218069	abcd
AZ-51	11.60049	1.400407	abcde
AZ-25	11.32823	0.267662	abcde
AZ-29	10.48916	0.390508	bcdef
AZ-7	10.47728	0.617656	bcdefg
AZ-46	9.69409	0.112231	cdefgh
AZ-26	9.420545	0.310204	cdefghi
AZ-115	9.395139	0.332736	cdefghij
AZ-30	9.291495	0.285172	cdefghijk
AZ-4	9.249942	0.080017	cdefghijkl
AZ-15	8.906645	0.138964	defghijklm
AZ-12	8.551772	0.30433	efghijklmn
AZ-111	8.376476	0.340058	fghijklmno
AZ-113	8.357189	0.150995	fghijklmno
AZ-67	8.289419	0.564337	fghijklmnop
AZ-27	8.143056	0.025349	fghijklmnopq
AZ-34	8.111276	0.394906	fghijklmnopqr

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AZ-35	8.093954	0.074104	fghijklmnopqr
AZ-114	8.053523	0.127838	fghijklmnopqr
AZ-68	7.859489	0.077819	fghijklmnopqrs
AZ-9	7.794394	0.274427	fghijklmnopqrs
AZ-88	7.706565	0.122289	ghijklmnopqrst
AZ-104	7.696932	0.418045	hijklmnopqrstu
AZ-108	7.67239	0.12883	hijklmnopqrstu
AZ-107	7.593334	0.201926	hijklmnopqrstuv
AZ-8	7.417461	0.840902	hijklmnopqrstuvw
AZ-50	7.144627	0.092807	hijklmnopqrstuvw
AZ-16	7.143619	0.164276	hijklmnopqrstuvw
AZ-63	7.06801	0.032752	ijklmnopqrstuvwxy
AZ-36	6.95475	0.300665	ijklmnopqrstuvwxy
AZ-37	6.911229	0.060711	ijklmnopqrstuvwxyA
AZ-80	6.908392	0.255224	ijklmnopqrstuvwxyA
AZ-49	6.88429	0.285424	klmnopqrstuvwxyA
AZ-65	6.87419	0.255177	klmnopqrstuvwxyA
AZ-39	6.854671	0.05834	klmnopqrstuvwxyA
AZ-21	6.803673	0.051158	lmnopqrstuvwxyAB
AZ-98	6.792033	0.253215	mnopqrstuvwxyAB
AZ-14	6.7416	0.083743	mnopqrstuvwxyAB
AZ-81	6.732861	0.259839	mnopqrstuvwxyAB
AZ-20	6.722011	0.194301	mnopqrstuvwxyAB
AZ-47	6.719652	0.224148	mnopqrstuvwxyAB
AZ-71	6.547472	0.063668	mnopqrstuvwxyABC
AZ-72	6.503511	0.081821	nopqrstuvwxyABC
AZ-48	6.496443	0.084155	nopqrstuvwxyABC
Cq-1	6.496403	0.382012	nopqrstuvwxyABC
AZ-60	6.425009	0.050915	nopqrstuvwxyABC
AZ-19	6.358073	0.128722	nopqrstuvwxyABC
AZ-61	6.355868	0.124868	nopqrstuvwxyABC
AZ-44	6.353282	0.029387	nopqrstuvwxyABC
AZ-110	6.347593	0.229898	nopqrstuvwxyABC
AZ-89	6.335284	0.46285	nopqrstuvwxyABC
AZ-59	6.256078	0.059655	nopqrstuvwxyABCD
AZ-76	6.240691	0.219323	opqrstuvwxyABCDE
AZ-41	6.153331	0.181129	opqrstuvwxyABCDE
AZ-93	6.070646	0.103154	pqrstuvwxyABCDEF
AZ-22	6.031523	0.295852	qrstuvwxyABCDEFG
AZ-96	5.931692	0.147417	rstuvwxyABCDEFGH
AZ-13	5.867038	0.160573	stuvwxyABCDEFGH
AZ-33	5.858072	0.068394	stuvwxyABCDEFGH
AZ-66	5.820114	0.117219	stuvwxyABCDEFGH
AZ-94	5.818776	0.055331	stuvwxyABCDEFGH
AZ-58	5.63775	0.03063	tuvwxyABCDEFGHI
AZ-95	5.629688	0.034352	tuvwxyABCDEFGHI

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AZ-83	5.623982	0.249076	uvwxyzABCDEFGH
AZ-55	5.619375	0.07892	uvwxyzABCDEFGH
AZ-45	5.594212	0.178042	vwxyzABCDEFGH
AZ-1	5.564102	0.120019	vwxyzABCDEFGH
AZ-6	5.548225	0.473392	wxyzABCDEFGH
AZ-97	5.542161	0.110766	vwxyzABCDEFGH
AZ-56	5.517579	0.126249	wxyzABCDEFGH
AZ-73	5.472562	0.080749	wxyzABCDEFGH
AZ-32	5.464922	0.179211	wxyzABCDEFGH
AZ-24	5.45157	0.177634	wxyzABCDEFGH
AZ-5	5.413386	0.36931	wxyzABCDEFGH
AZ-69	5.404513	0.103478	wxyzABCDEFGH
AZ-42	5.380049	0.145934	wxyzABCDEFGH
AZ-112	5.358347	0.062768	wxyzABCDEFGH
AZ-62	5.358176	0.086516	wxyzABCDEFGH
AZ-91	5.357895	0.082795	wxyzABCDEFGH
AZ-77	5.341052	0.133745	wxyzABCDEFGH
AZ-23	5.333431	0.164121	wxyzABCDEFGH
AZ-105	5.308893	0.580436	xyzABCDEFGHIJK
AZ-18	5.237719	0.116556	xyzABCDEFGHIJK
AZ-31	5.208501	0.092832	xyzABCDEFGHIJK
AZ-53	5.196108	0.088562	xyzABCDEFGHIJK
AZ-54	5.167534	0.092352	yzABCDEFGHIJK
AZ-74	5.166952	0.134722	yzABCDEFGHIJK
AZ-85	5.123988	0.102174	zABCDEFGHIJK
AZ-87	5.038159	0.062303	zABCDEFGHIJK
AZ-40	5.019057	0.062891	ABCDEFGHIJK
AZ-70	4.940577	0.084208	BCDEFGHIJK
AZ-84	4.825833	0.461347	CDEFGHIJK
AZ-38	4.819712	0.055706	CDEFGHIJK
AZ-10	4.7871	0.179095	CDEFGHIJK
AZ-86	4.745504	0.068888	CDEFGHIJK
AZ-79	4.73064	0.892351	DEFGHIJK
AZ-43	4.525911	0.206006	EFGHIJK
AZ-78	4.503585	0.096793	EFGHIJK
AZ-17	4.426341	0.090418	FGHIJK
AZ-82	4.362027	0.041832	GHIJK
AZ-99	4.337887	0.372339	HIJK
AZ-103	4.088792	0.219066	IJK
AZ-57	3.92793	0.093483	JKL
AZ-101	3.781978	0.273797	KL
AZ-102	2.858134	0.10683	L
Cq-3	0.219794	0.003195	M

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**Table S3.** Variance by genotypic effect. Variance explained by genotypic effect (Vg) was calculated according to the restricted maximum likelihood (REML) variance components. The table shows the significant genotypic effect represented by Vg, and the existence of genetic diversity is up to 94.5% within the tested population for saponin content. Mu and Sigma are the mean and the standard deviation of each variable. OA: oleanolic acid, HD: hederagenin, PA: phytolaccagenic acid.

Trait	Mu	Sigma	Min	Max	Vg
OA	2.184332	0.851878	0.119811	5.228009	95.526
HD	1.875622	0.690553	0.053093	4.182189	95.76
PA	2.626221	1.252596	0	7.874068	97.476
TS	6.686175	2.291514	0.214159	15.19523	94.561