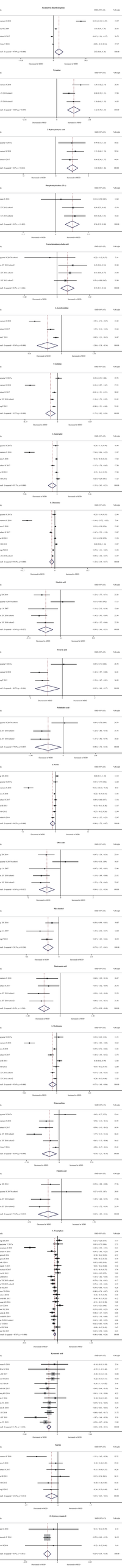
a
Ascorbic dimethylester
Study
SMD (95% CI)
%Weight
Karonen S 2014
0.24 (-0.10 | 0.58)
19.57
Sellke MI, 2004
1.16 (0.36 | 1.96)
8.21
Ebrahimi F 2017
-0.07 (-1.16 | 0.97)
3.75
Ali-Sisto T 2018
-0.09 (-0.32 | 0.14)
27.17
Overall (I-squared = 57.9%, p = 0.086)
0.32 (0.08 | 0.56)
100.00
-1.0
-0.5
0.0
0.5
1.0
Decreased in MMP
Increased in MMP
b
Tocopherol
Study
SMD (95% CI)
%Weight
Karonen S 2014
-1.70 (-2.02 | -1.38)
28.36
Fan D 2018 (adult)
0.00 (0.70 | 1.31)
17.08
Fan D 2018 (elderly)
-1.10 (0.65 | 1.55)
16.55
Ali-Sisto T 2018
-1.12 (0.76 | 1.55)
100.00
Overall (I-squared = 96.8%, p = 0.000)
-1.0
-0.5
0.0
0.5
1.0
Decreased in MMP
Increased in MMP
c
1-Methylnicotinic acid
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.39 (0.12 | 1.42)
16.42
Karonen S 2018
1.22 (0.68 | 1.76)
30.94
Liu XY 2015 (adult)
0.98 (0.28 | 1.57)
19.03
Overall (I-squared = 0.0%, p = 0.612)
1.02 (0.69 | 1.36)
100.00
-2.0
-1.0
0.0
1.0
2.0
Decreased in MMP
Increased in MMP
d
Phosphatidylcholine (PLC)
Study
SMD (95% CI)
%Weight
Karonen S 2014
0.30 (-0.30 | 0.91)
12.61
Liu XY 2015 (adult)
0.39 (0.21 | 0.95)
41.16
Liu XY 2015 (elderly)
0.65 (0.28 | 1.01)
46.23
Overall (I-squared = 0.0%, p = 0.446)
0.50 (0.32 | 0.86)
100.00
-1.0
-0.5
0.0
0.5
1.0
Decreased in MMP
Increased in MMP
e
Tauroh(taurolo)ursodeoxycholic acid
Study
SMD (95% CI)
%Weight
Karonen S 2017b
0.22 (-1.02 | 0.57)
7.10
Zhou XY 2018 (adult)
0.40 (0.04 | 0.96)
22.40
Liu XY 2015 (adult)
0.41 (0.04 | 0.77)
36.66
Zhou XY 2018 (elderly)
0.56 (0.08 | 0.82)
33.85
Overall (I-squared = 0.0%, p = 0.446)
0.35 (0.15 | 0.56)
100.00
-1.0
-0.5
0.0
0.5
1.0
Decreased in MMP
Increased in MMP
f
5-Aminolevulinic
Study
SMD (95% CI)
%Weight
Karonen S 2014
-2.91 (-4.76 | -1.07)
31.85
Ali-Sisto T 2018
-1.39 (-2.34 | -0.43)
53.68
Vancsa J 2018
-0.82 (-1.31 | -0.43)
14.47
Overall (I-squared = 95.4%, p = 0.000)
-2.06 (-3.58 | -0.54)
100.00
-4.0
-2.0
0.0
2.0
Decreased in MMP
Increased in MMP
g
Creatinine
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.20 (-0.31 | 1.06)
19.78
Karonen S 2018
0.94 (-0.22 | 3.65)
17.32
Fan D 2018
0.01 (-1.31 | 0.31)
20.92
Ebrahimi F 2017
-1.32 (-1.96 | -0.68)
17.38
Wu M 2015
-0.33 (-0.61 | 0.35)
17.46
Yu SB 2012
0.30 (-0.29 | 0.91)
17.23
Overall (I-squared = 87.7%, p = 0.000)
-0.33 (-1.41 | 0.21)
100.00
-4.0
-2.0
0.0
2.0
4.0
Decreased in MMP
Increased in MMP
h
L-Arginine
Study
SMD (95% CI)
%Weight
Karonen S 2017a
-0.36 (-1.16 | 0.44)
16.46
Karonen S 2018
-7.64 (-9.06 | -6.22)
13.97
Fan D 2018
-0.11 (-0.40 | 0.21)
22.52
Ebrahimi F 2017
-1.17 (-1.78 | -0.65)
17.38
Wu M 2015
-0.33 (-0.61 | 0.35)
17.46
Yu SB 2012
0.30 (-0.29 | 0.91)
17.23
Overall (I-squared = 97.7%, p = 0.000)
-1.73 (-2.41 | -0.21)
100.00
-10.0
-5.0
0.0
5.0
Decreased in MMP
Increased in MMP
i
L-Citrulline
Study
SMD (95% CI)
%Weight
Karonen S 2017a
-0.25 (-1.06 | 0.55)
16.46
Karonen S 2018
-11.64 (-13.72 | -9.55)
7.98
Fan D 2018
0.19 (-0.10 | 0.50)
23.46
Ebrahimi F 2017
-1.67 (-2.21 | -1.14)
15.07
Wu M 2015
0.11 (-0.38 | 0.59)
17.16
Yu SB 2012
0.40 (0.06 | 1.04)
15.87
Overall (I-squared = 98.7%, p = 0.000)
-1.78 (-3.11 | -0.45)
100.00
-10.0
-5.0
0.0
5.0
Decreased in MMP
Increased in MMP
j
Linoleic acid
Study
SMD (95% CI)
%Weight
Ding XD 2014
-1.24 (-1.77 | -0.71)
21.28
Karonen S 2017b (adult)
0.11 (-0.67 | 0.92)
17.13
Pagi-Lt 2007
-1.16 (-2.11 | -0.16)
15.69
Zhou XY 2018 (adult)
-1.42 (-1.95 | -0.89)
21.38
Zhou XY 2018 (elderly)
-1.02 (-1.57 | -0.46)
22.39
Overall (I-squared = 81.4%, p = 0.027)
-0.94 (-1.46 | -0.41)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
k
Ferrous acid
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.09 (-0.71 | 0.90)
26.70
Karonen S 2018
-1.41 (-1.97 | -0.84)
36.41
Zhou F 2012
-1.24 (-1.67 | -0.81)
36.89
Overall (I-squared = 38.7%, p = 0.000)
-0.92 (-1.60 | -0.27)
100.00
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
l
Palmitoleic acid
Study
SMD (95% CI)
%Weight
Karonen S 2017b (adult)
0.00 (-0.78 | 0.80)
25.78
Zhou XY 2018 (adult)
-1.28 (-1.80 | -0.76)
25.78
Zhou XY 2018 (elderly)
-1.37 (-1.96 | -0.79)
24.42
Overall (I-squared = 75.0%, p = 0.045)
-0.90 (-1.78 | -0.18)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
m
L-Serine
Study
SMD (95% CI)
%Weight
Ding XD 2014
0.68 (0.11 | 1.18)
13.11
Karonen S 2017a
0.81 (-0.77 | 2.02)
12.20
Karonen S 2018
-0.81 (-0.61 | 7.36)
8.93
Ogawa S 2016
0.32 (-0.30 | 0.93)
13.41
Ebrahimi F 2017
0.00 (-0.68 | 0.67)
13.41
Wu M 2015
0.32 (-0.61 | 0.36)
13.17
Yu SB 2012
0.27 (-0.42 | 0.26)
12.99
Wendell JF 2016
0.01 (-1.37 | 0.42)
12.69
Overall (I-squared = 60.2%, p = 0.008)
0.30 (-1.72 | 0.65)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
n
Olive acid
Study
SMD (95% CI)
%Weight
Ding XD 2014
0.07 (-1.38 | 0.36)
21.64
Karonen S 2017b (adult)
0.30 (-0.16 | 1.08)
16.87
Pagi-Lt 2007
-0.97 (-1.91 | -0.04)
15.69
Zhou XY 2018 (adult)
-1.39 (-1.88 | -0.86)
23.02
Zhou XY 2018 (elderly)
-1.22 (-1.79 | -0.65)
22.67
Overall (I-squared = 65.4%, p = 0.027)
-0.66 (-1.31 | -0.36)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
o
Myristoleic acid
Study
SMD (95% CI)
%Weight
Ding XD 2014
-0.30 (-0.99 | 0.01)
24.67
Pagi-Lt 2007
-1.30 (-1.88 | -0.27)
22.68
Zhou XY 2018
-0.87 (-1.28 | -0.46)
52.65
Overall (I-squared = 28.2%, p = 0.246)
-0.79 (-1.15 | -0.41)
100.00
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
p
Dodecanoic acid
Study
SMD (95% CI)
%Weight
Karonen S 2018
-0.46 (-1.09 | 0.16)
26.07
Ebrahimi F 2017
-0.75 (-1.02 | -0.06)
26.76
Zhou XY 2018 (adult)
-0.90 (-1.46 | -0.40)
23.39
Zhou XY 2018 (elderly)
-0.66 (-1.01 | -0.31)
23.76
Overall (I-squared = 0.0%, p = 0.104)
-0.72 (-0.96 | -0.48)
100.00
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
q
L-Methionine
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.30 (-0.62 | 1.18)
11.31
Karonen S 2018
-0.83 (-0.81 | 1.08)
10.65
Ogawa S 2016
-0.39 (-0.36 | 0.82)
12.21
Ebrahimi F 2017
-1.01 (-1.51 | -0.51)
13.41
Wu M 2015
0.30 (0.02 | 0.96)
12.61
Yu SB 2012
-0.07 (-0.62 | 0.47)
12.60
Zhou XY 2018
-0.75 (-1.28 | -0.21)
13.41
Zhou XY 2018 (adult)
-0.28 (-0.63 | 0.08)
13.25
Overall (I-squared = 55.4%, p = 0.008)
-0.72 (-1.01 | -0.06)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
r
Hypoxanthine
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.31 (-0.37 | 1.23)
13.64
Karonen S 2018
-0.82 (-1.61 | -0.41)
16.90
Ebrahimi F 2017
-0.96 (-1.49 | -0.43)
16.94
Zhou XY 2018 (adult)
-1.77 (-2.31 | -1.22)
16.45
Zhou XY 2018 (elderly)
-0.41 (-1.15 | -0.06)
16.45
Overall (I-squared = 87.3%, p = 0.000)
-0.26 (-0.87 | -0.01)
19.60
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
s
Palmitic acid
Study
SMD (95% CI)
%Weight
Karonen S 2017a
0.30 (-1.08 | 0.06)
27.76
Karonen S 2017b (adult)
0.27 (-0.53 | 1.07)
20.01
Zhou XY 2018 (adult)
-1.90 (-1.68 | -0.79)
27.06
Zhou XY 2018 (elderly)
-1.11 (-1.72 | -0.50)
25.18
Overall (I-squared = 75.2%, p = 0.013)
-0.69 (-1.21 | -0.16)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
t
N-Urocaphan
Study
SMD (95% CI)
%Weight
Ding XD 2014
0.23 (-0.16 | 0.78)
1.77
Karonen S 2017a
0.00 (-0.67 | 0.67)
1.41
Karonen S 2017b
0.41 (-0.31 | 1.19)
1.27
Karonen S 2018
-0.00 (-0.67 | 0.67)
1.41
Ogawa S 2016
0.30 (-0.62 | 0.85)
4.32
Ogawa S 2016
0.00 (-0.67 | 0.67)
1.41
Qian J 2016
0.62 (-0.05 | 0.94)
4.60
Ebrahimi F 2017
0.00 (-0.67 | 0.67)
1.41
Ebrahimi F 2017
0.00 (-0.67 | 0.67)
1.41
Wu M 2015
0.00 (-0.68 | 0.32)
1.88
Wu M 2015
0.00 (-0.67 | 0.67)
1.41
Yu SB 2012
0.74 (-1.56 | -0.41)
0.37
Yu SB 2012
0.74 (-1.56 | -0.41)
0.37
Chu GC 2017
-0.30 (-0.84 | -0.23)
4.26
Chu GC 2017
-0.30 (-0.84 | -0.23)
4.26
Sawa-Ohtake
-0.34 (-0.74 | 0.08)
1.48
Wendell JF 2017
-0.14 (-0.32 | 0.21)
4.32
Yang SJ 2016
-0.13 (-0.63 | 0.34)
2.84
Yu CY 2018
0.02 (-0.81 | 0.39)
4.19
Lu SY 2018
0.00 (-0.67 | 0.67)
1.41
Zhou YL 2018
0.00 (-0.68 | 0.46)
0.85
Overall (I-squared = 42.8%, p = 0.000)
-0.06 (-0.26 | 0.04)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
u
Acrylamide
Study
SMD (95% CI)
%Weight
Karonen S 2018
-0.41 (-0.82 | 0.36)
2.34
Chu GC 2016
-0.32 (-1.18 | 0.47)
1.97
Chu GC 2017
-0.20 (-0.54 | 0.34)
10.00
Sawa-Ohtake
0.21 (-0.53 | 1.11)
1.97
Sawa-1 (2018)
-0.36 (-1.14 | 0.42)
1.86
Yang SJ 2016
0.00 (-0.68 | 0.68)
1.41
Yang SJ2 2016
-0.61 (-1.14 | 0.08)
2.52
Yu CY 2018
-0.61 (-1.14 | 0.08)
2.52
Lu SY 2018
-0.30 (-0.67 | 0.68)
1.80
Zhou YL 2018
-0.61 (-0.68 | 0.61)
1.41
Overall (I-squared = 17.2%, p = 0.000)
-0.32 (-0.62 | -0.01)
100.00
-3.0
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
v
Taurine
Study
SMD (95% CI)
%Weight
Karonen S 2018
-1.12 (-1.61 | -0.56)
15.22
Ogawa S 2016
-0.12 (-0.48 | 0.25)
19.32
Ebrahimi F 2017
-0.11 (-0.68 | 0.37)
16.26
Wu M 2015
0.12 (-0.36 | 0.61)
16.31
Yu SB 2012
-0.30 (-1.06 | 0.46)
12.41
Zhang F 2012
-0.24 (-0.76 | 0.28)
16.48
Overall (I-squared = 0.0%, p = 0.813)
-0.25 (-0.61 | 0.06)
100.00
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP
w
25-Hydroxyvitamin D
Study
SMD (95% CI)
%Weight
Gindel I 2014
0.13 (-0.82 | 0.58)
7.14
Mihatsch T 2016
-0.29 (-0.46 | -0.16)
96.13
Pierce D 2018
0.12 (-0.92 | 0.88)
1.69
Overall (I-squared = 0.0%, p = 0.013)
-0.28 (-0.38 | -0.18)
100.00
-2.0
-1.0
0.0
1.0
Decreased in MMP
Increased in MMP