**Supplementary Table 1** Carotenoid content (µg/g consumed weight) of study foods, means (SD).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Animal Crackers | Fruit Gummies | Dried Plums\* | Dried Figs | Dried Dates | Raisin |
| α carotene | 0.0528 (0.0024) | ND | 1.76 (0.041) | 0.100 (0.015) | ND | ND |
| β carotene | 0.170 (0.011) | 0.103 (0.0048) | 7.58 (0.30) | 0.562 (0.037) | 0.139 (0.015) | 0.0948 (0.025) |
| Lutein | 0.609 (0.022) | ND | ND | 0.0916 (0.021) | ND | ND |
| Total | 0.823 (0.0093) | 0.103 (0.0048) | 12.87 (0.53) | 0.754 (0.073) | 0.139 (0.015) | 0.0948 (0.025) |

ND, specific carotenoid species was not detectable. \*Dried plums carotenoids do not sum to total because other carotenoids were detected in plums including β-cryptoxanthin (0.425 ± 0.028 µg/g), 9-cis β-carotene (2.36 ± 0.12 µg/g), 13-cis β-carotene (0.748 ± 0.050 µg/g).

**Supplementary Table 2** Phenolic composition (µg/g consumed weight) of study foods, means (SD).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Animal Crackers | Fruit Gummies | Dried Plums | Dried Figs | Dried Dates | Raisin |
| Protocatechuic acid\* | ND | ND | ND | 42.6 (3.5) | ND | 20.4 (0.61) |
| Gallic acid | ND | ND | 82.0 (11) | 2.73 (0.77) | ND | ND |
| Caffeic acid | ND | 77.3 (23) | 2053 (199) | 179 (16) | 265 (5.6) | 75.7 (8.6) |
| Ferulic acid | 21.3 (1.1) | NQ | 4.82 (0.65) | 6.42 (0.43) | 21.1 (0.21) | NQ |
| p Coumaric acid | NQ | NQ | 2.61 (0.23) | 1.11 (0.14) | 7.50 (0.30) | NQ |
| 3-Caffeoylquinic acid | ND | ND | 88.0 (4.6) | 2.54 (0.44) | ND | ND |
| Apigenin\* | ND | ND | ND | 10.1 (0.55) | ND | ND |
| Kaemfero-3-glucoside\* | ND | ND | ND | ND | NQ | 13.6 (1.9) |
| Quercetin | ND | ND | ND | 1.69 (0.051) | NQ | 10.5 (0.25) |
| Quercetin-3-glucoside\* | ND | NQ | ND | NQ | 58.6 (0.72) | 130 (12) |
| Total phenolics by UPLC | 21.3 (1.1) | 77.3 (23) | 690 (52) | 243 (17) | 351 (4.8) | 250 (21) |
| Total phenolic content (µg GAE/mL)† | 233 (47) | 238 (81) | 513 (50 ) | 334 (70) | 275 (59) | 281 (22) |

ND, specific phenolic compound was not detectable. NQ, below the quantification limit. \*Content of protocatechuic acid, apigenin, kaemferol-3-glucoside, and quercetin-3-glucoside should be perceived as semi-quantitative values, since these phenolic compounds were not calculated based on calibration curves of the matching authentic standards. †Total phenolic content determined by Folin–Ciocalteu Assay for comparison with UPLC; note values are not corrected for background content of vitamin C and protein in fruit snacks and animal crackers, respectively.

**Supplemental Table 3** Sensitivity analysis of condition effects for variables found to differ significantly between or within conditions in intention-to-treat analysis after removing data from participants with ≥2.0 kg weight change within a condition versus baseline (control n=44, dried fruit n=45).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Control | | | | Dried Fruit | | | |  |  |
|  | Mean | SEM | Change from Baseline | SEM | Mean | SEM | Change from Baseline | SEM | *P*for comparison of means | *P* for comparison of changes from baseline |
| LDL-C, mmol/L | 3.02 | 0.14 | 0.06 | 0.05 | 3.06 | 0.14 | 0.06 | 0.05 | 0.47 | 0.91 |
| Non-HDL-C, mmol/L | 3.60 | 0.16 | 0.04 | 0.06 | 3.70 | 0.16 | 0.09 | 0.06 | 0.23 | 0.54 |
| HDL-C, mmol/L | 1.26 | 0.06 | -0.03 | 0.02 | 1.25 | 0.06 | -0.05\* | 0.02 | 0.29† | 0.66 |
| TC:HDL-C | 4.2 | 0.2 | 0.1 | 0.1 | 4.3 | 0.2 | 0.2\* | 0.1 | 0.17† | 0.24 |
| LDL Particles (total), nmol/L | 1138 | 54 | 37 | 26 | 1157 | 54 | 42 | 26 | 0.49 | 0.85 |
| Small LDL Particles, nmol/L | 677 | 47 | 44 | 26 | 682 | 47 | 39 | 26 | 0.84 | 0.83 |
| Large HDL Particles, μmol/L | 6.8 | 0.5 | -0.2 | 0.2 | 6.6 | 0.5 | -0.3 | 0.2 | 0.80† | 0.56 |
| Glucose, mmol/L | 5.42 | 0.05 | -0.01 | 0.06 | 5.53 | 0.05 | 0.12\* | 0.06 | 0.010 | 0.006 |
| Brachial DBP, mmHg | 78.2 | 1.2 | 2.1\* | 0.8 | 77.0 | 1.2 | 0.8 | 0.3 | 0.18 | 0.16 |
| Central DBP, mmHg | 79.0 | 1.2 | 2.0 | 0.8 | 77.6 | 1.2 | 0.7 | 0.8 | 0.13 | 0.13 |

Least squared means and SEM for untransformed end-of treatment-means and changes from baseline following control and dried fruit conditions. \*Significant change from baseline (*P*<0.05). †Transformed means used in linear mixed model for variables with non-normally distributed residuals.

**Supplementary Table 4** Per protocol analysis of condition effects after removing data from participants with <90% reported compliance during a condition (control n=39, dried fruit n=36).

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Control | | | | Dried Fruit | | | |  |  |
|  | Mean | SEM | Change from Baseline | SEM | Mean | SEM | Change from Baseline | SEM | *P* for comparison of means | *P* for comparison of changes from baseline |
| Weight, kg | 84.4 | 2.0 | 0.6\* | 0.2 | 84.1 | 2.0 | 0.3 | 0.2 | 0.24 | 0.16 |
| TC, mmol/L | 4.93 | 0.16 | 0.02 | 0.07 | 4.93 | 0.16 | 0.05 | 0.07 | 0.91 | 0.74 |
| LDL-C, mmol/L | 3.03 | 0.14 | 0.03 | 0.05 | 3.06 | 0.15 | 0.07 | 0.05 | 0.60 | 0.44 |
| Non-HDL-C, mg/dL | 3.68 | 0.17 | 0.05 | 0.07 | 3.72 | 0.17 | 0.10 | 0.07 | 0.61 | 0.48 |
| HDL-C, mg/dL | 1.25 | 0.07 | -0.05 | 0.02 | 1.26 | 0.07 | -0.04 | 0.02 | 0.77† | 0.71 |
| TC:HDL-C | 4.3 | 0.3 | 0.2\* | 0.1 | 4.4 | 0.3 | 0.2\* | 0.1 | 0.65† | 0.64 |
| Triglycerides, mg/dL | 1.43 | 0.12 | 0.10 | 0.08 | 1.35 | 0.12 | 0.03 | 0.08 | 0.77† | 0.39 |
| VLDL & Chylomicron Particles (total), nmol/L | 54.4 | 4.1 | -1.1 | 3 | 53.0 | 4.2 | -2.7 | 3 | 0.90† | 0.64 |
| Large VLDL & Chylomicron Particles, nmol/L | 5.1 | 0.8 | 0.9 | 0.7 | 4.9 | 0.8 | 0.8 | 0.7 | 0.22† | 0.86 |
| Medium VLDL Particles, nmol/L | 21.0 | 2.6 | -0.8 | 2.1 | 20.2 | 2.7 | -1.5 | 2.2 | 0.93† | 0.67 |
| Small VLDL Particles, nmol/L | 28.1 | 2.2 | -1.5 | 2.4 | 27.0 | 2.3 | -1.8 | 2.5 | 0.74† | 0.91 |
| LDL Particles (total), nmol/L | 1168 | 59 | 53 | 30 | 1149 | 59 | 37 | 31 | 0.40 | 0.49 |
| IDL Particles, nmol/L | 171 | 19 | -14 | 19 | 190 | 19 | 6 | 20 | 0.36† | 0.18 |
| Large LDL Particles, nmol/L | 287 | 31 | -5 | 23 | 280 | 32 | -15 | 23 | 0.77 | 0.66 |
| Small LDL Particles, nmol/L | 711 | 54 | 72\* | 31 | 682 | 54 | 48 | 32 | 0.33 | 0.39 |
| HDL Particles (total), μmol/L | 31.7 | 0.9 | 0 | 0.5 | 31.6 | 0.9 | 0 | 0.5 | 0.78 | 0.96 |
| Large HDL Particles, μmol/L | 6.7 | 0.6 | -0.3 | 0.2 | 6.5 | 0.6 | -0.4 | 0.2 | 0.41† | 0.42 |
| Medium HDL Particles, μmol/L | 8.9 | 0.8 | 0.2 | 0.7 | 9.2 | 0.8 | 0.7 | 0.7 | 0.32† | 0.51 |
| Small HDL Particles, μmol/L | 16.1 | 0.9 | 0.1 | 0.7 | 15.9 | 0.9 | -0.3 | 0.8 | 0.74 | 0.63 |
| VLDL Size, nm | 49.3 | 1.1 | 0.9 | 1.1 | 50.0 | 1.1 | 1.5 | 1.2 | 0.52† | 0.64 |
| LDL Size, nm | 20.6 | 0.1 | -0.1 | 0.1 | 20.6 | 0.1 | -0.1 | 0.1 | 0.81 | 0.82 |
| HDL Size, nm | 9.3 | 0.1 | -0.1 | 0 | 9.3 | 0.1 | -0.1 | 0 | 0.50 | 0.57 |
| Calculated triglyceride (total), mmol/L | 1.46 | 0.14 | 0.12 | 0.10 | 1.40 | 0.14 | 0.07 | 0.10 | 0.86† | 0.61 |
| Calculated VLDL & Chylomicron TG, mmol/L | 1.02 | 0.10 | 0.07 | 0.07 | 0.98 | 0.10 | 0.03 | 0.08 | 0.87† | 0.60 |
| Calculated HDL Cholesterol, mmol/L | 1.27 | 0.07 | -0.03 | 0.02 | 1.27 | 0.07 | -0.04 | 0.03 | 0.56† | 0.82 |
| Lipoprotein Insulin Resistance Score | 48 | 3 | 3 | 2 | 51 | 3 | 6\* | 2 | 0.10 | 0.11 |
| Glucose, mmol/L | 5.43 | 0.06 | 0.04 | 0.07 | 5.54 | 0.07 | 0.15\* | 0.07 | 0.026 | 0.03 |
| Insulin, pmol/L | 41.4 | 3.4 | 0.9 | 3.0 | 45.4 | 3.4 | 5.1 | 3.0 | 0.10† | 0.07 |
| hsCRP, mg/L | 2.1 | 0.3 | 0.4 | 0.3 | 2.3 | 0.3 | 0.6\* | 0.3 | 0.49† | 0.31 |
| PCSK9, ng/mL | 175 | 14 | 11 | 14 | 185 | 15 | 19 | 15 | 0.33† | 0.65 |
| Clinician-assessed brachial SBP, mmHg | 112.9 | 1.6 | 2.0 | 1.1 | 112.6 | 1.6 | 1.5 | 1.2 | 0.81 | 0.69 |
| Clinician-assessed brachial DBP, mmHg | 76.4 | 1.2 | -0.5 | 0.8 | 76.1 | 1.2 | -0.7 | 0.8 | 0.79 | 0.81 |
| Brachial SBP, mmHg | 118.9 | 1.7 | -0.6 | 1.2 | 119.3 | 1.7 | -0.1 | 1.2 | 0.78 | 0.65 |
| Brachial DBP, mmHg | 77.7 | 1.3 | 1.6 | 0.8 | 76.2 | 1.3 | 0.4 | 0.9 | 0.07 | 0.13 |
| Central SBP, mmHg | 109.3 | 1.5 | -0.2 | 1.0 | 109.3 | 1.6 | -0.1 | 1.1 | 0.98 | 0.92 |
| Central DBP, mmHg | 78.4 | 1.3 | 1.5 | 0.8 | 77.0 | 1.3 | 0.4 | 0.9 | 0.10 | 0.19 |
| Augmentation Pressure, mmHg | 7.1 | 0.7 | -0.6 | 0.5 | 8.1 | 0.7 | 0.2 | 0.6 | 0.07 | 0.15 |
| Augmentation Index, % | 19.8 | 2 | 0.5 | 1.2 | 22.0 | 2 | 2.3 | 1.3 | 0.08 | 0.12 |
| Pulse Wave Velocity, m/s | 6.6 | 0.1 | 0.1 | 0.1 | 6.6 | 0.1 | 0.1 | 0.1 | 0.98 | 0.88 |

Least squared means ± SEM for untransformed end-of-condition means and changes from baseline for control and dried fruit conditions. \*Significant change from baseline (*P*<0.05). †Transformed means used in linear mixed model for variables with non-normally distributed residuals.

Methods for Chemical Analyses

Study foods (dried figs, raisins, dates, plums, fruit gummies, and animal crackers) were individually particlized (<0.5 mm) and portioned (100 mg/sample) for extraction procedures. Extractions and analyses were performed on five samples of each food at 6˚C.

Sugars

*Extraction*. Sugars were extracted in 10 mL distilled water for 30 min at 210 oscillations per minute (opm) and then centrifuged for 3 minutes at 3,500 rpm. Supernatant was collected and the extraction procedure was repeated two more times for the precipitate. Supernatant was pooled for the three extractions and diluted with distilled water to final volume of 50 mL.

*Analysis*. Samples were filtered by 0.45 μm cellulose acetate membrane. Sugar content was determined by HPLC with refractive index detection (Hitachi D-2000 Elite HPLC system). Separation was performed on a Rezex RCM-Monosaccharide Ca+2 (8%) column (8 μm, 7.8 mm id x 100 mm) equipped with a Carbo-Ca guard column (3.0 mm id x 4 mm). Samples were eluted statically with distilled water at a flow rate of 0.6 mL/min. Glucose, fructose and sucrose were identified by comparing retention time of sample peaks with those of authentic standards. Sugar content was determined according to calibration curves covering 0.078-100 mg/mL.

Carotenoids

*Extraction*: Carotenoid extraction and analysis were performed as previously described with minor modifications (Kean EG, J Agric Food Chem, 2008. 56(21): 9918). Samples were hydrated with 1 mL water, and five samples were randomly spiked with 50 µL β-apo-A to determine extraction recovery. Extraction was carried out in acetone (5 mL) for 25 min at 210 opm, followed by centrifugation for 3 min at 3,5000 rpm. Supernatant was collected and extraction was repeated once more for the precipitate by the same procedure. The resultant precipitate was mixed with 2 mL petroleum ether and oscillated for 25 min at 210 opm. The supernatant from all three extractions was pooled and dried by nitrogen flow. The extract was reconstituted in 500 µL of solvent (methanol:ethyl acetate, 50:50). Average extraction recovery was 57.8 ± 8.1 %.

*Analysis*. Samples were filtered by 0.45 μm cellulose acetate membrane. Carotenoids were determined by HPLC with photodiode array detection (Waters Alliance 2695 LC system equipped with a Waters 2998 Photodiode Array Detector). Separation was performed on a YMC C30 column (3 μm, 150 mm x 2 mm) at a flow rate of 0.37 mL/min. Samples were eluted with a gradient of 2% ammonium acetate in methanol (solvent A, pH 4.6) and ethyl acetate (solvent B) as follows: 0 min, 5% B; 3.0 min, 5% B; 8.0 min, 15% B; 9.0 min, 80% B; 13.0 min, 100% B; 13.1 min, 5% B; 17.0 min, 5% B. The elution profile was recorded at 220-600 nm upon injection (10 µL). Carotenoids were identified by comparing retention time and UV-Vis spectra of sample peaks with those of authentic standards. Carotenoid content was determined at 450 nm according to calibration curves covering 0.01-7.5 μM.

Phenolic Compounds

*Extraction.* Samples were hydrated with 1 mL 2% formic acid solution. Five random samples were spiked with 50 µL of ethyl gallate solution (10 µg/mL) to determine extraction recovery. Extraction was performed in 3 mL methanol solvent (formic acid: methanol: water, 2:78:20, v/v) for 25 min at 210 opm, followed by centrifugation for 3 min at 3,500 rpm. The supernatant was collected and the extraction procedure was repeated for the precipitate two more times. Supernatant from all three extractions was pooled and vacuum-dried separate the aqueous phase. The resulting aqueous solutions were subjected to solid phase extraction as previously described (Blount JW J Agric Food Chem. 2015;63(8):2233). The final phenolic extract was reconstituted in 1.0 mL 50% methanol containing 0.2% formic acid. Average extraction recovery was 93.2 ± 6.4 %.

*Analysis*. Samples were filtered by 0.45 μm cellulose acetate membranes. Phenolic contents were determined by UPLC-MS/MS using a Waters UPLC Acquity H Class system equipped with a TUV and TQD detector. Separation was performed on a BEH C18 column (2.1 μm, 1.7 mm id x 50 mm) at a flow rate of 0.5 mL/min. Samples were eluted with a gradient of 0.2% formic acid in acetonitrile (solvent A) and 0.2% formic acid in water (solvent B) as follows: 0 min, 100% B; 0.5 min, 94% B; 2.0 min, 91% B; 3.0 min, 87% B; 4.5 min, 65% B; 5.3 min, 100% B; 6 min, 100% B. The elution profile was recorded at 280 and 320 nm upon injection (5 µL). Phenolics were identified by comparing retention time and molecular mass of sample peaks with those of authentic standards. Phenolic content were determined according to calibration curves for gallic acid, caffeic acid, ferulic acid, 5-caffeoylquinic acid, *p* coumaric acid and quercetin covering 0.1-50 µg/mL. MS/MS conditions were as follows: ionization mode: ESI-; capillary voltage: 3.0 kV; probe temp: 150 °C; source temp: 600°C; desolvation gas flow: 1000 L/hr; cone gas flow: 50 L/hr; collision energy: 20 V; selective ion responses were reported in Supplemental Table 6.

**Supplementary Table 6** Tandem mass spectrometry conditions for analysis of phenolic compounds.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Name | Retention time (min) | [M-H] (*m/z*) | Fragment ion (*m/z*) | Cone/Collision voltage (V) |
| 3-Caffeoylquinic acids | 1.1 | 353 | 191 | 28/18 |
| Protocatecheuic acid | 0.9 | 153 | 81 | 28/18 |
| Caffeic acid | 1.77 | 179 | 135 | 32/22 |
| Ferulic acid | 3.15 | 193 | 134 | 28/17 |
| *p* Coumaric acid | 2.58 | 163 | 119 | 30/16 |
| Apigenin | 4.57 | 269 | 117 | 40/32 |
| Kaemferol-3-glucoside | 3.73 | 593 | 285 | 42/8 |
| Quercetin | 4.28 | 301 | 151 | 38/20 |
| Quercetin-3-glucoside | 3.56 | 462 | 301 | 42/24 |
| Ethyl gallate | 2.81 | 197 | 125 | 30/30 |