

Supplementary table 1: Subgroup analysis of the effects of berries ingestion on primary outcomes of this meta-analysis.

Variables	TC				HDL				LDL				TG				SBP				DBP			
	Number of trials	95% CI	<i>p</i> -value	I ² (%)	Number of trials	95% CI	<i>p</i> -value	I ² (%)	Number of trials	95% CI	<i>p</i> -value	I ² (%)	Number of trials	95% CI	<i>p</i> -value	I ² (%)	Number of trials	95% CI	<i>p</i> -value	I ² (%)	Number of trials	95% CI	<i>p</i> -value	I ² (%)
Total	33	-	-	-	30	-	-	-	32	-	-	-	32	-	-	-	33	-	-	-	34	-	-	-
WMD observed	-	-0.151 (-0.316 to 0.014)	0.073	78.237	-	0.048 (0.02 to 0.076)	0.001*	5.307	-	-0.139 (-0.246 to -0.032)	0.011*	56.230	-	-0.069 (-0.135 to -0.003)	0.042*	15.291	-	-2.073 (- .3.504 to -0.641)	0.005*	17.264	-	-1.432 (-2.479 to -0.386)	0.007*	39.690
WMD adjusted	-	-0.292 (- 0.4442 to -0.139)	-	-	-	0.062 (0.034 to 0.091)	-	-	-	-0.244 (-0.352 to -0.136)	-	-	-	-0.1371 (-0.203 to -0.072)	-	-	-	-2.8648 (-4.340 to -1.389)	-	-	-	-1.432 (-2.479 to -0.386)	-	-
Subgroup analysis																								
BMI (Kg/m²)																								
<i>normal (between 18.5 and 25)</i>	6	0.216 (-0.027 to 0.459)	0.081	0.000	6	0.081 (-0.013 to 0.176)	0.091	14.522	6	0.063 (-0.127 to 0.253)	0.517	0.000	6	0.003 (-0.132 to 0.138)	0.960	0.000	7	-1.53 (-5.532 to 2.473)	0.454	25.696	8	-1.781 (-4.182 to 0.62)	0.146	14.934
<i>overweight (> 25)</i>	23	-0.255 (-0.455 to -0.156)	0.0012*	82.854	21	0.04 (0.006 to 0.073)	0.020*	16.643	22	-0.183 (-0.315 to -0.051)	0.007*	65.365	21	-0.115 (-0.201 to -0.03)	0.008*	97.178	23	-2.323 (-4.108 to -0.538)	0.011*	25.342	24	-1.218 (-2.408 to -0.029)	0.045*	43.625
Mean age																								
<i>≥ 50 years</i>	15	-0.219 (-0.536 to -0.099)	0.177	87.043	12	0.005 (-0.033 to 0.043)	0.794	0.000	13	-0.145 (-0.344 to 0.054)	0.155	72.615	14	-0.142 (-0.217 to -0.067)	0.000*	50.450	17	-2.974 (-5.724 to -0.223)	0.034*	46.710	18	-1.779 (-3.348 to -0.119)	0.036*	49.298
<i>< 50 years</i>	13	-0.13 (-0.334 to 0.074)	0.135	51.964	14	0.053 (0.001 to 0.105)	0.046*	0.000	14	-0.049 (-0.176 to 0.078)	0.450	6.822	14	-0.017 (-0.152 to 0.118)	0.805	32.893	12	-1.747 (-3.697 to 0.204)	0.079	0.000	12	-1.419 (-3.183 to 0.345)	0.115	39.042

Intervention duration																								
<i>longer term</i> (<i>> 56 days</i>)	11	-0.092 (-0.28 to 0.095)	0.334	49.490	11	0.028 (-0.044 to 0.101)	0.445	42.495	12	-0.128 (-0.289 to 0.033)	0.119	46.680	12	0.003 (-0.089 to 0.095)	0.946	0.000	9	-2.383 (-6.085 to 1.32)	0.207	46.169	9	-0.741 (-2.696 to 1.214)	0.458	40.081
<i>medium term</i> (<i>between 30 and 56 days</i>)	14	-0.239 (-0.559 to 0.082)	0.144	86.566	13	0.051 (0.012 to 0.09)	0.010*	85.603	13	-0.211 (-0.405 to -0.018)	0.032*	68.321	14	-0.163 (-0.249 to -0.078)	0.000*	54.137	15	-2.292 (-4.093 to -0.491)	0.013*	0.000	16	-1.762 (-3.388 to -0.137)	0.034*	40.703
<i>shorter term</i> (<i>≤ 30 days</i>)	8	-0.032 (-0.289 to 0.223)	0.805	50.754	17	0.017 (-0.051 to 0.085)	0.629	0.000	7	0.012 (-0.138 to 0.163)	0.874	0.000	8	-0.109 (-0.329 to 0.111)	0.332	99.001	9	-1.294 (-4.168 to 1.58)	0.378	18.775	9	-1.643 (-3.778 to 0.493)	0.132	46.905
Type of patient																								
<i>CVDs risk factors</i>	7	0.022 (-0.139 to 0.184)	0.673	0.000	7	0.066 (0.005 to 0.127)	0.033*	0.000	6	-0.057 (-0.26 to 0.146)	0.584	31.597	6	-0.024 (-0.137 to 0.089)	0.680	99.165	8	-1.93 (-6.524 to 2.664)	0.410	63.724	8	-1.002 (-3.708 to 1.704)	0.468	65.403
<i>diabetic</i>	2	-0.317 (-1.10 to 0.466)	0.002*	89.384	1	0.000 (-0.139 to 0.139)	1.000	NA	2	-0.309 (-0.897 to -0.279)	0.303	85.674	2	-0.038 (-0.306 to 0.230)	0.783	0.000	1	-1.00 (-6.903 to 4.903)	0.740	NA	2	-0.506 (-3.374 to 2.362)	0.729	0.000
<i>dyslipidaemic</i>	8	-0.183 (-0.476 to 0.11)	0.008*	63.477	8	0.033 (-0.028 to 0.095)	0.288	0.000	8	-0.063 (-0.288 to 0.161)	0.581	39.490	8	-0.123 (-0.374 to 0.129)	0.339	55.590	6	-1.775 (-4.429 to 0.878)	0.190	0.000	6	-0.936 (-3.418 to 1.546)	0.460	53.112
<i>healthy</i>	8	0.001 (-0.241 to 0.244)	0.991	37.543	7	0.055 (-0.023 to 0.133)	0.166	25.788	8	-0.093 (-0.227 to 0.041)	0.172	0.000	9	0.005 (-0.113 to 0.124)	0.931	0.000	10	-3.764 (-6.936 to -0.591)	0.020*	25.353	10	-3.737 (-5.895 to -1.579)	0.001*	24.083
<i>metabolic syndrome</i>	7	-0.4 (-1.003)	0.193	91.820	6	0.004 (-0.044)	0.879	0.000	7	-0.232 (-0.555)	0.158	76.252	6	-0.22 (-0.338)	0.000*	78.085	7	-0.741 (-3.544)	0.605	0.000	7	-0.586 (-2.366)	0.519	0.000

		to 0.202)				to 0.051)				to 0.09)				to - 0.102)				to 2.063)				to 1.193)			
Type of berry																									
<i>bilberry</i>	3	-0.011 (-0.237 to 0.215)	0.926	0.000	3	0.083 (0.013 to 0.153)	0.019*	0.000	2	-0.212 (-0.624 to 0.199)	0.312	65.684	3	-0.049 (-0.250 to 0.152)	0.633	0.000	3	0.006 (-3.738 to 3.870)	0.973	0.000	3	-0.459 (-2.522 to 1.604)	0.663	0.000	
<i>black raspberry</i>	2	-0.159 (-0.945 to 0.627)	0.692	82.493	2	0.025 (-0.085 to 0.135)	0.654	0.000	2	-0.05 (-0.461 to 0.36)	0.181	58.660	2	-0.033 (-0.241 to 0.176)	0.759	0.000	4	-3.118 (-7.731 to 1.494)	0.185	22.017	4	-2.133 (-6.496 to 2.229)	0.338	67.416	
<i>blackberry</i>	1	-0.060 (-0.450 to 0.330)	0.763	NA	1	0.090 (-0.007 to 0.187)	0.069	NA	1	0.050 (-0.236 to 0.336)	0.732	NA	1	-0.140 (-0.774 to 0.494)	0.665	NA	1	-1.530 (-5.400 to 2.340)	0.438	NA	1	0.560 (-1.696 to 2.816)	0.627	NA	
<i>blueberry</i>	7	-0.139 (-0.312 to 0.034)	0.116	0.000	8	0.056 (-0.02 to 0.135)	0.146	53.215	8	-0.268 (-0.391 to -0.144)	0.000*	0.000	8	-0.011 (-0.151 to 0.128)	0.872	0.000	10	-2.224 (-4.851 to 0.402)	0.097	0.000	10	-2.017 (-3.764 to -0.269)	0.024*	0.000	
<i>chokeberry</i>	1	0.207 (-0.344 to 0.758)	0.461	NA	1	0.010 (-0.135 to 0.155)	0.892	NA	1	0.170 (-0.293 to 0.633)	0.472	NA	1	-0.060 (-0.397 to 0.277)	0.727	NA	1	-16.600 (- 26.276 to -6.924)	0.001*	NA	1	-8.600 (- 13.918 to -3.282)	0.002*	NA	
<i>cranberry</i>	9	-0.063 (-0.296 to 0.171)	0.599	67.380	7	0.026 (-0.051 to 0.103)	0.505	18.162	9	-0.093 (-0.287 to 0.101)	0.346	59.727	8	0.011 (-0.104 to 0.125)	0.853	0.000	7	-3.888 (-7.143 to - 0.634)	0.019*	34.722	8	-1.356 (-4.455 to 1.743)	0.391	70.169	
<i>elderberry</i>	2	0.012 (-0.603 to 0.627)	0.969	69.756	2	-0.031 (-0.192 to 0.130)	0.707	0.000	2	0.1 (-0.214 to 0.413)	0.533	0.000	2	-0.011 (-0.172 to 0.151)	0.897	0.000	1	7.000 (-0.785 to 14.785)	0.078	NA	1	1.000 (-3.863 to 5.863)	0.687	NA	

<i>goji berry</i>	1	0.030 (-0.479 to 0.539)	0.908	NA	0	-	-	-	0	-	-	-	1	-0.020 (-0.572 to 0.532)	0.943	NA	1	0.530 (-6.430 to 7.490)	0.881	NA	1	-0.270 (-4.397 to 3.857)	0.898	NA
<i>maqui berry</i>	1	0.020 (-0.451 to 0.491)	0.934	NA	1	0.020 (-0.216 to 0.256)	0.868	NA	1	0.000 (-0.536 to 0.536)	1.000	NA	0	-	-	-	1	1.800 (-11.949 to 15.549)	0.797	NA	1	0.700 (-7.188 to 8.588)	0.862	NA
<i>strawberry</i>	4	-0.202 (-0.758 to 0.35)	0.471	73.729	4	0.012 (-0.108 to 0.132)	0.850	0.000	4	-0.202 (-0.723 to 0.319)	0.448	67.217	4	-0.036 (-0.299 to 0.226)	0.785	0.000	4	-0.856 (-4.409 to 2.696)	0.637	0.000	4	-1.095 (-3.092 to 0.903)	0.283	0.000
<i>whortleberry</i>	2	-1.437 (2.311 to -0.563)	0.001*	85.913	1	0.019 (-0.127 to 0.161)	0.793	NA	2	0.718 (-1.384 to -0.053)	0.034*	80.150	2	-0.548 (-1.076 to -0.019)	0.042*	80.285	0	-	-	-	0	-	-	-

WMD - weighted mean differences; CI - confidence interval; * Indicates a significant result; BMI - body mass index; CVDs - cardiovascular diseases; TC - total cholesterol; HDL - HDL-cholesterol; LDL - LDL-cholesterol; TG - triglycerides; SBP - systolic blood pressure; DBP - diastolic blood pressure; NA - not applicable.

Supplementary table 2: Results of sensitivity analysis.

Outcomes	Number of removed studies	I ² (%)	WMD		
			observed		adjusted
			95% CI	<i>p</i> -value	95% CI
TC	1	50.72	-0.093 (-0.208 to 0.021)	0.110	-0.186 (-0.2925 to -0.073)
HDL	3	0	0.047 (0.013 to 0.080)	0.006*	0.066 (0.035 to 0.097)
LDL	5	0	-0.099 (-0.178 to -0.021)	0.013*	-0.1314 (-0.214 to -0.05)
TG	5	0	-0.074 (-0.148 to -0.001)	0.049*	-0.096 (-0.1642 to -0.028)
SBP	4	0	-1.065 (-1.925 to -0.205)	0.015*	-0.3216 (-1.374 to 0.734)
DBP	3	0	-2.239 (-3.559 to -0.919)	0.001*	-2.473 (-3.761 to -1.1845)

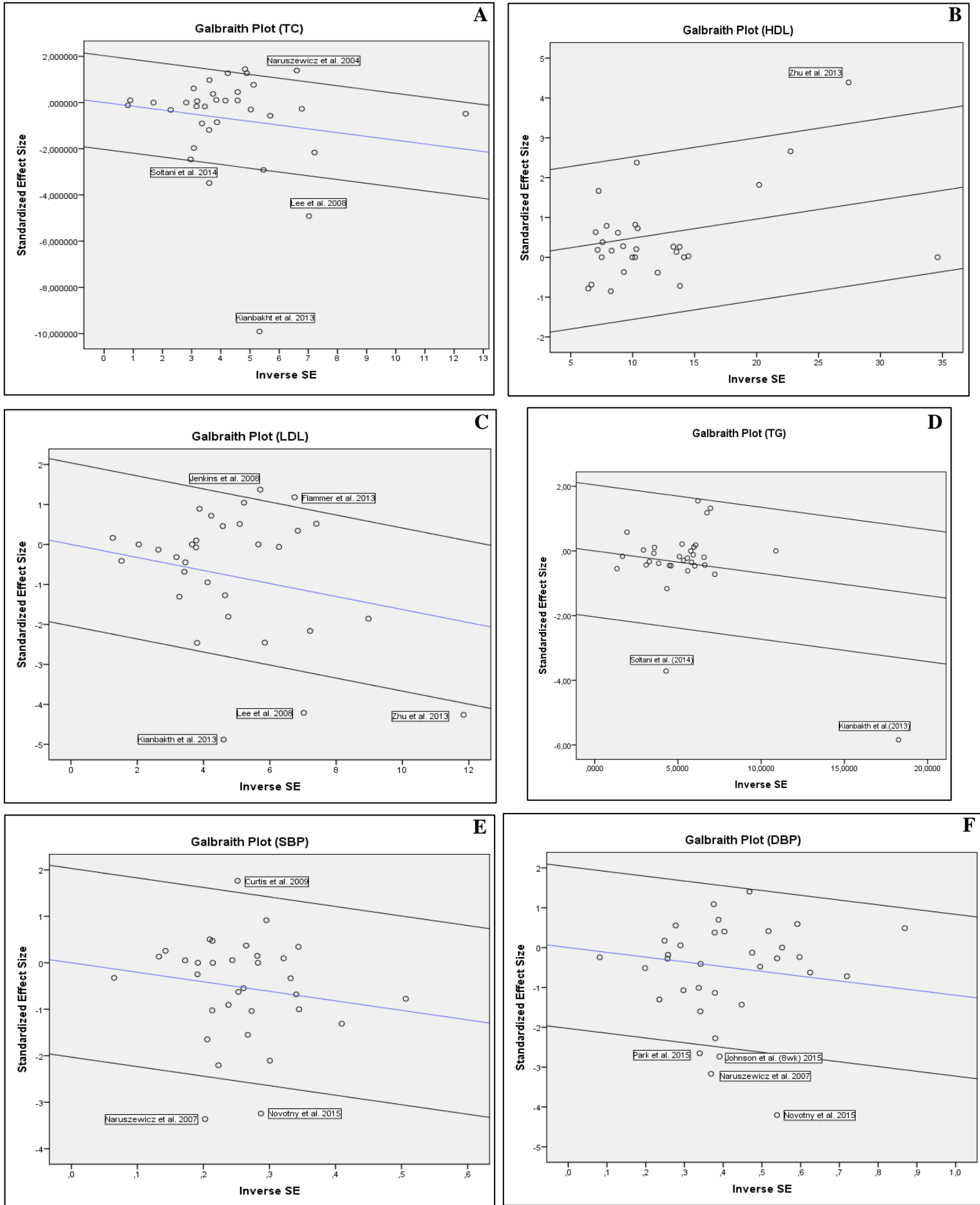
WMD - weighted mean differences; CI - confidence interval; * Indicates a significant result; TC - total cholesterol; HDL - HDL-cholesterol; LDL - LDL-cholesterol; TG - triglycerides; SBP - systolic blood pressure; DBP - diastolic blood pressure.

Supplementary table 3: Assessment of publication bias for the impact of berries consumption on CVDs risk factors.

Outcomes	Egger's regression test			
	95% CI	<i>t</i>	df	<i>p</i> -value
TC	-1.57442 to 2.12595	0.30399	31	0.76317
HDL	-1.27988 to 0.36329	1.14263	28	0.26287
LDL	-0.78104 to 1.94254	0.87095	30	0.3907
TG	-0.37394 to 1.47561	1.21146	30	0.23329
SBP	-1.46202 to 1.15392	0.24065	31	0.81141
DBP	-2.11409 to 0.38567	1.40841	32	0.16865
CRP	-0.87019 to 0.41307	0.74081	21	0.46701
TNF- α	-3.50339 to 1.9269	0.65674	9	0.52779
IL-6	-1.41233 to 0.0069	2.1601	12	0.0517
VCAM	-1.57629 to 0.70915	0.82668	12	0.42455
ICAM	-0.66124 to 0.17911	1.25003	12	0.23512
glucose	-0.85602 to 0.92435	0.08097	17	0.93641
insulin	-0.50375 to 0.94019	0.71471	7	0.49792
Apo A-I	-1.31059 to 2.13949	0.58788	6	0.57805
Apo B	-2.61585 to 1.13772	1.09334	4	0.33567

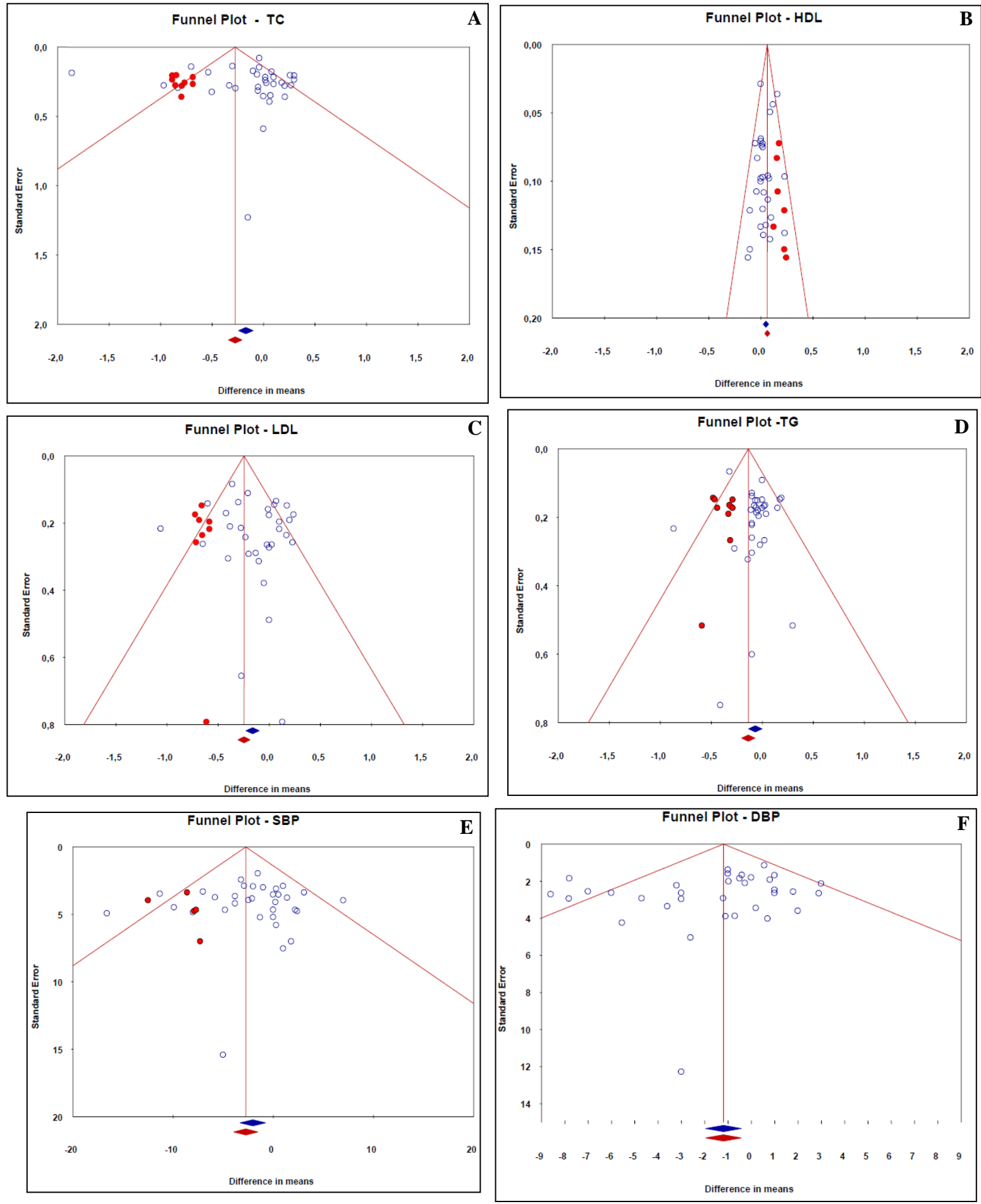
CI - confidence interval; df - degrees of freedom; TC - total cholesterol; HDL - HDL-cholesterol; LDL - LDL-cholesterol; TG - triglycerides; SBP - systolic blood pressure; DBP - diastolic blood pressure; CRP - C-reactive protein; TNF- α - tumour necrosis factor- α ; IL-6 - interleukin-6; VCAM - vascular cell adhesion molecule-1; ICAM - intercellular adhesion molecule-1; Apo A-I - apolipoprotein A-I; Apo B - apolipoprotein B.

Supplementary figure 1: Galbraith plots of the primary outcomes of this meta-analysis.



TC - total cholesterol; HDL - HDL-cholesterol; LDL - LDL-cholesterol; TG - triglycerides; SBP - systolic blood pressure; DBP - diastolic blood pressure.

Supplementary figure 2: Funnel plots of standard error by difference in means (publication bias tests) of the effects of berries ingestion on primary outcomes of this meta-analysis.



TC - total cholesterol; HDL - HDL-cholesterol; LDL - LDL-cholesterol; TG - triglycerides; SBP - systolic blood pressure; DBP - diastolic blood pressure.