

Table S1. MASLD No and MASLD Yes groups according to the positive diagnostic criteria

| Criteria MASLD | MASLD No | MASLD Yes |
|--|--------------|--------------|
| N | 668 (51.50%) | 629 (48.50%) |
| Hepatic Steatosis | | |
| No | 668 (100.0%) | 0 (0.0%) |
| Yes | 0 (0.0%) | 629 (100.0%) |
| BMI \geq 25 kg/m ² | 329 (37.8%) | 542 (62.2%) |
| Waist: M > 94 cm and F >80 cm | 270 (33.4%) | 539 (66.6%) |
| SBP \geq 130 (mmHg) | 170 (34.6%) | 321 (65.4%) |
| DBP \geq 85 (mmHg) | 668 (51.5%) | 629 (48.5%) |
| Serum Glucose \geq 100 mg/dL | 96 (27.4%) | 255 (72.6%) |
| Triglycerides \geq 150 mg/dL | 57 (25.9%) | 163 (74.1%) |
| HDL cholesterol < 40 mg/dL for M and < 50 mg/dL for F | 192 (42.7%) | 258 (57.3%) |

MASLD: Metabolic dysfunction-associated steatotic liver disease; BMI: Body Mass Index; MASLD: Metabolic dysfunction-associated steatotic liver disease; HDL-C: High-Density Lipoprotein Cholesterol.

Table S2. Amount mean (\pm SD) of flavonoids (mg/day) contained in the following health foods by MASLD in the Nutrihep cohort.

| | MASLD | | <i>p-value</i> [‡] |
|--------------|-----------------|-----------------|-----------------------------|
| | No | Yes | |
| N | 668 | 629 | |
| Flavonoids | 189.63 (112.85) | 211.81 (113.54) | <0.001 |
| Apples | 85.80 (87.33) | 101.03 (85.57) | 0.002 |
| Peaches | 22.84 (18.13) | 23.56 (17.82) | 0.47 |
| Pear | 19.37 (20.92) | 23.79 (25.85) | <0.001 |
| Strawberries | 17.15 (28.44) | 17.62 (31.73) | 0.78 |
| Oranges | 16.27 (16.35) | 18.05 (13.31) | 0.031 |
| Grapes | 14.88 (16.23) | 15.85 (17.17) | 0.29 |
| Walnuts | 6.10 (9.96) | 6.45 (9.57) | 0.52 |
| Orange Juice | 4.13 (10.15) | 4.10 (12.50) | 0.96 |
| Spinach | 1.41 (1.73) | 1.32 (1.67) | 0.38 |
| Courgettes | 0.98 (1.05) | 0.88 (1.03) | 0.090 |
| Broccoli | 0.91 (0.89) | 0.98 (1.02) | 0.21 |
| Cooked onion | 0.68 (1.42) | 0.74 (1.46) | 0.47 |
| Aubergines | 0.64 (0.68) | 0.58 (0.69) | 0.17 |
| Tomatoes | 0.54 (0.50) | 0.55 (0.48) | 0.61 |
| Celery | 0.45 (0.49) | 0.43 (0.49) | 0.55 |
| Onions | 0.17 (0.39) | 0.25 (0.50) | <0.001 |

[‡]Wilcoxon rank-sum. MASLD: Metabolic dysfunction-associated steatotic liver disease

Table S3 . Lasso selects covariates logit model
Selection: Bayesian information criterion

| ID | Description | lambda | No. of nonzero coef. | In-sample dev. ratio | BIC |
|------|-----------------|-----------------|----------------------------|-------------------------|-----------------|
| 1 | first lambda | .1679354 | 3 | 0.0202 | 1782.149 |
| 31 | lambda before | .0103044 | 10 | 0.2429 | 1433.747 |
| * 32 | selected lambda | .0093889 | 10 | 0.2443 | 1431.251 |
| 33 | lambda after | .0085549 | 11 | 0.2455 | 1436.268 |
| 74 | last lambda | .0001886 | 14 | 0.2547 | 1441.344 |

* lambda selected by Bayesian information criterion.

| | minBIC | adaptive | cv |
|----------------|--------|----------|----|
| weight | x | x | x |
| age65 | x | x | x |
| γGT | x | x | x |
| sex_1M | x | x | x |
| ALT | x | x | x |
| flavonoidis | x | x | x |
| kcal_day | x | x | x |
| Marital_Status | x | x | x |
| homa2_5 | x | x | x |
| job | x | x | x |
| _cons | x | x | x |

Table S4. Collinearity Diagnostics by VIF for the independent variables

| Independent Variables | VIF | SQRT VIF | Tolerance | R ² |
|--------------------------|------|----------|-----------|----------------|
| Flavonoids (mg/day) | 1.16 | 1.08 | 0.8589 | 0.1411 |
| Job | 1.39 | 1.18 | 0.7211 | 0.2789 |
| Kcal (day) | 1.23 | 1.11 | 0.8130 | 0.1870 |
| Marital Status | 1.10 | 1.05 | 0.9084 | 0.0916 |
| ALT | 1.41 | 1.19 | 0.7117 | 0.2883 |
| γGT | 1.46 | 1.21 | 0.6862 | 0.3138 |
| Gender | 1.38 | 1.18 | 0.7224 | 0.2776 |
| Age (<65 yrs vs ≥65 yrs) | 1.57 | 1.25 | 0.6367 | 0.3633 |
| Homa (<2.5 vs ≥2.5) | 1.13 | 1.06 | 0.8883 | 0.1117 |
| Weight (kg) | 1.41 | 1.19 | 0.7087 | 0.2913 |
| Mean VIF | 1.32 | | | |

VIF: Variance Inflation Factors; ALT: Alanine Aminotransferase; γGT: Gamma Glutamyl Transferase; HOMA: Homeostasis Model Assessment.

Table S5. Characteristics of Participants by Median Value of Flavonoids in the Nutrihep cohort.

| Parameters ^a | Flavonoids (mg/day) | |
|-----------------------------|---------------------|-------------------|
| | <185 | ≥185 |
| N | 648 | 649 |
| Age (years) | 50.71 (13.94) | 57.94 (13.82) |
| Age categories (years) (%) | | |
| <65 | 521 (54.6) | 434 (45.4) |
| ≥65 | 127 (37.1) | 215 (62.9) |
| Gender (%) | | |
| Female | 379 (50.9) | 365 (49.1) |
| Male | 269 (48.6) | 284 (51.4) |
| MASLD (%) | | |
| No | 367 (54.9) | 301 (45.1) |
| Yes | 281 (44.7) | 348 (55.3) |
| Flavonoids (mg/day) | 110.97 (46.54) | 289.67 (87.79) |
| SBP (mmHg) | 118,66 (15,40) | 123,18 (15,90) |
| DBP (mmHg) | 77,07 (8,20) | 78,28 (7,75) |
| rMED (median (IQR)) | 7.00 (6.00-9.00) | 9.00 (7.00-10.00) |
| BMI (kg/m ²) | 27.23 (5.26) | 27.94 (4.80) |
| Weight (kg) | 72.65 (15.56) | 73.20 (14.16) |
| Waist (cm) | 89.19 (13.90) | 91.70 (12.90) |
| HbA1c (mmol/mol) | 37.59 (6.38) | 38.54 (7.31) |
| HOMA | 1.87 (1.82) | 1.90 (1.94) |
| ALT (U/L) | 22.85 (20.96) | 21.55 (9.29) |
| γGT (U/L) | 17.75 (15.11) | 17.41 (11.58) |
| AST (U/L) | 21.87 (14.39) | 21.61 (5.46) |
| TG (mg/dL) | 92.70 (64.27) | 104.08 (73.45) |
| C-Reactive Protein (mg /dL) | 0.26 (0.65) | 0.25 (0.43) |
| TC (mg/dL) | 190.95 (34.26) | 191.75 (36.44) |
| HDL (mg/dL) | 51.25 (12.82) | 50.33 (12.35) |
| Glucose (mg/dL) | 93.61 (17.04) | 97.05 (17.48) |
| ALP (U/L) | 52.52 (17.60) | 53.44 (14.44) |
| Alcohol intake (g/day) | 10.96 (13.38) | 10.21 (12.03) |
| Kcal (day) | 1901.92 (708.62) | 2210.37 (759.39) |
| Smoker (%) | | |
| Never/Former | 557 (49.0) | 580 (51.0) |
| Current | 90 (56.6) | 69 (43.4) |
| Hypertension (%) | | |
| No | 459 (54.2) | 388 (45.8) |
| Yes | 157 (40.8) | 228 (59.2) |
| Dyslipidemia (%) | | |
| No | 546 (52.1) | 501 (47.9) |
| Yes | 69 (37.5) | 115 (62.5) |
| Diabetes (%) | | |

| | | |
|-----|------------|------------|
| No | 585 (51.0) | 563 (49.0) |
| Yes | 31 (36.9) | 53 (63.1) |

^aAs Means and Standard Deviation. MASLD: Metabolic dysfunction-associated steatotic liver disease; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; rMED: Relative Mediterranean Diet; BMI: Body Mass Index; HbA1c: Glycosylated Haemoglobin; HOMA: Homeostasis Model Assessment; ALT: Alanine Aminotransferase; γ GT: Gamma Glutamyl Transferase; AST: Aspartate Aminotransferase; TG: Triglycerides; TC: Total Cholesterol; HDL-C: High-Density Lipoprotein Cholesterol; ALP: Alkaline Phosphatase Level.

Table S6. Absolute frequencies on deciles of daily flavonoid.

| Flavonoid intake (mg/day) | 0-10 (2; 66) | 10-20 (66; 97) | 20-30 (97; 129.4) | 30-40 (129.4; 155) | 40-50 (155; 185) | 50-60 (185; 211.8) | 60-70 (211.8; 245.6) | 70-80 (245.6; 290.4) | 80-90 (290.4; 354.2) | 90-100 (354.2; 500) |
|---------------------------|--------------|----------------|-------------------|--------------------|------------------|--------------------|----------------------|----------------------|----------------------|---------------------|
| NO MASLD | 81 | 78 | 70 | 70 | 68 | 62 | 54 | 58 | 64 | 61 |
| MASLD | 50 | 50 | 58 | 64 | 59 | 63 | 75 | 71 | 65 | 68 |
| SUM | 131 | 128 | 128 | 134 | 127 | 125 | 129 | 129 | 129 | 129 |

Table S7. Logistic regression analysis of MASLD on flavonoid intake divided into deciles

| | <i>p-value</i> | 95% CI |
|---------------------------|----------------|--------------|
| OR _{d2} = 1.258 | 0.468 | 0.675; 2.345 |
| OR _{d3} = 1.571 | 0.155 | 0.842; 2.931 |
| OR _{d4} = 1.733 | 0.078 | 0.939; 3.199 |
| OR _{d5} = 1.819 | 0.064 | 0.964; 3.434 |
| OR _{d6} = 2.173 | 0.014 | 1.166; 4.053 |
| OR _{d7} = 2.451 | 0.004 | 1.317; 4.563 |
| OR _{d8} = 2.316 | 0.008 | 1.239; 4.329 |
| OR _{d9} = 1.625 | 0.133 | 0.861; 3.066 |
| OR _{d10} = 1.951 | 0.039 | 1.034; 3.681 |

ref. d1: 1st decile. Models adjusted for Job, Daily calories, Weight (kg), Gamma Glutamyl Transferase, Alanine Aminotransferase, gender (Female vs Male), age (<65 vs \geq 65 years), Marital status, Homa (<2.5 vs \geq 2.5)