**Supplementary material**

**Table S1.** Literature sources for nitrate and nitrite values in selected foods reported in 24-hour recalls or the food frequency questionnaire

|  |  |  |
| --- | --- | --- |
| Study/report | Country | Foodsa |
| Nitrate | Nitrite |
| Achtzehn (1969)([1](#_ENREF_1)) | Germany | Bananas |  |
| Chilvers (1984)([2](#_ENREF_2)) | UK | Potato chips |  |
| Cornee (1992)([3](#_ENREF_3)) | France | Cheese (gouda, camembert), oysters, peppers | Cheese (gouda, camembert), oysters, tomatoes (raw, sauce, salsa) |
| Harada (1975)([4](#_ENREF_4)) | Japan | Noodles, pasta |  |
| Howe (1986)([5](#_ENREF_5)) | US/Canada | Rice, barley, millet, bulgur | Rice, barley, millet, bulgur |
| Jackson (1967)([6](#_ENREF_6)) | US | Carrots, green/string beans, cauliflower, peppers |  |
| Jakszyn (2004)([7](#_ENREF_7)) | 23 countries | Cheese (feta, blue, gruyere), peppers | Cheese (feta, blue, gruyere) |
| Lee (1971)([8](#_ENREF_8)) | US | Broccoli, beets | Beets |
| MAFFb UK (1998)([9](#_ENREF_9)) | UK | Beef, pork, blood sausage, scrapple, souse, liver (beef/pork/chicken), head cheese, beef (dried, chopped), luncheon meat (poultry), chicken, turkey, dried fruits (raisins, prunes, apples, mango, papaya, pineapple) | Yogurt, beef, pork, blood sausage, scrapple, souse, liver (beef/pork/chicken), head cheese, beef (dried, chopped), luncheon meat (poultry), chicken, turkey, fish/shellfish, egg, dried fruits (raisins, prunes, figs, apples, mango, papaya, dates, pineapple) |
| Maynard (1972)([10](#_ENREF_10)) | US | Beets | Beets |
| Meah (1994)([11](#_ENREF_11)) | UK | Milk, sour cream, ice cream, frozen yogurt, tofu, fish/shellfish, sugar, fat, corn, potato (sweet), green/string beans, cabbage, cauliflower, brussels sprouts, peppers, alfalfa sprouts, bean sprouts | Milk, cheese (cottage, ricotta), sour cream, ice cream, frozen yogurt, sugar, fat, corn |
| Menard (2008)([12](#_ENREF_12)) | France | Dried fruits (dates, figs), broccoli, beets | Beets |
| NASc (1981)([13](#_ENREF_13)) | US | Juices, bacon, sausage, frankfurter/hot dogs, luncheon meat (red meat), bologna, salami, cereal (miscellaneous), fruits, melons, fruit juice, endive, tomato (raw, sauce, salsa), coffee, tea, soft drinks, alcoholic beverages, turnips | Cheese (hard), juice, bacon, sausage, frankfurter/hot dogs, luncheon meat (red meat), bologna, salami, cereal (miscellaneous), fruit juice, endive, coffee, tea, soft drinks, alcoholic beverages |
| Panalaks (1973)([14](#_ENREF_14)) | Canada | Ham, sausage, frankfurter/hot dogs, luncheon meat, bologna, salami | sausage, frankfurter/hot dogs, luncheon meat, bologna, salami |
| Panalaks (1974)([15](#_ENREF_15))  | US/Canada | Ham |  |
| Pogoda (2001)([16](#_ENREF_16)) | US/Canada |  | Ham |
| Rooma (1971)([17](#_ENREF_17)) | Russia | Bread/cracker (whole wheat, wheat, pumpernickel, multigrain, Irish soda, rye, cracked wheat, oatmeal, barley), baked goods (whole wheat, wheat bran) | Bread /cracker(whole wheat, wheat, pumpernickel, multigrain, Irish soda, rye, cracked wheat, oatmeal, barley), baked goods (whole wheat, wheat bran,) |
| Selenka (1976)([18](#_ENREF_18)) | Germany | Bread/cracker (white, rye), pastry, doughnut, baked goods (white) | Bread/cracker (white, rye), pastry, doughnut, baked goods (white) |
| Siciliano (1975)([19](#_ENREF_19)) | US | Corn, carrots, green/string beans, peas, brussels sprouts, peppers, eggplant, okra, zucchini, onion, celery, asparagus, mushrooms, artichokes, okra, beets | Corn, potato (white, sweet), green/leafy vegetables, broccoli, green/string beans, peas, cauliflower, brussels sprouts, peppers, eggplant, okra, zucchini, onion, celery, asparagus, mushrooms, artichoke, rutabaga, okra, beets |
| Susin (2006)([20](#_ENREF_20)) | Slovenia | Apples, peaches, pears, strawberries, grapes, cucumbers | Apples, peaches, pears, bananas, melons, strawberries, grapes, green/string beans (raw), cabbage, cucumbers |
| Thomson (2007)([21](#_ENREF_21)) | New Zealand | Cheese (hard, cottage, ricotta), pizza, potatoes (white), green/leafy vegetables, rutabaga | Pizza, broccoli |
| White (1975)([22](#_ENREF_22)) | US | Citrus fruits, beans | Citrus fruits, lima beans |
| Ysart (1999)([23](#_ENREF_23)) | UK | Milk, yogurt, sour cream, ice cream, frozen yogurt, egg, sugar and preserves, corn chips, nuts, cauliflower, margarine, butter, oil, fat, candy bar, candy | Sugar and preserves, oil and fat, nuts, margarine, butter, candy bar, candy |
| Peterson (1999)([24](#_ENREF_24)) | Denmark | Beets | Beets |
| Gangolli (1994)([25](#_ENREF_25)) | Multiple  | Radishes, squash | Radishes, squash |
| Shahlaei (2006)([26](#_ENREF_26)) | Iran | Garlic | Garlic |

a If multiple study/reports were relevant to a food, the weighted average of values was assigned. Food items included in a few mixed dish recipes for which nitrate/nitrite values were not found in a literature and thus substituted with other food items are not listed.

b Ministry of Agriculture Fisheries and Food

c National Academy of Science

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**Table S2.** Assigned nitrate and nitrite concentrationsa for the food frequency questionnaire food items assessed in the NIH-AARP Diet and Health Study Diet History Questionnaire

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Food Item | Nitrate (mg/100g) | Nitrite (mg/100g) | Food Item | Nitrate (mg/100g) | Nitrite (mg/100g) |
| Alcoholic beverages, liquor  | 0.1 | 0 | Macaroni and cheese | 0.43 | 0.11 |
| Apples  | 3 | 0.1 | Margarine | 0.05 | 0 |
| Applesauce / cooked apples  | 2 | 0.1 | Mayonnaise | 0 | 0.02 |
| Aspartame  | 0 | 0 | Meat, processed | 4.2 | 2.4 |
| Bacon | 6.5 | 0.8 | Milk | 0.04 | 0.1 |
| Bananas  | 2 | 0.1 | Non-dairy creamer | 0.05 | 0 |
| Beans  | 0.41 | 0.1 | Nuts / seeds | 1.8 | 0 |
| Beef roasts | 1 | 0.1 | Oils | 0 | 0 |
| Beef stews / pot pies  | 1.15 | 0.08 | Orange / grapefruit juice | 0.4 | 0.1 |
| Beef, burgers,  | 1 | 0.1 | Oranges, tangerines, etc.  | 2 | 0.1 |
| Beef, ground | 1 | 0.09 | Other juice  | 0.11 | 0.1 |
| Beef, in sandwiches | 1 | 0.1 | Other melon | 2 | 0 |
| Beef, steaks | 1 | 0.1 | Pancakes, waffles  | 0.44 | 0.05 |
| Beer  | 0.12 | 0 | Pasta | 0.43 | 0.14 |
| Biscuits | 1.2 | 0.26 | Peaches / nectarines / plums  | 2 | 0 |
| Breads / rolls | 1.2 | 0.26 | Pears  | 2 | 0.1 |
| Broccoli | 74 | 0.1 | Peas | 2.2 | 0.06 |
| Butter | 0.05 | 0.72 | Peppers | 12 | 0.04 |
| Cakes | 0.16 | 0.06 | Pies | 1.3 | 0.07 |
| Candy, chocolate  | 0 | 0 | Pizza  | 6.8 | 0.05 |
| Candy, not chocolate  | 0 | 0.07 | Popcorn  | 0.09 | 0.14 |
| Cantaloupe  | 1.09 | 0 | Pork  | 1 | 0.1 |
| Carrots | 16.3 | 0.08 | Potato / corn / other chips | 8.35 | 0.34 |
| Cauliflower / Brussels Sprouts | 37.4 | 0.11 | Potato salads  | 11 | 0.04 |
| Cheese | 0.05 | 0 | Potatoes, white | 11 | 0.06 |
| Chicken / turkey | 1 | 0.1 | Quick breads, donuts, sweet rolls | 1.2 | 0.26 |
| Chili  | 1.2 | 0.08 | Red meat  | 1 | 0.1 |
| Coffee | 0.13 | 0 | Rice / grains | 0.85 | 0.12 |
| Cold cuts, poultry  | 4.2 | 2.4 | Cereal | 1.2 | 0.26 |
| Cold cuts, regular  | 6.25 | 0.95 | Salad dressing | 0.12 | 0.1 |
| Coleslaw/ cabbage / sauerkraut | 52 | 0.05 | Sausage | 2 | 2.4 |
| Cookies, brownies | 1.2 | 0.26 | Sausage, turkey | 2 | 2.4 |
| Corn | 3.6 | 0.2 | Soft drinks | 0.19 | 0 |
| Cornbread / muffins  | 0.6 | 0.06 | Soups, bean-type  | 1.3 | 0 |
| Cottage cheese / ricotta cheese | 0.05 | 0.1 | Soups, creamed | 0.05 | 0 |
| Crackers | 1 | 0.14 | Soups, with vegetables  | 4.4 | 0.04 |
| Cream cheese | 0.04 | 0.1 | Sour cream | 0.05 | 0 |
| Cream, regular, or ½ & ½ | 0.05 | 0 | Spinach / greens, cooked | 175.2 | 0.25 |
| Dried fruit | 6 | 0.5 | Spinach / greens, raw  | 180 | 0.25 |
| Eggs | 1 | 0.1 | Strawberries  | 2.01 | 0.1 |
| English muffin / bagel  | 1.2 | 0.26 | String beans | 26.8 | 0.06 |
| Fish | 1 | 0.1 | Sugars / honey | 1.4 | 0.1 |
| Frozen yogurt, ice milk | 0.05 | 0.3 | Sweet potatoes | 4.6 | 0.07 |
| Fruit drinks | 0.11 | 0.1 | Tea | 0.13 | 0 |
| Grapefruit | 2 | 0 | Tomato / vegetable juice | 13.3 | 0.1 |
| Grapes | 2 | 0.1 | Tomato salsa  | 5.8 | 0 |
| Gravy  | 0.1 | 0.1 | Tomato sauce | 24.3 | 0.09 |
| Ham, not luncheon  | 2.91 | 7.17 | Tomatoes, raw | 5.8 | 0 |
| Hot dogs, turkey  | 4 | 1.43 | Tortillas  | 1.2 | 0.47 |
| Hotdogs, regular | 10.5 | 2.4 | Tuna | 0 | 0.12 |
| Ice cream, regular  | 0.05 | 0 | Turkey | 0 | 0.12 |
| Lard, fatback bacon fat  | 0 | 2.4 | Vegetable medley | 10.21 | 0.09 |
| Lasagna, ravioli, shells, etc.  | 0.43 | 0.12 | Vegetable shortening  | 0 | 0 |
| Lettuce | 170 | 0.04 | Wine  | 0.12 | 0 |
| Liver, liverwurst  | 1 | 0.1 | Yogurt | 0.04 | 0.13 |

a We assigned nitrate and nitrite levels to the U.S. Department ofAgriculture's 1994 – 1996 Continuing Survey of Food Intakesby Individuals (CSFII) foods comprising each food frequency questionnaire (FFQ) food item based on a literature review of 27 studies and reports published between 1967 and 2008. If multiple studies were available for a particular food/cooking method combination, we calculated the mean weighted by the number of samples analyzed in each study. For vegetables specified as cooked in the FFQ where only a raw value was available in the literature, the changes in nitrate through cooking were estimated as the process of cooking typically lowers nitrate concentrations. Nitrate and nitrite contents for each FFQ line item were computed by weighting the food-specific values by sex-specific intake amounts from the CSFII. Nitrate and nitrite values were also assigned to FFQ mixed dish food items by using standardized recipes in the CSFII for relevant foods, for example, vegetable soup, beef stew, chicken pot pie, various salads and sandwiches, and meatloaf. The values assigned to these mixed dishes were a weighted average of the nitrate and nitrite content of the foods in the recipe. When a value for a food item from mixed dishes was not available in the literature, we substituted a value for a similar food.