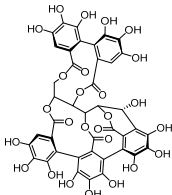
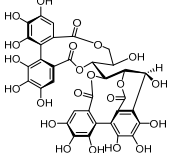
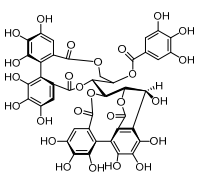
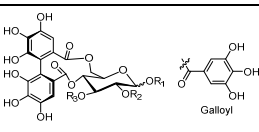
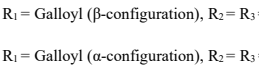
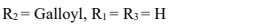
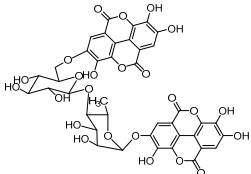
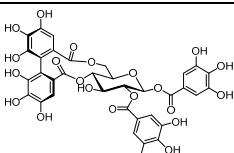
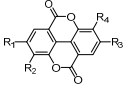
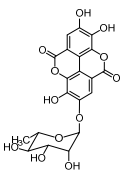
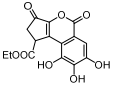
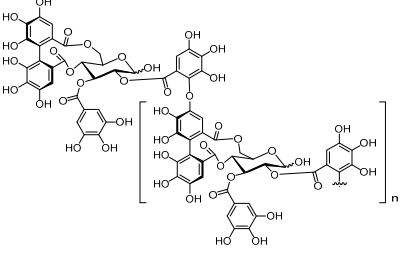
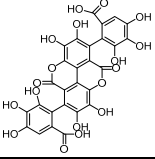
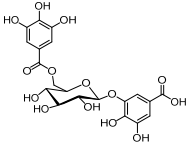
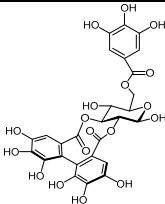
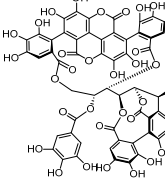
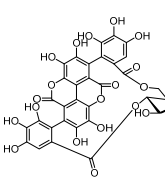
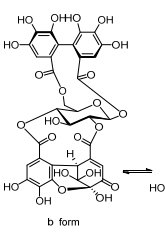
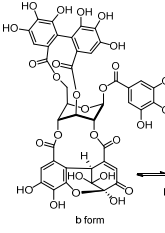
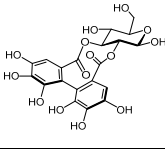
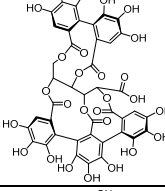
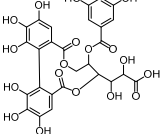
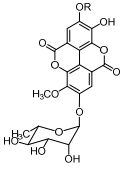
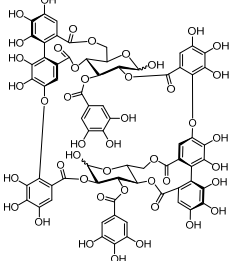
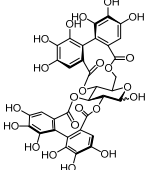
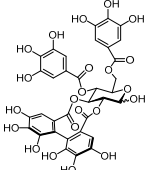
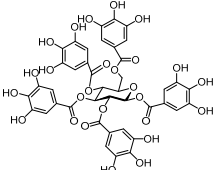
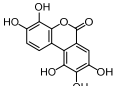
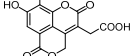
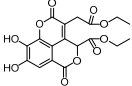


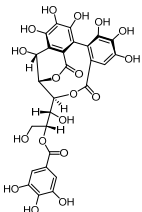
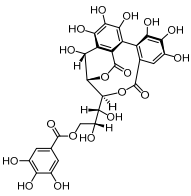
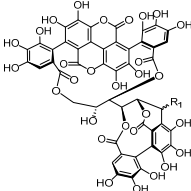
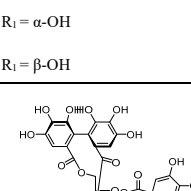
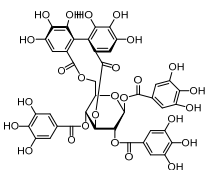
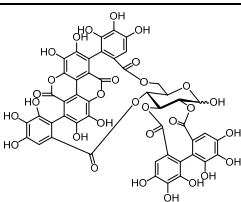
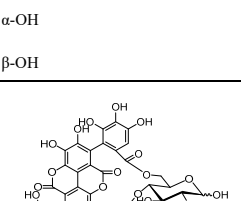
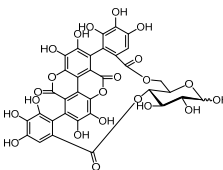
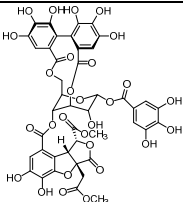
Table S1. Phytochemicals identified from different pomegranate tissues. The chemical structures, molecular formulas, and molecular weights of the phytochemicals are shown. The analytical methods, tissues of identification, and representative references are also indicated. CAS, chemical abstracts service; DAD, diode array detection; ESR, electron spin resonance; FD, fluorescence detection; FID, flame ionization detection; ID, identification method; IR, infrared spectroscopy; MP, melting point; MS, mass spectrometry; MW, molecular weight; NMR, nuclear magnetic resonance; TLC, thin layer chromatography.

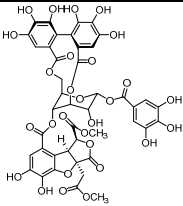
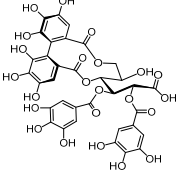
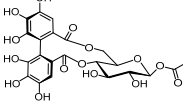
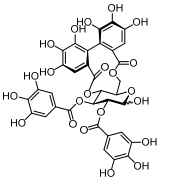
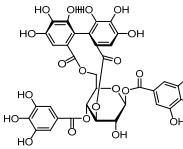
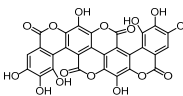
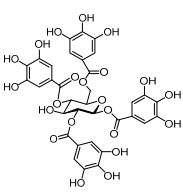
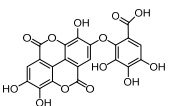
Name	Structure	Formula	MW	ID	Tissue	References
Ellagitannins, gallotannins and derivatives						
Brevifolin		C ₁₂ H ₈ O ₆	248.1900	NMR	Leaf	[1]
Brevifolin carboxylic acid		C ₁₃ H ₈ O ₈	292.1990	NMR	Leaf, flower, heartwood	[1-3]
Brevifolin carboxylic acid 10-monopotassium sulphate		C ₁₃ H ₇ KO ₁₁ S	410.3463	NMR	Leaf	[4]
Castalagin		C ₄₁ H ₂₆ O ₂₆	934.6330	NMR	Stem bark	[5]
Casuariin		C ₃₄ H ₂₄ O ₂₂	784.5440	NMR	Stem bark	[5]
Casuarinin		C ₄₁ H ₂₈ O ₂₆	936.6490	NMR	Peel, stem bark	[5, 6]
Corilagin		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR	Peel, leaf	[6, 7]
Isocorilagin		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR	Flower	[8]
Hippomanin A		C ₂₇ H ₂₂ O ₁₈	634.4550	IR	Flower	[2]
Gemin D		C ₂₇ H ₂₂ O ₁₈	634.4550	IR	Flower	[2]
Diellagic acid rhamnosyl(1→4) glucopyranoside		C ₄₀ H ₃₀ O ₂₄	894.6560	NMR	Heartwood	[9]
1,2-Di-O-galloyl-4,6-O-(S)-hexahydroxydiphenyl β-D-glucopyranoside		C ₃₄ H ₂₆ O ₂₂	786.5600	MS	Flower	[10]

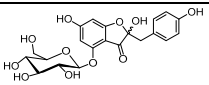
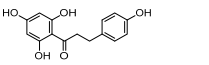
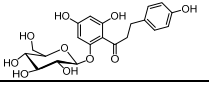
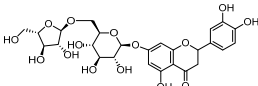
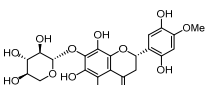
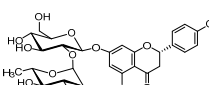
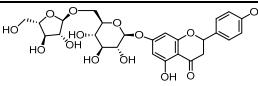
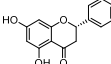
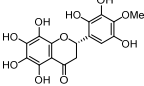
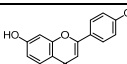
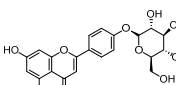
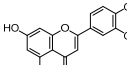
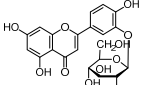
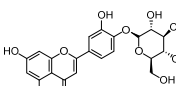
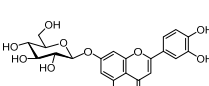
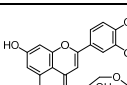
Ellagic acid	 $R_1 = R_2 = R_3 = R_4 = OH$	$C_{14}H_6O_8$	302.1940	NMR	Peel, flower, leaf	[1, 11, 12]
3,3'-Di-O-methylellagic acid	$R_1 = R_3 = OH, R_2 = R_4 = OCH_3$	$C_{16}H_{10}O_8$	330.2480	IR	Seed	[13]
3,3',4'-Tri-O-methylellagic acid	$R_1 = OH, R_2 = R_3 = R_4 = OCH_3$	$C_{17}H_{12}O_8$	344.2750	IR	Seed	[13]
3-O-methylellagic acid	$R_2 = OCH_3, R_1 = R_3 = R_4 = OH$	$C_{15}H_8O_8$	316.2210	NMR	Heartwood	[3]
4,4'-Di-O-methylellagic acid	$R_1 = R_3 = OCH_3, R_2 = R_4 = OH$	$C_{16}H_{10}O_8$	330.2480	NMR	Heartwood	[3]
3'-O-methyl-3,4-methylenedioxy-ellagic acid	$R_1-R_2 = OCH_2O, R_3 = OH, R_4 = OCH_3$	$C_{16}H_8O_8$	328.2320	NMR	Heartwood	[14]
Eschweilenol C (Ellagic acid 4-O- α -L-rhamnopyranoside)		$C_{20}H_{16}O_{12}$	448.3360	NMR	Heartwood	[14]
Ethyl brevifolincarboxylate		$C_{15}H_{12}O_8$	320.2530	IR	Flower	[12]
Eucalbanin B	 $n = 1$	$C_{68}H_{50}O_{44}$	1571.1040	NMR	Aril	[15]
Eucarpanin T ₁	$n = 2$	$C_{102}H_{74}O_{66}$	2355.6480	NMR	Aril	[15]
Pomegraniin A	$n = 3$	$C_{136}H_{98}O_{88}$	3140.1920	NMR	Aril	[15]
Pomegraniin B	$n = 4$	$C_{170}H_{122}O_{110}$	3924.7360	NMR	Aril	[15]
Gallagic acid		$C_{28}H_{14}O_{18}$	638.4020	MS	Peel	[11]
Gallic acid 3-O- β -D-(6'-O-galloyl)-glucopyranoside		$C_{20}H_{20}O_{14}$	484.3660	IR	Flower	[2]

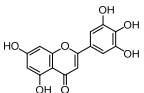
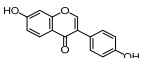
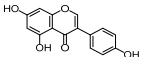
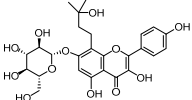
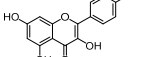
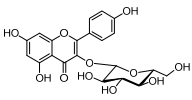
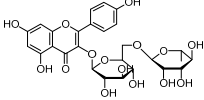
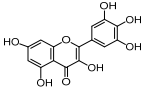
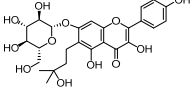
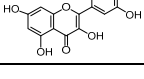
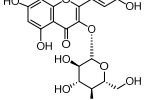
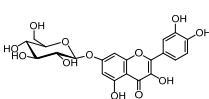
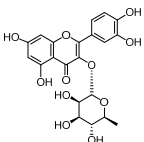
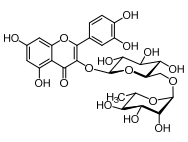
6- <i>O</i> -galloyl-2,3-(<i>S</i>)-hexahydroxydiphenoyl-D-glucose		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR MS	Stem bark, juice	[16, 17]
5-Galloylpunicacortin D		C ₅₃ H ₃₂ O ₃₄	1236.8270	NMR	Heartwood	[9]
2- <i>O</i> -galloylpunicalin (2- <i>O</i> -galloyl-4,6-(<i>S,S</i>)-gallagyl-D-glucose)		C ₄₁ H ₂₆ O ₂₆	934.6330	NMR	Heartwood, stem bark	[9, 16]
Granatin A		C ₃₄ H ₂₄ O ₂₃	800.5430	NMR	Fruit, leaf	[7, 18]
Granatin B		C ₄₁ H ₂₈ O ₂₇	952.6480	NMR	Fruit, leaf	[7, 18]
2,3-(<i>S</i>)-hexahydroxydiphenoyl-D-glucose		C ₂₀ H ₁₈ O ₁₄	482.3500	NMR MS	Stem bark, juice	[16, 17]
Lagerstannin B		C ₄₁ H ₂₆ O ₂₇	950.6320	MS	Peel	[19]
Lagerstannin C		C ₂₇ H ₂₂ O ₁₉	650.4540	MS	Juice	[17]

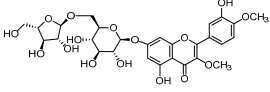
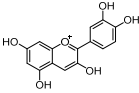
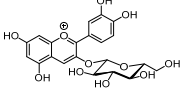
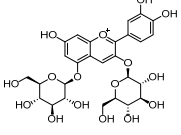
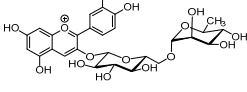
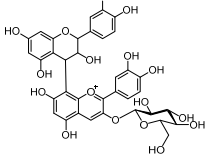
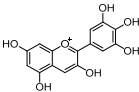
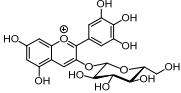
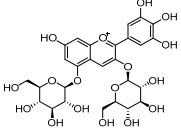
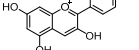
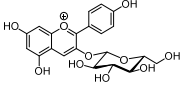
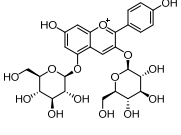
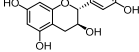
3-<i>O</i>-methylellagic acid 4-<i>O</i>-α-L-rhamnopyranoside 3,4'-<i>O</i>-dimethylellagic acid 4-<i>O</i>-α-L-rhamnopyranoside	 R = H R = CH₃	C₂₁H₁₈O₁₂ C₂₂H₂₀O₁₂	462.3630 476.3900	NMR NMR	Heartwood Heartwood	[3] [3]
Oenothien B		C₆₈H₄₈O₄₄	1569.0880	NMR	Aril	[15]
Pedunculagin I		C₃₄H₂₄O₂₂	784.5440	NMR MS	Peel, stem bark	[16, 17]
Pedunculagin II		C₃₄H₂₆O₂₂	786.5600	MS	Juice	[17]
1,2,3,4,6-Penta-<i>O</i>-galloyl-β-D-glucose		C₄₁H₃₂O₂₆	940.6810	NMR	Leaf	[7]
3,4,8,9,10-Pentahydroxydibenzo[<i>b,d</i>]pyran-6-one (Urolithin M-5)		C₁₃H₈O₇	276.2000	NMR	Leaf	[1]
Phyllanthusiin E		C₁₃H₈O₈	292.1990	NMR	Flower	[12]
Pomegranate		C₁₈H₁₆O₁₀	392.3160	NMR	Flower	[12]

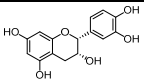
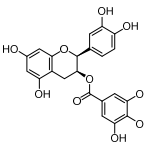
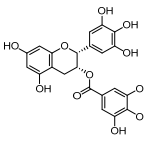
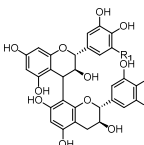
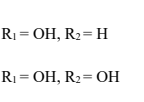
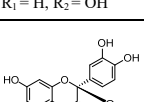
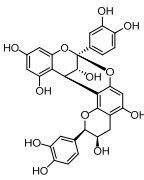
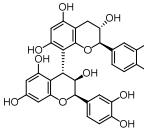
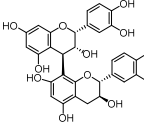
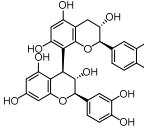
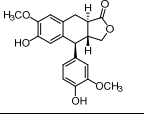
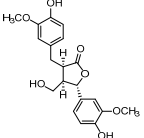
Punicacortein A		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR	Stem bark	[5]
Punicacortein B		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR	Stem bark	[5]
Punicacortein C	 R ₁ = α-OH	C ₄₈ H ₂₈ O ₃₀	1084.7220	NMR	Stem bark, peel	[5, 15]
Punicacortein D	 R ₁ = β-OH	C ₄₈ H ₂₈ O ₃₀	1084.7220	NMR	Stem bark	[5]
Punicafolin		C ₄₁ H ₃₀ O ₂₆	938.6650	NMR	Leaf	[7]
Punicalagin A	 α-OH	C ₄₈ H ₂₈ O ₃₀	1084.7220	NMR MS	Peel, stem bark, aril, juice, root	[11, 15, 16, 19, 20]
Punicalagin B	 β-OH					
Punicalin		C ₃₄ H ₂₂ O ₂₂	782.5280	NMR MS	Peel, stem bark, aril, juice, heartwood	[9, 11, 15, 16, 19]
Punicatannin A		C ₄₃ H ₃₄ O ₂₈	998.7170	NMR	Flower	[8]

Punicatannin B		C ₄₃ H ₃₄ O ₂₈	998.7170	NMR	Flower	[8]
Punigluconin		C ₃₄ H ₂₆ O ₂₃	802.5590	NMR	Stem bark	[5]
Strictinin [1- <i>O</i> -galloyl-4,6-(<i>S</i>)- hexahydroxydiphenyl-D-glucose]		C ₂₇ H ₂₂ O ₁₈	634.4550	NMR	Leaf	[7]
Tellimagrandin I		C ₃₄ H ₂₆ O ₂₂	786.5600	NMR	Peel	[6]
Tercatain [1,4-Di- <i>O</i> -galloyl-3,6-(<i>R</i>)- hexahydroxydiphenyl-β-glucopyranose]		C ₃₄ H ₂₆ O ₂₂	786.5600	NMR	Leaf	[4]
Terminalin (Gallagyl dilactone)		C ₂₈ H ₁₀ O ₁₆	602.3720	NMR	Stem bark	[16]
1,2,4,6-Tetra- <i>O</i> -galloyl-β-D-glucose		C ₃₄ H ₂₈ O ₂₂	788.5760	NMR	Leaf	[7]
1,2,3-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₁ = R ₂ = R ₃ = Galloyl, R ₄ = R ₅ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	NMR	Leaf	[1]
1,2,4-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₁ = R ₂ = R ₄ = Galloyl, R ₃ = R ₅ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	NMR	Leaf	[4]
1,2,6-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₁ = R ₂ = R ₅ = Galloyl, R ₃ = R ₄ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	NMR MS	Leaf, flower	[1, 10]
1,3,4-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₁ = R ₃ = R ₄ = Galloyl, R ₂ = R ₅ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	NMR	Leaf	[4]
1,4,6-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₁ = R ₄ = R ₅ = Galloyl, R ₂ = R ₃ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	NMR	Leaf	[1]
3,4,6-Tri- <i>O</i> -galloyl-β-glucopyranose	R ₃ = R ₄ = R ₅ = Galloyl, R ₁ = R ₂ = H	C ₂₇ H ₂₄ O ₁₈	636.4710	IR	Flower	[2]
Valoneic acid dilactone		C ₂₁ H ₁₀ O ₁₃	470.2980	MS	Juice, peel	[19]

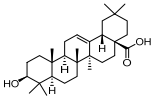
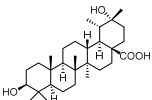
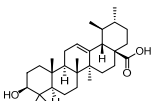
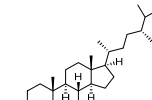
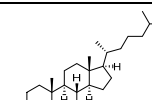
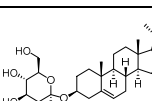
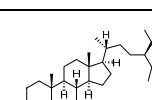
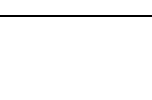
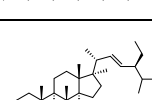
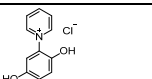
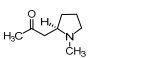
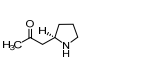
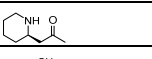
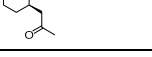
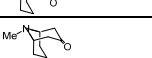
Flavonoids						
Hovetrichoside C		C ₂₁ H ₂₂ O ₁₁	450.3960	IR	Flower	[2]
Phloretin		C ₁₅ H ₁₄ O ₅	274.2720	MS	Juice	[21]
Phlorizin		C ₂₁ H ₂₄ O ₁₀	436.4130	IR	Flower	[2]
Eriodictyol-7-O-α-L-arabinofuranosyl (1-6)-β-D-glucoside		C ₂₆ H ₃₀ O ₁₅	582.5110	NMR	Stem bark	[22]
Granatumflavanyl xyloside		C ₂₁ H ₂₂ O ₁₃	482.3940	NMR	Flower	[23]
Naringin (Naringenin-7-O-rhamnoglucoside)		C ₂₇ H ₃₂ O ₁₄	580.5390	DAD	Peel	[24]
Naringenin-4'-methyl ether 7-O-α-L-arabinofuranosyl(1-6)-β-D-glucoside		C ₂₇ H ₃₂ O ₁₄	580.5390	NMR	Stem bark	[22]
Pinocembrin		C ₁₅ H ₁₂ O ₄	256.2570	MS	Juice	[21]
Punicaflavanol		C ₁₆ H ₁₄ O ₁₀	366.2780	NMR	Flower	[23]
Apigenin		C ₁₅ H ₁₀ O ₅	270.2400	DAD	Peel	[25]
Apigenin 4'-O-β-glucopyranoside		C ₂₁ H ₂₀ O ₁₀	432.3810	NMR	Leaf	[26]
Luteolin		C ₁₅ H ₁₀ O ₆	286.2390	NMR MS	Peel, flower	[10, 27]
Luteolin 3'-O-β-glucopyranoside		C ₂₁ H ₂₀ O ₁₁	448.3800	NMR	Leaf	[26]
Luteolin 4'-O-β-glucopyranoside		C ₂₁ H ₂₀ O ₁₁	448.3800	NMR	Leaf	[26]
Cynaroside (Luteolin 7-O-glycoside)		C ₂₁ H ₂₀ O ₁₁	448.3800	MS	Peel	[28]
Luteolin 3'-O-β-xylopyranoside		C ₂₀ H ₁₈ O ₁₀	418.3540	NMR	Leaf	[26]

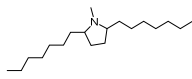
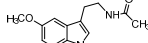
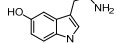
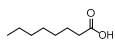
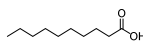
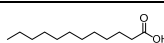
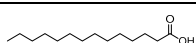
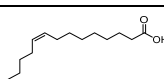
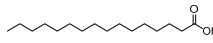
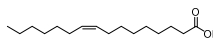
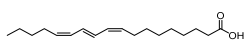
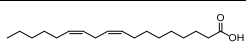
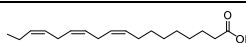
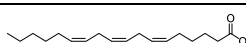
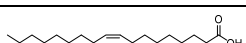
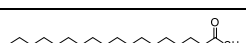
Tricetin		C ₁₅ H ₁₀ O ₇	302.2380	MS NMR	Flower, peel	[10, 27]
Daidzein		C ₁₅ H ₁₀ O ₄	254.2410	DAD	Seed	[29]
Genistein		C ₁₅ H ₁₀ O ₅	270.2400	DAD	Seed	[29]
Amurensin (Noricarinin 7-β-D-glucopyranoside)		C ₂₆ H ₃₀ O ₁₂	534.5140	MS	Juice	[30]
Kaempferol		C ₁₅ H ₁₀ O ₆	286.2390	MS	Peel	[28]
Astragalin (Kaempferol 3-O-glucoside)		C ₂₁ H ₂₀ O ₁₁	448.3800	MS	Peel	[31]
Kaempferol-3-O-rhamnoglucoside		C ₂₁ H ₂₀ O ₁₀	432.3810	MS	Juice	[21]
Myricetin		C ₁₅ H ₁₀ O ₈	318.2370	DAD	Peel	[25]
Phellatin		C ₂₆ H ₃₀ O ₁₂	534.5140	MS	Juice	[30]
Quercetin		C ₁₅ H ₁₀ O ₇	302.2380	DAD MS	Juice, leaf, seed, peel	[28, 32]
Hirsutrin (Quercetin-3-O-glucoside)		C ₂₁ H ₂₀ O ₁₂	464.3790	MS	Peel	[31]
Quercimeritrin (Quercetin-7-O-glucoside)		C ₂₁ H ₂₀ O ₁₂	464.3790	MS	Peel	[31]
Quercetin 3-O-rhamnoside		C ₂₁ H ₂₀ O ₁₁	448.3800	MS	Peel	[31]
Rutin (Quercetin-3-O-rutinoside)		C ₂₇ H ₃₀ O ₁₆	610.5210	DAD	Juice	[33]

Quercetin-3,4'-dimethyl ether 7-O- α -L-arabinofuranosyl(1-6)- β -D-glucoside		$C_{28}H_{32}O_{16}$	624.5480	NMR	Stem bark	[34]
Cyanidin		$C_{15}H_{11}O_6^+$	287.2465	ESR	Juice	[35]
Chrysanthemine (Cyanidin-3-O-glucoside)		$C_{21}H_{21}O_{11}^+$	449.3875	MS	Juice	[30]
Cyanin (Cyanidin-3,5-di-O-glucoside)		$C_{27}H_{31}O_{16}^+$	611.5285	MS	Juice	[30]
Antirrhinin (Cyanidin-3-O-rutinoside)		$C_{27}H_{31}O_{15}^+$	595.5295	MS	Juice	[30]
Catechin-cyanidin-3-hexoside		$C_{36}H_{33}O_{17}^+$	737.1715	MS	Juice	[30]
Delphinidin		$C_{15}H_{11}O_7^+$	303.2455	ESR	Juice	[35]
Myrtillin (Delphinidin-3-O-glucoside)		$C_{21}H_{21}O_{12}^+$	465.3865	MS	Juice	[30]
Delphinidin-3,5-di-O-glucoside		$C_{27}H_{31}O_{17}^+$	627.5275	MS	Juice	[30]
Pelargonidin		$C_{15}H_{11}O_5^+$	271.2475	ESR	Juice	[35]
Callistephin (Pelargonidin-3-O-glucoside)		$C_{21}H_{21}O_{10}^+$	433.3885	MS	Juice	[30]
Pelargonin (Pelargonidin-3,5-di-O-glucoside)		$C_{27}H_{31}O_{15}^+$	595.5295	MS	Juice	[30]
Catechin		$C_{15}H_{14}O_6$	290.2710	MS DAD	Peel, juice, leaf	[21, 31, 32]

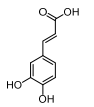
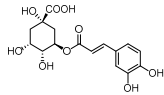
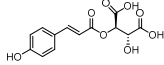
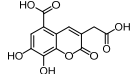
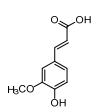
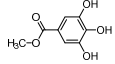
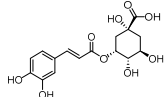
Epicatechin		C ₁₅ H ₁₄ O ₆	290.2710	MS DAD	Peel, juice, leaf, seed	[21, 31, 32]
Epicatechin gallate		C ₂₂ H ₁₈ O ₁₀	442.3760	MS	Peel	[31]
Epigallocatechin-3-O-gallate		C ₂₂ H ₁₈ O ₁₁	458.3750	DAD	Fruit	[36]
Galocatechin-(4→8)-catechin	 R ₁ = OH, R ₂ = H	C ₃₀ H ₂₆ O ₁₃	594.5250	MS	Peel	[37]
Galocatechin-(4→8)-galocatechin	 R ₁ = OH, R ₂ = OH	C ₃₀ H ₂₆ O ₁₄	610.5240	MS	Peel	[37]
Catechin-(4→8)-galocatechin	 R ₁ = H, R ₂ = OH	C ₃₀ H ₂₆ O ₁₃	594.5250	MS	Peel	[37]
Procyanidin A2		C ₃₀ H ₂₄ O ₁₂	576.5100	MS	Peel	[31]
Procyanidin B1		C ₃₀ H ₂₆ O ₁₂	578.5260	MS	Peel	[31]
Procyanidin B2		C ₃₀ H ₂₆ O ₁₂	578.5260	MS	Peel	[31]
Procyanidin B3		C ₃₀ H ₂₆ O ₁₂	578.5260	MS	Peel	[31]
Lignans						
Conidendrin		C ₂₀ H ₂₀ O ₆	356.3740	MS	Juice	[38]
Isohydroxymatairesinol		C ₂₀ H ₂₂ O ₇	374.3890	MS	Peel	[38]

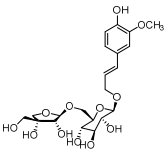
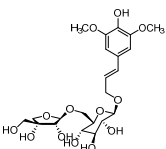
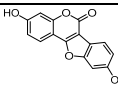
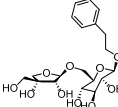
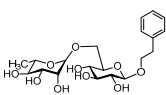
Isolariciresinol		C ₂₀ H ₂₄ O ₆	360.4060	MS	Juice, peel	[38]
Matairesinol		C ₂₀ H ₂₂ O ₆	358.3900	MS	Wood knot	[39]
Medioresinol		C ₂₁ H ₂₄ O ₇	388.4160	MS	Juice, wood knot, seed	[39]
Phylligenin		C ₂₁ H ₂₄ O ₆	372.4170	MS	Peel	[38]
Pinoresinol		C ₂₀ H ₂₂ O ₆	358.3900	MS	Juice	[21]
Secoisolariciresinol		C ₂₀ H ₂₆ O ₆	362.4220	MS	Peel, juice	[38]
Syringaresinol		C ₂₂ H ₂₆ O ₈	418.4420	MS	Juice, wood knot, peel, seed	[39]
Pomegalignan		C ₂₄ H ₂₈ O ₁₂	508.4760	NMR	Aril, peel	[15]
Punicatannin C		C ₃₁ H ₃₂ O ₁₆	660.5810	NMR	Flower	[2]
Triterpenoids and phytosterols						
Asiatic acid		C ₃₀ H ₄₈ O ₅	488.7090	MS	Flower	[10]
Betulinic acid (Betulic acid)		C ₃₀ H ₄₈ O ₃	456.7110	MP	Leaf	[40]
Friedooleanan-3-one (Friedelin)		C ₃₀ H ₅₀ O	426.7290	IR	Stem and root bark	[41]
Maslinic acid		C ₃₀ H ₄₈ O ₄	472.7100	MS	Flower	[10]

Oleanolic acid		C ₃₀ H ₄₈ O ₃	456.7110	MS	Flower	[10]
Punicanolic acid		C ₃₀ H ₅₀ O ₄	474.7260	DAD NMR	Flower, peel	[10, 27]
Ursolic acid		C ₃₀ H ₄₈ O ₃	456.7110	MS	Flower	[10]
Campesterol		C ₂₈ H ₄₈ O	400.6910	MS	Seed	[42]
Cholesterol		C ₂₇ H ₄₆ O	386.6640	MS	Seed	[42]
Daucosterol		C ₃₃ H ₆₀ O ₆	576.8590	MS	Seed, flower	[12, 13]
β-Sitosterol		C ₂₉ H ₅₀ O	414.7180	MS DAD	Seed, flower	[10, 42]
β-Sitosterol laurate		C ₄₁ H ₇₂ O ₂	597.0250	NMR	Peel	[27]
β-Sitosterol myristate		C ₄₃ H ₇₆ O ₂	625.0790	NMR	Peel	[27]
Stigmasterol		C ₂₉ H ₄₈ O	412.7020	MS	Seed	[42]
Alkaloids and indolamines						
<i>N</i> -(2',5'-dihydroxyphenyl)pyridinium chloride		C ₁₁ H ₁₀ ClNO ₂	223.6560	NMR	Leaf	[26]
Hygrine		C ₈ H ₁₅ NO	141.2140	MS	Root bark	[43]
Norhygrine		C ₇ H ₁₃ NO	127.1870	MS	Root bark	[43]
Pelletierine		C ₈ H ₁₅ NO	141.2140	MS	Stem and root bark	[43]
<i>N</i> -methylpelletierine		C ₉ H ₁₇ NO	155.2410	MS	Stem and root bark	[43]
Norpseudopelletierine		C ₈ H ₁₃ NO	139.1980	MS	Stem and root bark	[43]
Pseudopelletierine		C ₉ H ₁₅ NO	153.2250	MS	Stem and root bark	[43]

2-(2'-Hydroxypropyl)- Δ^1 piperidine		C ₈ H ₁₃ NO	141.2140	MS	Root bark	[43]
2-(2'-Propenyl)- Δ^1 piperidine		C ₈ H ₁₃ N	123.1990	MS	Root bark	[43]
Punigratane (2,5-Diheptyl-N-methylpyrrolidine)		C ₁₉ H ₃₉ N	281.5280	NMR	Peel	[44]
Sedridine		C ₈ H ₁₇ NO	143.2300	MS	Root bark	[43]
Melatonin		C ₁₃ H ₁₆ N ₂ O ₂	232.2830	MS	Fruit extract	[45]
Serotonin		C ₁₀ H ₁₂ N ₂ O	176.2190	FD	Fruit extract	[45]
Tryptamine		C ₁₀ H ₁₂ N ₂	160.2200	FD	Fruit extract	[45]
Fatty acids and lipids						
Caproic acid (Hexanoic acid)		C ₆ H ₁₂ O ₂	116.1600	MS	Juice	[46]
Caprylic acid (Octanoic acid)		C ₈ H ₁₆ O ₂	144.2140	MS	Juice	[47]
Capric acid (Decanoic acid)		C ₁₀ H ₂₀ O ₂	172.2680	MS	Juice	[47]
Lauric acid (Dodecanoic acid)		C ₁₂ H ₂₄ O ₂	200.3220	FID	Seed	[48]
Myristic acid (Tetradecanoic acid)		C ₁₄ H ₂₈ O ₂	228.3760	FID	Seed, fruit	[32]
Myristoleic acid (9- <i>cis</i> -Tetradecanoic acid)		C ₁₄ H ₂₆ O ₂	226.3600	FID	Seed	[48]
Palmitic acid (Hexadecanoic acid)		C ₁₆ H ₃₂ O ₂	256.4300	FID	Seed, fruit	[32, 49]
Palmitoleic acid (Hexadec-9-enoic acid)		C ₁₆ H ₃₀ O ₂	254.4140	FID	Seed, fruit	[32]
Punicic acid (9Z, 11E, 13Z-octadecatrienoic acid)		C ₁₈ H ₃₀ O ₂	278.4360	FID	Seed	[49]
Linoleic acid (<i>cis</i> , <i>cis</i> -9,12-Octadecadienoic acid)		C ₁₈ H ₃₂ O ₂	280.4520	FID	Seed, fruit	[32, 49]
α -Linolenic acid (All- <i>cis</i> -9,12,15-octadecatrienoic acid)		C ₁₈ H ₃₀ O ₂	278.4360	FID	Seed, fruit	[32]
γ -Linolenic acid (All- <i>cis</i> -6,9,12-octadecatrienoic acid)		C ₁₈ H ₃₀ O ₂	278.4360	FID	Seed, fruit	[32]
Oleic acid (9Z-octadecenoic acid)		C ₁₈ H ₃₄ O ₂	282.4680	MS FID	Seed, fruit	[32, 50]
Stearic acid (Octadecanoic acid)		C ₁₈ H ₃₆ O ₂	284.4840	MS FID	Seed, fruit	[32, 50]

α -Eleostearic acid (9Z, 11E, 13E-octadecatrienoic acid)		$C_{18}H_{30}O_2$	278.4360	MS	Seed	[51]
β -Eleostearic acid (9E, 11E, 13E-octadecatrienoic acid)		$C_{18}H_{30}O_2$	278.4360	MS	Seed	[51]
Catalpic acid (9E, 11E, 13Z-octadecatrienoic acid)		$C_{18}H_{30}O_2$	278.4360	MS	Seed	[51]
Arachidic acid (Eicosanoic acid)		$C_{20}H_{40}O_2$	312.5380	MS FID	Seed, fruit	[32, 50]
Gadoleic acid (9Z-icosenoic acid)		$C_{20}H_{38}O_2$	310.5220	MS	Seed	[51]
Behenic acid (Docosanoic acid)		$C_{22}H_{44}O_2$	340.5920	MS	Seed	[51]
Nervonic acid (cis-15-Tetracosenoic acid)		$C_{24}H_{46}O_2$	366.6300	FID	Seed, fruit	[32]
1-O-9E,11Z,13E-octadecatrienyl glycerol		$C_{21}H_{36}O_4$	352.5150	NMR	Seed, peel	[27, 50]
1-O-isopentyl-3-O-octadec-2-enoyl glycerol		$C_{26}H_{50}O_4$	426.6820	NMR MS	Seed, peel	[27, 50]
Tri-O-punicylglycerol		$C_{57}H_{92}O_6$	873.3570	NMR	Seed	[52]
Di-O-punicyl-O-octadeca-8Z, 11Z, 13E- trienylglycerol		$C_{57}H_{92}O_6$	873.3570	NMR	Seed	[52]
N-palmitoyl cerebroside		$C_{40}H_{77}NO_8$	700.0550	TLC FID	Seed	[53]
Organic acids and phenolic acids						
Ascorbic acid		$C_6H_8O_6$	176.1240	DAD	Leaf, peel, seed, juice	[32]
Citric acid		$C_6H_8O_7$	192.1230	MS DAD	Juice, leaf, peel, seed	[21, 32]
Fumaric acid		$C_4H_4O_4$	116.0720	DAD	Juice	[54]
L-malic acid		$C_4H_6O_5$	134.0870	MS DAD	Juice, leaf, peel, seed	[21, 32]
Oxalic acid		$C_2H_2O_4$	90.0340	DAD	Juice, leaf, peel, seed	[32, 55]

Quinic acid		C ₇ H ₁₂ O ₆	192.1670	DAD	Juice	[33]
Succinic acid		C ₄ H ₆ O ₄	118.0880	DAD	Juice, leaf, peel, seed	[32, 55]
Tartaric acid		C ₄ H ₆ O ₆	150.0860	DAD	Juice	[55]
Caffeic acid		C ₉ H ₈ O ₄	180.1590	DAD	Peel, juice, seed, leaf	[32, 33]
Chlorogenic acid		C ₁₆ H ₁₈ O ₉	354.3110	MS	Juice	[19]
Cinnamic acid		C ₉ H ₈ O ₂	148.1610	DAD	Juice	[33]
<i>O</i> -Coumaric acid		C ₉ H ₈ O ₃	164.1600	DAD	Juice	[33]
<i>p</i> -Coumaric acid		C ₉ H ₈ O ₃	164.1600	MS DAD	Peel, juice, seed, leaf	[19, 31, 32]
<i>Cis-p</i> -Coumaric acid		C ₉ H ₈ O ₃	164.1600	MS	Peel	[31]
Coutaric acid		C ₁₃ H ₁₂ O ₈	296.2310	MS	Peel	[31]
7,8-Dihydroxy-3-carboxymethylcoumarin-5-carboxylic acid		C ₁₂ H ₈ O ₈	280.1880	NMR	Flower	[2]
Ferulic acid		C ₁₀ H ₁₀ O ₄	194.1860	MS DAD	Juice, seed, peel, leaf	[17, 32]
Gallic acid		C ₇ H ₆ O ₅	170.1200	MS	Peel, juice, flower	[17, 19, 23]
Methyl gallate		C ₈ H ₈ O ₅	184.1470	MS	Heartwood	[14]
Neochlorogenic acid (5- <i>O</i> -caffeoylquinic acid)		C ₁₆ H ₁₈ O ₉	354.3110	MS	Peel, juice	[19, 31]
Protocatechuic acid		C ₇ H ₆ O ₄	154.1210	MS	Peel, juice	[19, 31]

Vanillic acid		C ₈ H ₈ O ₄	168.1480	MS	Peel, juice	[17, 31]
Coniferyl 9-O-[β-D-apiofuranosyl(1→6)]-O-β-D-glucopyranoside		C ₂₁ H ₃₀ O ₁₂	474.4590	NMR	Seed	[13]
Sinapyl 9-O-[β-D-apiofuranosyl(1→6)]-O-β-D-glucopyranoside		C ₂₂ H ₃₂ O ₁₃	504.4850	NMR	Seed	[13]
Other compounds						
Catechol		C ₆ H ₆ O ₂	110.1120	DAD	Juice	[33]
Coumestrol		C ₁₅ H ₈ O ₅	268.2240	DAD	Seed	[29]
Icariside D1		C ₁₉ H ₂₈ O ₁₀	416.4230	MS	Seed	[13]
Phenylethylrutinoside		C ₂₀ H ₃₀ O ₁₀	430.4500	MS	Seed	[13]
Syringaldehyde		C ₉ H ₁₀ O ₄	182.1750	MS	Juice	[21]

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11 References

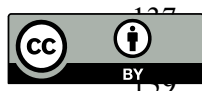
1. Nawwar, M. A. M.; Hussein, S. A. M.; Merfort, I., NMR spectral analysis of polyphenols from *Punica granatum*. *Phytochemistry* **1994**, *36*, 793-798.
2. Yuan, T.; Wan, C.; Ma, H.; Seeram, N. P., New phenolics from the flowers of *Punica granatum* and their *in vitro* α-glucosidase inhibitory activities. *Planta Med* **2013**, *79*, 1674-1679.
3. El-Toumy, S.; Rauwald, H., Two new ellagic acid rhamnosides from *Punica granatum* heartwood. *Plant Med* **2003**, *69*, 682-684.
4. Hussein, S. A. M.; Barakat, H. H.; Merfort, I.; Nawwar, M. A. M., Tannins from the leaves of *Punica granatum*. *Phytochemistry* **1997**, *45*, (4), 819-823.
5. Tanaka, T.; Nonaka, G.-I.; Nishioka, I., Tannins and related compounds. XLI. : Isolation and characterization of novel ellagitannins, punicacortins A, B, C, and D, and punigluconin from the bark of *Punica granatum* L. *Chem Pharm Bull (Tokyo)* **1986**, *34*, 656-663.
6. Satomi, H.; Umemura, K.; Ueno, A.; Hatano, T.; Okuda, T.; Noro, T., Carbonic anhydrase inhibitors from the pericarps of *Punica granatum* L. *Biol Pharm Bull* **1993**, *16*, 787-790.
7. Tanaka, T.; Nonaka, G.-I.; Nishioka, I., Punicafofin, an ellagitannin from the leaves of *Punica granatum*. *Phytochemistry* **1985**, *24*, 2075-2078.

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8. Yuan, T.; Ding, Y.; Wan, C.; Li, L.; Xu, J.; Liu, K.; Slitt, A.; Ferreira, D.; Khan, I. A.; Seeram, N. P., Antidiabetic ellagitannins from pomegranate flowers: inhibition of α -glucosidase and lipogenic gene expression. *Org Lett* **2012**, *14*, 5358-5361.
9. El-Toumy, S. A. A.; Rauwald, H. W., Two ellagitannins from *Punica granatum* heartwood. *Phytochemistry* **2002**, *61*, 971-974.
10. Xie, Y.; Morikawa, T.; Ninomiya, K.; Imura, K.; Muraoka, O.; Yuan, D.; Yoshikawa, M., Medicinal flowers. XXIII. New taraxastane-type triterpene, punicanolic acid, with tumor necrosis factor- α inhibitory activity from the flowers of *Punica granatum*. *Chem Pharm Bull (Tokyo)* **2008**, *56*, 1628-1631.
11. Glazer, I.; Masaphy, S.; Marciano, P.; Bar-Ilan, I.; Holland, D.; Kerem, Z.; Amir, R., Partial identification of bioactive compounds having antifungal activities from *Punica granatum* peel extracts. *J Agric Food Chem* **2012**, *60*, 4841-4848.
12. Wang, R.; Wei, W.; Wang, L.; Liu, R.; Yi, D.; Du, L., Constituents of the flowers of *Punica granatum*. *Fitoterapia* **2006**, *77*, 534-537.
13. Wang, R.-F.; Xie, W.-D.; Zhang, Xing, D.-M.; Ding, Y.; Wang, W.; Ma, C.; Du, L.-J., Bioactive compounds from the seeds of *Punica granatum* (pomegranate). *J Nat Prod* **2004**, *67*, 2096-2098.
14. El-Toumy, S.; Marzouk, M.; Rauwald, H., Ellagi- and gallotannins from *Punica granatum* heartwood. *Pharmazie* **2001**, *56*, 823-824.
15. Ito, H.; Li, P.; Koreishi, M.; Nagatomo, A.; Nishida, N.; Yoshida, T., Ellagitannin oligomers and a neolignan from pomegranate arils and their inhibitory effects on the formation of advanced glycation end products. *Food Chem* **2014**, *152*, 323-330.
16. Tanaka, T.; Nonaka, G.-I.; Nishioka, I., Tannins and related compounds. XL. : Revision of the structures of punicalin and punicalagin, and isolation and characterization of 2-O-galloylpunicalin from the bark of *Punica granatum* L. *Chem Pharm Bull (Tokyo)* **1986**, *34*, 650-655.
17. Calani, L.; Beghè, D.; Mena, P.; Del Rio, D.; Bruni, R.; Fabbri, A.; Dall'Asta, C.; Galaverna, G., Ultra-HPLC-MSn (poly)phenolic profiling and chemometric analysis of juices from ancient *Punica granatum* L. cultivars: a nontargeted approach. *J Agric Food Chem* **2013**, *61*, 5600-5609.
18. Steinmetz, W. E., NMR assignment and characterization of proton exchange of the ellagitannin granatin B. *Magn Reson Chem* **2010**, *48*, 565-570.
19. Fischer, U. A.; Carle, R.; Kammerer, D. R., Identification and quantification of phenolic compounds from pomegranate (*Punica granatum* L.) peel, mesocarp, aril and differently produced juices by HPLC-DAD-ESI/MSⁿ. *Food Chem* **2011**, *127*, 807-821.
20. Ono, N.; Bandaranayake, P. C. G.; Tian, L., Establishment of pomegranate (*Punica granatum*) hairy root cultures for genetic interrogation of the hydrolyzable tannin biosynthetic pathway. *Planta* **2012**, *236*, 931-941.
21. Mena, P.; Calani, L.; Dall'Asta, C.; Galaverna, G.; García-Viguera, C.; Bruni, R.; Crozier, A.; Del Rio, D., Rapid and comprehensive evaluation of (poly)phenolic compounds in pomegranate (*Punica granatum* L.) juice by UHPLC-MSⁿ. *Molecules* **2012**, *17*, 14821-14840.
22. Srivastava, R.; Chauhan, D.; Chauhan, J., Flavonoid diglycosides from *Punica granatum*. *Indian J Chem, Section B* **2001**, *40B*, 170-172.
23. Bagri, P.; Ali, M.; Sultana, S.; Aeri, V., New flavonoids from *Punica granatum* flowers. *Chem Nat Compd* **2010**, *46*, 201-204.
24. Lansky, E. P.; Newman, R. A., *Punica granatum* (pomegranate) and its potential for prevention and treatment of inflammation and cancer. *J Ethnopharmacol* **2007**, *109*, 177-206.

25. Zhao, X.; Yuan, Z.; Fang, Y.; Yin, Y.; Feng, L., Flavonols and flavones changes in pomegranate (*Punica granatum* L.) fruit peel during fruit development. *J Agr Sci Tech* **2014**, *16*, 1649-1659.
26. Nawwar, M. A. M.; Hussein, S. A. M.; Merfort, I., Leaf phenolics of *Punica granatum*. *Phytochemistry* **1994**, *37*, 1175-1177.
27. Lal, C.; Sharma, M.; Shakyawar, D.; Raja, A.; Sharma, K.; Pareek, P., Natural Dye constituents from rind of *Punica granatum* and its application on Pashmina fabrics. *Arch Appl Sci Res* **2011**, *3*, 350-357.
28. van Elswijk, D. A.; Schobel, U. P.; Lansky, E. P.; Irth, H.; van der Greef, J., Rapid dereplication of estrogenic compounds in pomegranate (*Punica granatum*) using on-line biochemical detection coupled to mass spectrometry. *Phytochemistry* **2004**, *65*, 233-241.
29. Moneam, N. M. A.; El Sharaky, A. S.; Badreldin, M. M., Oestrogen content of pomegranate seeds. *J Chromatogr* **1988**, *438*, 438-442.
30. Gómez-Caravaca, A. M.; Verardo, V.; Toselli, M.; Segura-Carretero, A.; Fernández-Gutiérrez, A.; Caboni, M. F., Determination of the major phenolic compounds in pomegranate juices by HPLC-DAD-ESI-MS. *J Agric Food Chem* **2013**, *61*, 5328-5337.
31. Ambigaipalan, P.; de Camargo, A. C.; Shahidi, F., Phenolic compounds of pomegranate byproducts (outer skin, mesocarp, divider membrane) and their antioxidant activities. *J Agric Food Chem* **2016**, *64*, 6584-6604.
32. Pande, G.; Akoh, C. C., Antioxidant capacity and lipid characterization of six Georgia-grown pomegranate cultivars. *J Agric Food Chem* **2009**, *57*, 9427-9436.
33. Artik, N.; Murakami, H.; Mori, T., Determination of phenolic compounds in pomegranate juice by using HPLC. *Fruit Process* **1998**, *8*, 492-499.
34. Chauhan, D.; Chauhan, J. S., Flavonoid diglycoside from *Punica granatum*. *Pharm Biol* **2001**, *39*, 155-157.
35. Noda, Y.; Kaneyuki, T.; Mori, A.; Packer, L., Antioxidant activities of pomegranate fruit extract and its Anthocyanidins: delphinidin, cyanidin, and pelargonidin. *J Agric Food Chem* **2002**, *50*, 166-171.
36. de Pascual-Teresa, S.; Santos-Buelga, C.; Rivas-Gonzalo, J. C., Quantitative analysis of flavan-3-ols in Spanish foodstuffs and beverages. *J Agric Food Chem* **2000**, *48*, 5331-5337.
37. Plumb, G. W.; Pascual-Teresa, S. d.; Santos-Buelga, C.; Rivas-Gonzalo, J. C.; Williamson, G., Antioxidant properties of galocatechin and prodelphinidins from pomegranate peel. *Redox Rep* **2002**, *7*, 41-46.
38. Fischer, U. A.; Jaksch, A. V.; Carle, R.; Kammerer, D. R., Determination of lignans in edible and nonedible parts of pomegranate (*Punica granatum* L.) and products derived therefrom, particularly focusing on the quantitation of isolariciresinol using HPLC-DAD-ESI/MSⁿ. *J Agric Food Chem* **2012**, *60*, 283-292.
39. Bonzanini, F.; Bruni, R.; Palla, G.; Serlataite, N.; Caligiani, A., Identification and distribution of lignans in *Punica granatum* L. fruit endocarp, pulp, seeds, wood knots and commercial juices by GC-MS. *Food Chem* **2009**, *117*, 745-749.
40. Brieskorn, C.; Keskin, M., Betulic acid in the leaves of *Punica granatum*. *Pharm Acta Helv* **1955**, *30*, 361-362.
41. Fayez, M.; Negm, S.; Sharaf, A., Constituents of local plants. V. The constituents of various parts of the pomegranate plant. *Planta Med* **1963**, *11*, 439-443.
42. Kaufman, M.; Wiesman, Z., Pomegranate oil analysis with emphasis on MALDI-TOF/MS triacylglycerol fingerprinting. *J Agric Food Chem* **2007**, *55*, 10405-10413.
43. Neuhofer, H.; Witte, L.; Gorunovic, M.; Czygan, F., Alkaloids in the bark of *Punica granatum* L. (pomegranate) from Yugoslavia. *Pharmazie* **1993**, *48*, 389-391.
44. Rafiq, Z.; Narasimhan, S.; Vennila, R.; Vaidyanathan, R., Punigratane, a novel pyrrolidine alkaloid from *Punica granatum* rind with putative efflux inhibition activity. *Nat Prod Res* **2016**, *25*, 1-6.

45. Badria, F., Melatonin, serotonin, and tryptamine in some egyptian food and medicinal plants. *J Med Food* **2004**, *5*, 153-157.
46. Mayuoni-kirshinbaum, L.; Tietel, Z.; Porat, R.; Ulrich, D., Identification of aroma-active compounds in 'wonderful' pomegranate fruit using solvent-assisted flavour evaporation and headspace solid-phase micro-extraction methods. *Eur Food Res Technol* **2012**, *235*, 277-283.
47. Andreu-Sevilla, A. J.; Mena, P.; Martí, N.; García Viguera, C.; Carbonell-Barrachina, Á. A., Volatile composition and descriptive sensory analysis of pomegranate juice and wine. *Food Res Int* **2013**, *54*, 246-254.
48. Akbari, M.; Vaziri, A.; Nasab, A., Comparison of quantitative and qualitative seed oil of pomegranate extracted by cold-press and hexane solvent. *Ind J Fund Appl Life Sci* **2015**, *5*, 3704-3709.
49. Fernandes, L.; Pereira, J.; López-Cortés, I.; Salazar, D.; Ramalhosa, E.; Casal, S., Lipid composition of seed oils of different pomegranate (*Punica granatum* L.) cultivars from Spain. *Int J Food Stud* **2015**, *4*, 95-103.
50. Fatope, M. O.; Al Burtomani, S. K. S.; Takeda, Y., Monoacylglycerol from *Punica granatum* seed oil. *J Agric Food Chem* **2002**, *50*, 357-360.
51. Topkafa, M.; Kara, H.; Sherazi, S. T. H., Evaluation of the triglyceride composition of pomegranate seed oil by RP-HPLC followed by GC-MS. *J Am Oil Chem Soc* **2015**, *92*, 791-800.
52. Yusuph, M.; Mann, J., A triglyceride from *Punica granatum*. *Phytochemistry* **1997**, *44*, 1391-1392.
53. Tsuyuki, H.; Ito, S.; Nakatsukasa, Y., Studies on the lipids in pomegranate seeds. *Bull Coll Agric Vet Med Nihon Univ* **1981**, *38*, 141-148.
54. Melgarejo, P.; Salazar, D. M.; Artés, F., Organic acids and sugars composition of harvested pomegranate fruits. *Eur Food Res Technol* **2000**, *211*, 185-190.
55. Poyrazoğlu, E.; Gökmen, V.; Artık, N., Organic acids and phenolic compounds in pomegranates (*Punica granatum* L.) grown in Turkey. *J Food Com Anal* **2002**, *15*, 567-575.



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