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Supplementary materials

Phenolic fingerprint in wild growing pomegranate fruits from Azerbaijan

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All relevant data are within the paper and its Supporting Information files.

Competing Interests:
The authors declare no competing interests.

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Abstract: The demand for pomegranate (*Punica granatum* L.) juices worldwide increasing due to its documented health-promoting effects which likely derive from phenolic compounds. This study reports the phenolic composition of the juices obtained from eight wild-growing pomegranate accessions collected in eight areas of Azerbaijan, characterized by different climate and soil composition. The anthocyanins found in all the accessions were cyaniding derivatives and pelargonidin derivatives, while only two accessions contained also delphinidin-3,5-O-diglucoside. The main hydrolysable tannins contained in the juices were punicalagin and ellagic acid derivatives. These bio-active metabolites found in the juices varied qualitatively and quantitatively among the eight accessions, thus constituting specific traits for selecting promising accessions that can be used as a nutritious food source. The different phenolic profiles might be determined both by genotype and the growing environmental conditions, or by their interaction. Our results suggest that some of the studied wild-growing pomegranate accessions might have a commercial value because of their richness in bioactive metabolites and might constitute a suitable source of genes for breeding programs.

Table S1 - Soil characteristics of the eight Azerbaijan regions where the accessions were collected

Collection site	Code	Type of soil	Granulometric composition of soils [1]	Salinization of soil (%) [2]	Humus content (%) [3]	N (%)	Total iodine (mg/kg)	Co (mg/kg) 0-18 cm	Average boron content (mg/kg)	CEC (meq/100 g)	Ch:Cf ratio	pH
Khizi District (200 m.a.s.l)	Pg 1	Grey brown salt marshes	3S 3D 4C (average clay alumina)	<0.25	1.11-3.14	0.24	2.5-5.7	32.0	58.0	22-30	*	7.5-8.2
Siyazan district (230 m.a.s.l)	Pg 2	Saline soils	3S 4D 3C (average clay loamy soil)	0.25-0.5	0.5-5.8	*	2.4-3.8	30.0	83.0	ott-20	Cf > Ch	7.3-7.5 (salted with neutral salts)
Shekı Regıon (280 m.a.s.l)	Pg 3	Chestnut (Gray-brown) Light chestnut	5S 3D 2C (heavy loamy sandstone)	<0.25	2.0-3.0 1.14-1.85	0.16-0.28 0.13-0.17	4.2-10.5 4.2-6.8	15.0 10.0	24.5 26.2	25-40 21-37	* *	7.2 7.2-7.5
İsmaıllı dıstrıct (540 m.a.s.l)	Pg 4	Mountain brown soil	3S 4D 3C (average clay loamy soil)	<0.25	7-ago	0.47-0.82	2.5-5.7	16.0	74.0	39.7	0.8-1.2	7.0-7.3
Yevlakh district (60 m.a.s.l)	Pg 5	Saline earth serozems	3S 4D 3C (average clay loamy soil)	0.15-0.22	1.40-1.87	0.11-0.12	1.5-4.3	2.4	81.0	18-27	0.5-0.6	8.1-8.3
Agsu mountaın pass	Pg 6	Salt marshes	3S 4D 3C (average clay loamy soil)	0.5-1.1	4.3-6.6	*	2.4-3.8	25.0	58.0	47 -54	Cf > Ch	08/10/2020 (containin soda)
Agsu dıstrıct (190 m.a.s.l)	Pg 7	Salt marshes	3S 4D 3C (average clay loamy soil)	0.5-1.1	4.3-6.6	*	2.4-3.8	25.0	58.0	47-54	Cf > Ch	8-ott
Gokchay dıstrıct (170 m.a.s.l)	Pg 8	Light brown soils	3S 4D 3C (average clay loamy soil)	<0.25	3.0-4.0	0.16	2.5-5.7	12.0	74.0	*	*	7.0-7.5

* Information not found.
[1] Correlation between elements of granulometric composition of soils: sand, dust, clay.
[2] The salt content of the dry residue (%) in 0-100 cm layer.
[3] In the upper 0-19 cm of soil layer.
CEC - Cation Exchange Capacity.
Ch:Cf ratio - Humic and fulvic acids in humus composition.

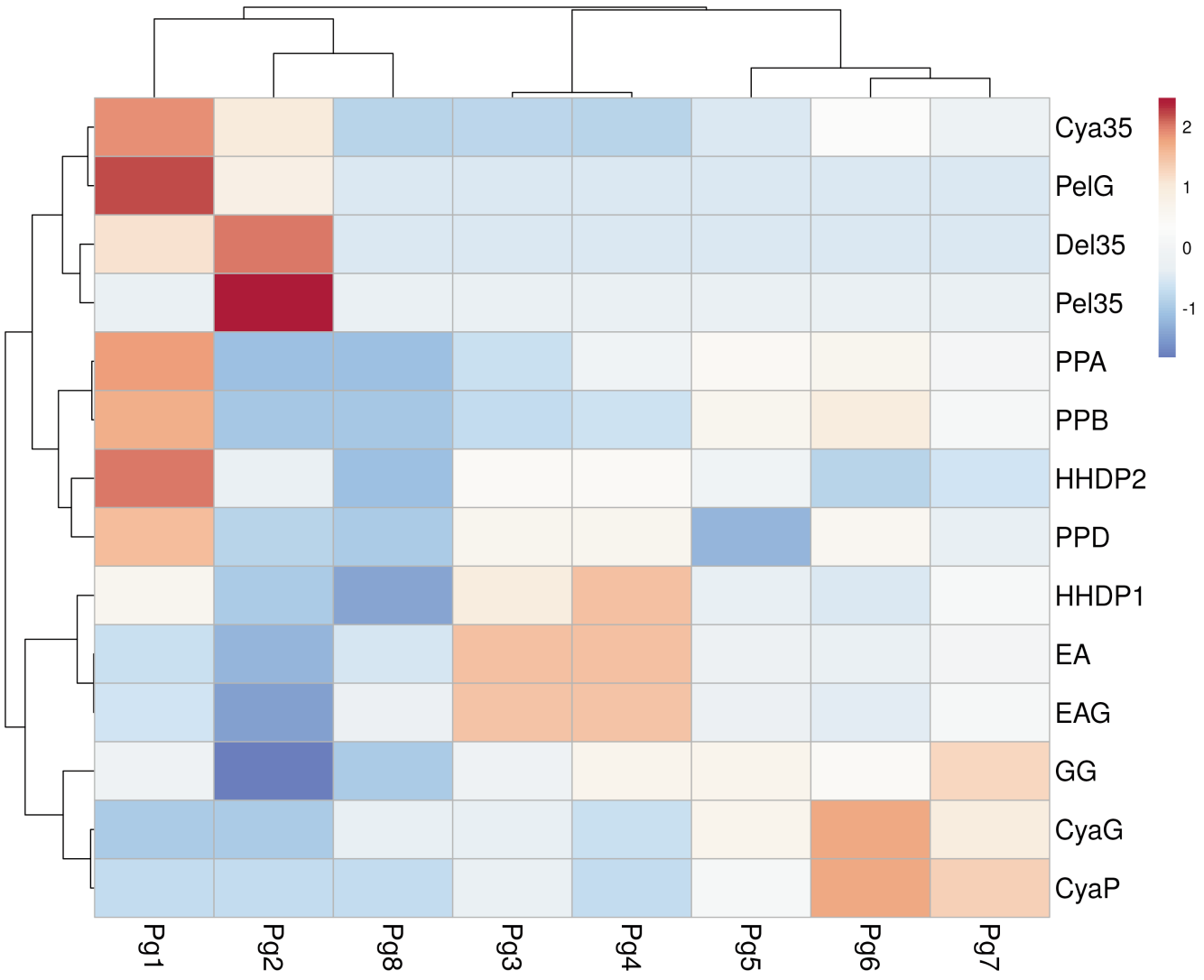

Fig. S1 - Heat map showing the concentration of phenolic compound in wild-growing pomegranate in each studied area.
Cya35= cyanidin-3,5-O-diglucoside; PelG: pelargonidin-3-O-glucoside;
Del35= delphinidin-3,5-O-diglucoside;
Pel35= pelargonidin-3,5-O-diglucoside;
PPA= punicalagin isomer α;
PPB= punicalagin isomer β;
HHDP2= HHDP-hex-deriv 2;
PPD= sum of punicalagin derivative;
HHDP1= HHDP-hex-deriv1;
EA= ellagic acid;
EAG= ellagic acid glucoside;
GG= galloyl-glucose;
CyaG= cyanidin-3-O-glucoside;
CyaP= cyanidin-3-O-pentoside.

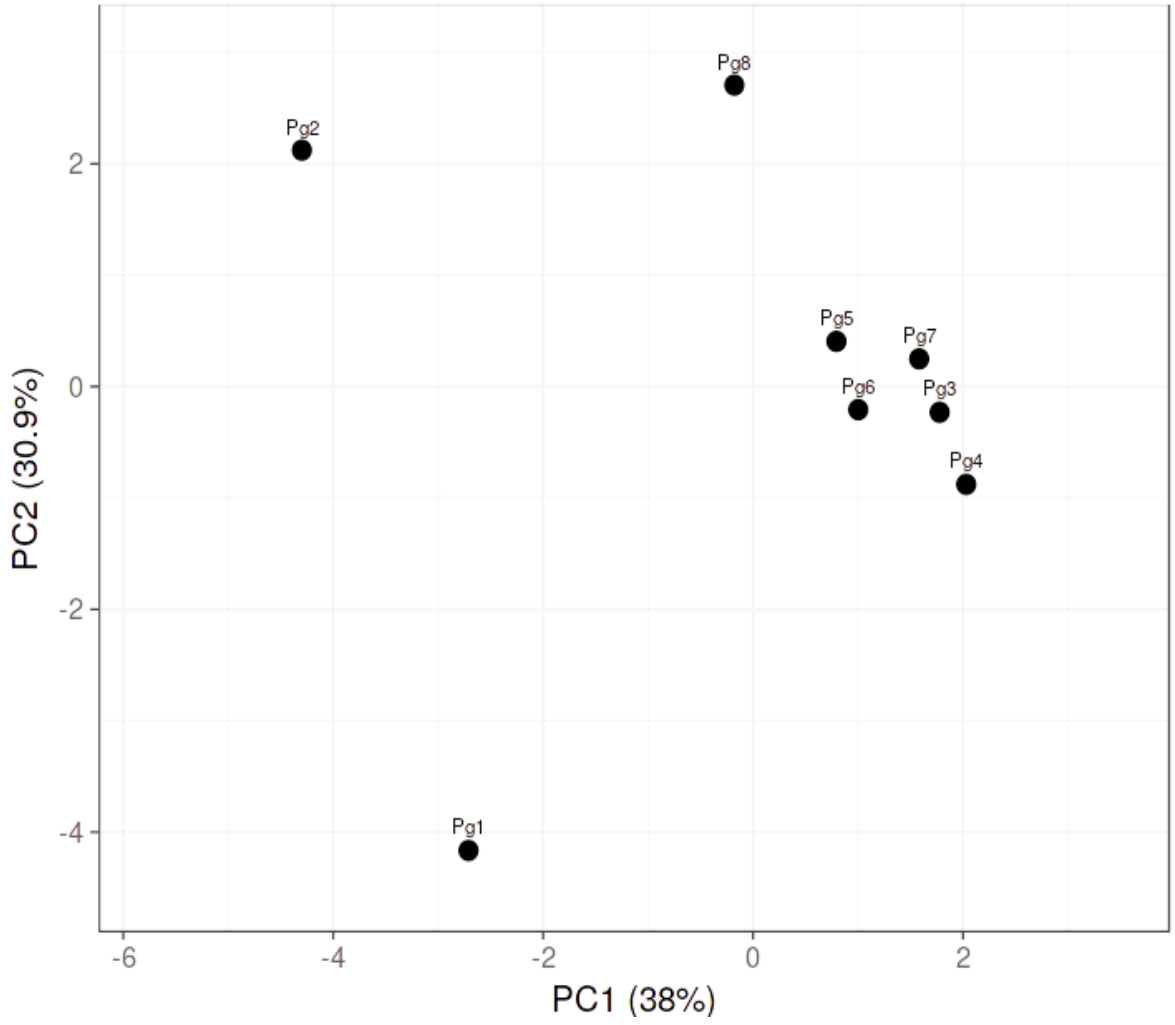

Fig. S2 - PCAbi-plot for the studied areas of wild-growing pomegranates based on the concentration of phenolic compounds.