

# Systematic Evaluation of Nutrition Indicators for use within Food LCA Studies

## 1. Analyzed food products

Figure 1 shows the 118 individual foods and 53 subgroups color-coded according to the Swedish food based dietary guidelines (“A way to a healthier you” brochure, [1]). Briefly, foods whose consumption should be increased were classified as “green”. They belong to 4 food groups: vegetables and legumes, fruit and berries, fish and seafood, nuts and seeds. Foods which are considered healthier options and are hence to be preferred were classified as yellow. They include vegetable oils, low fat dairy products and wholegrain cereal products. Foods whose consumption should be reduced were classified as red. They either belong to four categories (red and processed meats, beverages and foods with added sugars, foods high in salt, alcohol) or are less healthy alternatives to the “yellow” foods (i.e. animal fats, refined cereal products, medium or high fat dairy products). Processed foods in the green and yellow categories were further analyzed for their coherence with the nutritional criteria for the SFA’s keyhole symbol. Where the product was not fully compliant with the threshold levels for key nutrients (i.e. saturated fat and salt), it was labelled as red. After color-coding of individual foods, food subgroups were also classified as green, yellow or red accordingly.

**Table S1.** List of analyzed food products from the Swedish market, partition in subgroups and groups, and portion sizes. Food items and subgroups were color-coded according to the Swedish dietary guidelines.

Food groups	Food subgroups	Food products	Portion size (g)	Rationale for color-coding
Dairy products		Milk, 3% fat, enriched with vitamin D	200	Higher fat alternative, to be replaced by fat-reduced alternatives
		High fat and medium fat milk and yoghurt	200	Higher fat alternative, to be replaced by fat-reduced alternatives
		Yoghurt, natural flavor, 3 % fat	200	Higher fat alternative, to be replaced by fat-reduced alternatives
	High fat cream, crème fraiche and sour cream	Whipping cream, 40% fat	25	Higher fat alternative, to be replaced by fat-reduced alternatives
		Crème fraiche, 34% fat	28	Higher fat alternative, to be replaced by fat-reduced alternatives
		Sour cream, 12% fat	28	Higher fat alternative, to be replaced by fat-reduced alternatives
	High fat cheese	Hard cheese, 28% fat	15	Higher fat alternative, to be replaced by fat-reduced alternatives
	Low fat milk, yoghurt and soured milk	Low fat milk, 0,5% fat, enriched with vitamin D	200	Lower fat alternative, to be preferred
		Low fat soured milk, 0,5% fat	200	Lower fat alternative, to be preferred
		Low fat yoghurt, natural flavor, 0,5% fat	200	Lower fat alternative, to be preferred
	Light cream and crème fraiche	Light cream, 20% fat	25	Lower fat alternative but not compliant with keyhole
		Light crème fraiche, 15% fat	28	Lower fat alternative but not compliant with keyhole
	Low fat cheese	Low fat hard cheese, 17% fat	15	Lower fat alternative, to be preferred
Plant-based dairy products substitutes		Soy drink, enriched, 1,5% fat	200	Lower-fat alternative, to be preferred
	Enriched plant-based drinks	Almond drink, enriched, 1,3% fat	200	Lower-fat alternative, to be preferred
		Oat drink, enriched, 1,1% fat	200	Lower-fat alternative, to be preferred
	Plant-based cooking cream	Base for cooking, soy, 17% fat	61	Not compliant with keyhole
		Base for cooking, oat, 13% fat	61	Not compliant with keyhole
		Coconut milk, 24% fat	61	Not compliant with keyhole
Egg	Egg	Egg, hard boiled	50	Healthy protein source, to be preferred

<b>Poultry</b>	Poultry	Chicken breast with skin, fried	125	Healthy protein source, to be preferred
	Minced meat (beef and pork)	Minced meat (67% beef, 33% pork), fried	100	Red meat, consumption to be reduced
<b>Meat</b>	Red meat from ruminants (beef and lamb)	Beef entrecôte, fried	100	Red meat, consumption to be reduced
		Lamb meat, fried	100	Red meat, consumption to be reduced
	Venison (deer bred in captivity)	Deer meat, oven baked	100	Red meat, consumption to be reduced
	Pork	Pork meat, fried	100	Red meat, consumption to be reduced
	Cold cuts	Pork ham, smoked, 1-3% fat	15	Red meat, consumption to be reduced
		Salami, 34-44% fat	15	Red meat, consumption to be reduced
	Liver paste	Spreadable liver paste, 24% fat	14	Red meat, consumption to be reduced
	Sausage	Sausage (e.g. Chorizo), fried, 73% meat	100	Red meat, consumption to be reduced
		Pork sausage, fried, 24% meat	100	Red meat, consumption to be reduced
		Sausage, boiled, 51-54% meat	100	Red meat, consumption to be reduced
<b>Fish and seafood</b>	Salmon	Salmon, fried	130	Fish and seafood, consumption to be increased
	Pelagic fish	Herring, canned	35	Fish and seafood, consumption to be increased
		Baltic herring fillet, fried	35	Fish and seafood, consumption to be increased
	Cod	Cod fillet, boiled	125	Fish and seafood, consumption to be increased
	Crustaceans	Prawns, boiled	100	Fish and seafood, consumption to be increased
<b>Legumes and plant-based meat substitutes</b>	Legumes	Brown beans, boiled	190	Legumes, consumption to be increased
		Red lentils, boiled with salt	190	Legumes, consumption to be increased
		Chickpeas, canned	190	Legumes, consumption to be increased
		Black beans, canned	190	Legumes, consumption to be increased
	Plant-based meat substitutes	Chickpeas burger (e.g. falafel), fried	85	Not compliant with keyhole
		Soy sausage, fried	100	Not compliant with keyhole
		Vegetarian minced soy protein, frozen	95	Plant-based meat-alternative, to be preferred
		Tofu	85	Plant-based meat-alternative, to be preferred

Cereal products	Low fiber pasta	Pasta, boiled with salt	175	Refined grain, to be replaced by whole-grain alternatives
	Rice	Rice, long-grain, boiled with salt	180	Refined grain, to be replaced by whole-grain alternatives
	Wholegrain bread	Bread (e.g. graham), wholegrain, 13% fiber	40	Whole-grain alternative, to be preferred
		Crispbread, rye, wholegrain, 15,5% fiber	24	Whole-grain alternative, to be preferred
	Low fiber bread	White bread, 3,5% fiber	40	Refined grain, to be replaced by whole-grain alternatives
		White bread, 5% fiber	40	Refined grain, to be replaced by whole-grain alternatives
		Flat bread, with milk, 4% fiber	25	Refined grain, to be replaced by whole-grain alternatives
	Muesli and breakfast cereals	Muesli, whole grain, natural	40	Whole-grain alternative, to be preferred
		Muesli, wholegrain, fruit and berries	40	Whole-grain alternative, to be preferred
		Muesli, wholegrain, nuts and seeds	40	Whole-grain alternative, to be preferred
		Breakfast cereals (e.g. corn flakes), fortified	30	Refined grain, to be replaced by whole-grain alternatives
		Breakfast cereals, wholegrain (e.g. Special K)	40	Whole-grain alternative, to be preferred
	Porridge	Oat porridge, wholegrain, boiled	200	Whole-grain alternative, to be preferred
Fat and condiments	Margarine	Margarine, 80 % fat, fortified	5	Not compliant with keyhole
		Light margarine, 40% fat, fortified	5	Not compliant with keyhole
	Vegetable oils	Rapeseed oil	14	Vegetable oil, to be preferred
		Olive oil	15	Vegetable oil, to be preferred
	Butter and other hard fats	Butter, 80 % fat	5	Animal fat, to be replaced by vegetable alternative
		Mixed hard fat, 75% fat, fortified	5	Animal fat, to be replaced by vegetable alternative
Sugar-containing products and snacks	Honey, jams	Honey	20	Sweets and snacks, consumption to be reduced
		Strawberry jam	20	Sweets and snacks, consumption to be reduced
	Chocholate, candies	Dark chocolate, >70 % cocoa	20	Sweets and snacks, consumption to be reduced

		Milk chocolate	25	Sweets and snacks, consumption to be reduced
		Jelly candies	25	Sweets and snacks, consumption to be reduced
		Foam candies	25	Sweets and snacks, consumption to be reduced
	Biscuits, cakes	Biscuits, unspecified	25	Sweets and snacks, consumption to be reduced
		Cake (e.g. cream-layer)	110	Sweets and snacks, consumption to be reduced
	Ice-cream	Ice-cream, 12% fat	75	Sweets and snacks, consumption to be reduced
	Wheat buns, rusks	Sweetened wheat buns	25	Sweets and snacks, consumption to be reduced
		Wheat rusks	10	Sweets and snacks, consumption to be reduced
		Chips, salted	30	Sweets and snacks, consumption to be reduced
	Snacks	Popcorn, 22% fat	30	Sweets and snacks, consumption to be reduced
		Peanuts, roasted, salted	30	Sweets and snacks, consumption to be reduced
		Cabbage	70	Vegetables, consumption to be increased
		Cabbage, broccoli and spinach	100	Vegetables, consumption to be increased
		Kale	100	Vegetables, consumption to be increased
		Spinach	30	Vegetables, consumption to be increased
Vegetables and potato	Salad vegetables	Iceberg lettuce	40	Vegetables, consumption to be increased
		Tomato	50	Vegetables, consumption to be increased
		Cucumber	50	Vegetables, consumption to be increased
	Root vegetables	Potatoes, boiled with salt	175	Tubers, consumption to be increased
		Potatoes, boiled and fried	150	Not compliant with keyhole
		Potatoes, deep fried, 17% fat	150	Not compliant with keyhole
		Carrots	70	Tubers, consumption to be increased
		Beetroot, boiled	70	Tubers, consumption to be increased
		Swedish turnip, boiled	100	Tubers, consumption to be increased

Fruit and berries	Banana	Banana	105	Fruit, consumption to be increased
	Pome fruits and stone fruits	Apple	125	Fruit, consumption to be increased
		Pear	138	Fruit, consumption to be increased
		Peach	135	Fruit, consumption to be increased
	Citrus fruit	Orange	125	Fruit, consumption to be increased
		Clementine, mandarin, tangerine, satsuma	75	Fruit, consumption to be increased
		Grapefruit	95	Fruit, consumption to be increased
	Avocado	Avocado	55	Fruit, consumption to be increased
	Berries	Strawberry	125	Fruit, consumption to be increased
		Raspberry	125	Fruit, consumption to be increased
		Raspberry, frozen	125	Fruit, consumption to be increased
		Blueberry	125	Fruit, consumption to be increased
		Blueberry, frozen	125	Fruit, consumption to be increased
	Dried fruit	Raisin	45	Fruit, consumption to be increased
		Apricot	45	Fruit, consumption to be increased
Nuts and seeds	Nuts	Hazelnuts	30	Nuts, consumption to be increased
		Almonds	30	Nuts, consumption to be increased
		Cashews	30	Nuts, consumption to be increased
		Walnuts	30	Nuts, consumption to be increased
	Seeds	Sunflower seeds	30	Seeds, consumption to be increased
		Pumpkin seeds	30	Seeds, consumption to be increased
Drinks	Soft drinks	Carbonated soft drink	330	Sugary drinks, consumption to be reduced
	Juice	Orange juice drink	200	Processed fruit, consumption to be reduced
	Alcoholic drinks	Beer pilsner, % 3,5 vol.	330	Alcohol, consumption to be reduced
		Red wine, % 14 vol.	150	Alcohol, consumption to be reduced
	Fruit soup	Rosehip soup (pasteurized or from powder), enriched	250	Processed fruit, consumption to be reduced
		Fruit cream, unspecified	125	Processed fruit, consumption to be reduced

## 2. Dietary reference intake for the nutrient density calculation

The reference values (Table S2) were based on dietary reference intake (DRI) levels of nutrients for desirable nutrients and maximum recommended intake (MRI) levels for non-desirable nutrients according to the Nordic Nutrition Recommendations 2012 [2]. Average values were used for nutrients where gender-specific recommendations exist. In the case reference values differ between women in fertile age and other women, the higher intake levels recommended for fertile women were used. The reference values are expressed for an average person, 31-60 years of age with a sedentary physical activity level of 1.6.

**Table S2.** Nutrients included in the nutritional assessment and reference values.

Desirable nutrients	Dietary reference intake (DRI)		
	Women	Men	Average women and men
Protein (g/d) <sup>1</sup>	78	97	87
Fibre (g/d)	25	35	30
Omega-3 fatty acids (g/d) <sup>2</sup>	2.4	3.0	2.7
Vitamin A (µg RE)	700	900	800
Vitamin D (µg)	10	10	10
Vitamin E (mg)	8.0	10	9.0
Thiamin (mg)	1.1	1.4	1.25
Riboflavin (mg)	1.2	1.5	1.35
Vitamin C (mg)	75	75	75
Niacin equivalents (mg)	14	18	16
Vitamin B6 (mg)	1.2	1.5	1.35
Vitamin B12 (µg)	2.0	2.0	2.0
Folate (µg) <sup>3</sup>	400	300	350
Phosphorus (mg)	600	600	600
Iron (mg) <sup>3</sup>	15	9.0	12
Calcium (mg)	800	800	800
Potassium (g)	3.1	3.5	3.3
Magnesium (mg)	280	350	315
Iodine (µg)	150	150	150
Selenium (µg)	50	60	55
Zinc (mg)	7.0	9.0	8.0
Non-desirable nutrients	Maximum Recommended Intake (MRI)		
Added sugar (g/d) <sup>4</sup>	52	65	58
Saturated fatty acids (g/d) <sup>4</sup>	24	30	27
Sodium (g/d)	2.4	2.4	2.4

Data based on Nordic Nutrition Recommendations 2012 [2]. Total energy intake refers to an average person with a sedentary physical activity level of 1.6 (8800 kJ for women, 11000 kJ for men).<sup>1</sup>Based on 15% of total energy intake (E%), recommended intake is 10-20 E%. <sup>2</sup>Based on a recommended intake

of 1 E%. <sup>3</sup>Based on recommendation for women of fertile age. <sup>4</sup>Based on a maximum recommended intake of 10 E%.

### 3. Ranking of food subgroups based on 45 variants of nutrient density index NRF (Nutrient Rich Food).

**Table S3a.** Food subgroups ranking in the highest quintile (quintile one, Q1) for nutrient density calculated as NRF9.3 and according to different method choices.

NRF9.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Seeds
Salad vegetables	Liver paste	Legumes
Berries	Nuts	Plant-based meat substitutes
Citrus fruit	Vegetable oils	Juice
Liver paste	Dried fruit	Berries
Juice	Snacks	Root vegetables
Seeds	Cabbage, broccoli and spinach	Venison (deer bred in captivity)
Enriched plant-based drinks (soy, almond, oat)	Plant-based meat substitutes	Nuts
Egg	Low-fat cheese	Cabbage, broccoli and spinach
Plant-based meat substitutes	Egg	Dried fruit
Dried fruit	Wholegrain bread	Enriched plant-based drinks (soy, almond, oat)

  

Weighted NRF9.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Berries	Liver paste	Seeds
Salad vegetables	Nuts	Plant-based meat substitutes
Citrus fruit	Dried fruit	Berries
Liver paste	Snacks	Venison (deer bred in captivity)
Juice	Cabbage, broccoli and spinach	Juice
Seeds	Vegetable oils	Root vegetables
Enriched plant-based drinks (soy, almond, oat)	Plant-based meat substitutes	Dried fruit
Plant-based meat substitutes	Wholegrain bread	Nuts
Dried fruit	Low-fat cheese	Cabbage, broccoli and spinach
Legumes	Egg	Enriched plant-based drinks (soy, almond, oat)

  

Capped NRF9.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Seeds
Salad vegetables	Nuts	Legumes
Berries	Dried fruit	Plant-based meat substitutes
Citrus fruit	Snacks	Juice



Juice	Cabbage, broccoli and spinach	Berries
Liver paste	Plant-based meat substitutes	Root vegetables
Seeds	Liver paste	Venison (deer bred in captivity)
Enriched plant-based drinks (soy, almond, oat)	Egg	Nuts
Egg	Low-fat cheese	Cabbage, broccoli and spinach
Plant-based meat substitutes	Wholegrain bread	Dried fruit
Dried fruit	Venison (deer bred in captivity)	Enriched plant-based drinks (soy, almond, oat)

### Weighted and Capped NRF9.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Salad vegetables	Nuts	Seeds
Berries	Dried fruit	Plant-based meat substitutes
Citrus fruit	Snacks	Berries
Juice	Cabbage, broccoli and spinach	Venison (deer bred in captivity)
Liver paste	Plant-based meat substitutes	Juice
Seeds	Liver paste	Root vegetables
Enriched plant-based drinks (soy, almond, oat)	Wholegrain bread	Dried fruit
Plant-based meat substitutes	Low-fat cheese	Nuts
Dried fruit	Egg	Cabbage, broccoli and spinach
Legumes	Venison (deer bred in captivity)	Enriched plant-based drinks (soy, almond, oat)

### Capped and Weighted NRF9.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Salad vegetables	Nuts	Seeds
Berries	Dried fruit	Plant-based meat substitutes
Citrus fruit	Snacks	Berries
Juice	Cabbage, broccoli and spinach	Venison (deer bred in captivity)
Liver paste	Plant-based meat substitutes	Juice
Seeds	Liver paste	Root vegetables
Enriched plant-based drinks (soy, almond, oat)	Wholegrain bread	Dried fruit
Plant-based meat substitutes	Egg	Nuts
Dried fruit	Low-fat cheese	Cabbage, broccoli and spinach
Legumes	Venison (deer bred in captivity)	Enriched plant-based drinks (soy, almond, oat)

Foods are color-coded according to the Swedish dietary guidelines [1]: green indicates foods whose consumption should be increased, yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

**Table S3b.** Food subgroups ranking in the highest quintile (quintile one, Q1) for nutrient density calculated as NRF11.3 and according to different method choices.

NRF11.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon
Salad vegetables	Liver paste	Legumes
Berries	Nuts	Seeds
Citrus fruit	Vegetable oils	Plant-based meat substitutes
Juice	Snacks	Juice
Liver paste	Cabbage, broccoli and spinach	Berries
Enriched plant-based drinks (soy, almond, oat)	Dried fruit	Enriched plant-based drinks (soy, almond, oat)
Egg	Margarine	Cabbage, broccoli and spinach
Seeds	Plant-based meat substitutes	Root vegetables
Plant-based meat substitutes	Egg	Venison (deer bred in captivity)
Low fat milk, yoghurt and soured milk	Salmon	Poultry

  

Weighted NRF11.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon
Salad vegetables	Liver paste	Legumes
Berries	Nuts	Seeds
Citrus fruit	Dried fruit	Plant-based meat substitutes
Liver paste	Salmon	Berries
Juice	Cabbage, broccoli and spinach	Juice
Enriched plant-based drinks (soy, almond, oat)	Snacks	Cabbage, broccoli and spinach
Egg	Margarine	Root vegetables
Plant-based meat substitutes	Plant-based meat substitutes	Poultry
Pelagic fish	Egg	Enriched plant-based drinks (soy, almond, oat)
Seeds	Wholegrain bread	Venison (deer bred in captivity)

  

Capped NRF11.3		
Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Salad vegetables	Margarine	Seeds
Berries	Nuts	Salmon
Citrus fruit	Snacks	Plant-based meat substitutes
Juice	Cabbage, broccoli and spinach	Juice
Enriched plant-based drinks (soy, almond, oat)	Dried fruit	Berries
Liver paste	Butter and other hard fats	Enriched plant-based drinks (soy, almond, oat)

Egg	Plant-based meat substitutes	Cabbage, broccoli and spinach
Seeds	Egg	Root vegetables
Plant-based meat substitutes	Salmon	Venison (deer bred in captivity)
Low fat milk, yoghurt and soured milk	Liver paste	Poultry

#### Weighted and Capped NRF11.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Salad vegetables	Nuts	Seeds
Berries	Dried fruit	Salmon
Citrus fruit	Cabbage, broccoli and spinach	Plant-based meat substitutes
Juice	Snacks	Berries
Enriched plant-based drinks (soy, almond, oat)	Plant-based meat substitutes	Juice
Liver paste	Egg	Cabbage, broccoli and spinach
Egg	Salmon	Root vegetables
Plant-based meat substitutes	Liver paste	Poultry
Pelagic fish	Wholegrain bread	Enriched plant-based drinks (soy, almond, oat)
Seeds	Margarine	Venison (deer bred in captivity)

#### Capped and Weighted NRF11.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Legumes
Salad vegetables	Nuts	Salmon
Berries	Dried fruit	Seeds
Citrus fruit	Salmon	Plant-based meat substitutes
Enriched plant-based drinks (soy, almond, oat)	Cabbage, broccoli and spinach	Berries
Juice	Snacks	Juice
Liver paste	Plant-based meat substitutes	Cabbage, broccoli and spinach
Egg	Egg	Root vegetables
Plant-based meat substitutes	Margarine	Poultry
Pelagic fish	Wholegrain bread	Enriched plant-based drinks (soy, almond, oat)
Seeds	Liver paste	Venison (deer bred in captivity)

Foods are color-coded according to the Swedish dietary guidelines [1]: green indicates foods whose consumption should be increased, yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

**Table S3c.** Food subgroups ranking in the highest quintile (quintile one, Q1) for nutrient density calculated as NRF21.3 and according to different method choices.

#### NRF21.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon

Cod	Liver paste	Cod
Salad vegetables	Pelagic fish	Venison (deer bred in captivity)
Pelagic fish	Salmon	Poultry
Venison (deer bred in captivity)	Nuts	Legumes
Liver paste	Venison (deer bred in captivity)	Pork
Berries	Cod	Red meat from ruminants
Egg	Low-fat cheese	Minced meat
Crustaceans	Egg	Seeds
Enriched plant-based drinks (soy, almond, oat)	High-fat cheese	Crustaceans
Salmon	Poultry	High fat and medium-fat milk and yoghurt

#### Weighted NRF21.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon
Cod	Liver paste	Cod
Salad vegetables	Salmon	Legumes
Pelagic fish	Nuts	Venison (deer bred in captivity)
Berries	Pelagic fish	Poultry
Liver paste	Cod	Pork
Venison (deer bred in captivity)	Venison (deer bred in captivity)	Seeds
Egg	Egg	Minced meat
Enriched plant-based drinks (soy, almond, oat)	Low-fat cheese	Red meat from ruminants
Salmon	Vegetable oils	Plant-based meat substitutes
Citrus fruit	Pork	Crustaceans

#### Capped NRF21.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon
Salad vegetables	Salmon	Cod
Cod	Nuts	Venison (deer bred in captivity)
Venison (deer bred in captivity)	Venison (deer bred in captivity)	Poultry
Pelagic fish	Low-fat cheese	Legumes
Liver paste	Liver paste	Pork
Egg	Pelagic fish	Red meat from ruminants
Crustaceans	Cod	Minced meat
Enriched plant-based drinks (soy, almond, oat)	Egg	Seeds
Salmon	High-fat cheese	Crustaceans
Low fat milk, yoghurt and soured milk	Pork	High fat and medium-fat milk and yoghurt

#### Weighted and Capped NRF21.3

Per 100kcal	Per 100g	Per portion
-------------	----------	-------------

Cabbage, broccoli and spinach	Seeds	Salmon
Salad vegetables	Salmon	Cod
Cod	Nuts	Legumes
Pelagic fish	Liver paste	Venison (deer bred in captivity)
Berries	Pelagic fish	Poultry
Venison (deer bred in captivity)	Venison (deer bred in captivity)	Pork
Egg	Cod	Seeds
Enriched plant-based drinks (soy, almond, oat)	Egg	Minced meat
Salmon	Low-fat cheese	Red meat from ruminants
Liver paste	Pork	Plant-based meat substitutes
Low fat milk, yoghurt and soured milk	Poultry	Crustaceans

### Capped and Weighted NRF21.3

Per 100kcal	Per 100g	Per portion
Cabbage, broccoli and spinach	Seeds	Salmon
Salad vegetables	Salmon	Cod
Cod	Nuts	Legumes
Pelagic fish	Liver paste	Venison (deer bred in captivity)
Berries	Venison (deer bred in captivity)	Poultry
Venison (deer bred in captivity)	Pelagic fish	Pork
Egg	Cod	Seeds
Enriched plant-based drinks (soy, almond, oat)	Egg	Minced meat
Salmon	Low-fat cheese	Red meat from ruminants
Liver paste	Pork	Plant-based meat substitutes
Low fat milk, yoghurt and soured milk	Dried fruit	Crustaceans

Foods are color-coded according to the Swedish dietary guidelines [1]: green indicates foods whose consumption should be increased, yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

#### 4. Ranking of food products based on nutrient density, according to different NRF indexes, in the meat, dairy and cereal products groups.

**Table S4a.** Ranking of foods in the meat category over and under the median for nutrient density.

NRF9.3		
Per 100kcal	Per 100g	Per portion
Liver paste	Liver paste	Game
Egg	Egg	Chicken breast
Game	Game	Liver paste
Beef entrecôte	Beef entrecôte	Egg
Chicken breast	Chicken breast	Beef entrecôte
Lamb	Lamb	Lamb
Pork	Pork	Pork
Minced meat	Minced meat	Minced meat
Sausage, boiled	Pork ham	Pork ham
Sausage (e.g. Chorizo)	Sausage, boiled	Salami
Pork sausage	Sausage (e.g. Chorizo)	Sausage, boiled
Salami	Pork sausage	Sausage (e.g. Chorizo)
Pork ham	Salami	Pork sausage
NRF11.3		
Per 100kcal	Per 100g	Per portion
Liver paste	Liver paste	Game
Egg	Egg	Chicken breast
Game	Game	Liver paste
Beef entrecôte	Beef entrecôte	Egg
Chicken breast	Chicken breast	Beef entrecôte
Lamb	Lamb	Lamb
Pork	Pork	Pork
Minced meat	Minced meat	Minced meat
Sausage, boiled	Pork ham	Pork ham
Sausage (e.g. Chorizo)	Sausage, boiled	Salami
Pork sausage	Sausage (e.g. Chorizo)	Sausage, boiled
Salami	Pork sausage	Sausage (e.g. Chorizo)
Pork ham	Salami	Pork sausage
NRF21.3		
Per 100kcal	Per 100g	Per portion
Game	Liver paste	Game
Liver paste	Game	Chicken breast
Egg	Egg	Lamb
Pork ham	Lamb	Pork
Pork	Chicken breast	Minced meat
Chicken breast	Pork	Beef entrecôte
Lamb	Minced meat	Egg

Beef entrecôte	Beef entrecôte	Sausage (e.g. Chorizo)
Minced meat	Pork ham	Liver paste
Sausage (e.g. Chorizo)	Sausage (e.g. Chorizo)	Pork sausage
Pork sausage	Salami	Sausage, boiled
Salami	Pork sausage	Pork ham
Sausage, boiled	Sausage, boiled	Salami

Foods are color-coded according to the Swedish dietary guidelines [1]: yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

**Table S4b.** Ranking of foods in the dairy category over and under the median for nutrient density.

NRF9.3		
Per 100kcal	Per 100g	Per portion
Low fat milk	Low fat hard cheese	Low fat yoghurt
Low fat yoghurt	Hard cheese	Low fat milk
Low fat sour milk	Low fat yoghurt	Low fat sour milk
Milk, 1,5% fat	Low fat milk	Milk, 1,5% fat
Low fat hard cheese	Low fat sour milk	Milk
Yoghurt	Milk, 1,5% fat	Yoghurt
Milk	Milk	Low fat hard cheese
Hard cheese	Yoghurt	Hard cheese
Sour cream	Sour cream	Sour cream
Light crème fraiche	Light crème fraiche	Light crème fraiche
Whipping cream	Crème fraiche	Whipping cream
Crème fraiche	Whipping cream	Crème fraiche
Light cream	Light cream	Light cream

NRF11.3		
Per 100kcal	Per 100g	Per portion
Low fat milk	Low fat hard cheese	Low fat yoghurt
Low fat yoghurt	Hard cheese	Low fat milk
Low fat sour milk	Low fat yoghurt	Low fat sour milk
Milk, 1,5% fat	Low fat milk	Milk, 1,5% fat
Low fat hard cheese	Low fat sour milk	Milk
Yoghurt	Milk, 1,5% fat	Yoghurt
Milk	Milk	Low fat hard cheese
Hard cheese	Yoghurt	Hard cheese
Sour cream	Sour cream	Sour cream
Light crème fraiche	Light crème fraiche	Light crème fraiche
Whipping cream	Crème fraiche	Whipping cream
Crème fraiche	Whipping cream	Crème fraiche
Light cream	Light cream	Light cream

NRF21.3		
Per 100kcal	Per 100g	Per portion
Low fat milk	Low fat hard cheese	Low fat milk

Milk, 1,5% fat	Hard cheese	Milk, 1,5% fat
Low fat yoghurt	Low fat milk	Milk
Low fat sour milk	Milk, 1,5% fat	Low fat yoghurt
Milk	Milk	Yoghurt
Yoghurt	Low fat yoghurt	Low fat sour milk
Low fat hard cheese	Yoghurt	Low fat hard cheese
Hard cheese	Low fat sour milk	Hard cheese
Sour cream	Sour cream	Sour cream
Light crème fraiche	Light crème fraiche	Light crème fraiche
Light cream	Light cream	Light cream
Whipping cream	Whipping cream	Whipping cream
Crème fraiche	Crème fraiche	Crème fraiche

Foods are color-coded according to the Swedish dietary guidelines [1]: yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

**Table 4. c.** Ranking of foods in the cereal products category over and under the median for nutrient density.

NRF9.3		
Per 100kcal	Per 100g	Per portion
Muesli, wholegrain, nuts and seeds	Muesli, wholegrain, nuts and seeds	Muesli, wholegrain, nuts and seeds
Crispbread, rye	Crispbread, rye	Muesli, whole grain, natural
Bread (e.g. graham), wholegrain	Muesli, whole grain, natural	Muesli, wholegrain, fruit and berries
Muesli, whole grain, natural	Muesli, wholegrain, fruit and berries	Crispbread, rye
Muesli, wholegrain, fruit and berries	Bread (e.g. graham), wholegrain	Bread (e.g. graham), wholegrain
White bread, 3,5% fiber	White bread, 3,5% fiber	Pasta
Flat bread, with milk	Breakfast cereals, wholegrain	White bread, 3,5% fiber
White bread, 5% fiber	Corn flakes	Breakfast cereals, wholegrain
Pasta	Flat bread, with milk	Oat porridge
Oat porridge	White bread, 5% fiber	Corn flakes
Breakfast cereals, wholegrain	Pasta	White bread, 5% fiber
Corn flakes	Oat porridge	Flat bread, with milk
Rice	Rice	Rice

NRF11.3		
Per 100kcal	Per 100g	Per portion
Muesli, wholegrain, nuts and seeds	Muesli, wholegrain, nuts and seeds	Muesli, wholegrain, nuts and seeds
Crispbread, rye	Crispbread, rye	Muesli, whole grain, natural
Bread (e.g. graham), wholegrain	Muesli, whole grain, natural	Muesli, wholegrain, fruit and berries
Muesli, whole grain, natural	Muesli, wholegrain, fruit and berries	Crispbread, rye
Muesli, wholegrain, fruit and berries	Bread (e.g. graham), wholegrain	Bread (e.g. graham), wholegrain
White bread, 3,5% fiber	White bread, 3,5% fiber	Pasta
Flat bread, with milk	Breakfast cereals, wholegrain	White bread, 3,5% fiber
White bread, 5% fiber	Corn flakes	Breakfast cereals, wholegrain
Pasta	Flat bread, with milk	Oat porridge



Oat porridge	White bread, 5% fiber	Corn flakes
Breakfast cereals, wholegrain	Pasta	White bread, 5% fiber
Corn flakes	Oat porridge	Flat bread, with milk
Rice	Rice	Rice

### NRF21.3

Per 100kcal	Per 100g	Per portion
Corn flakes	Corn flakes	Muesli, wholegrain, nuts and seeds
Muesli, wholegrain, nuts and seeds	Muesli, wholegrain, nuts and seeds	Corn flakes
Oat porridge	Crispbread, rye	Oat porridge
Crispbread, rye	Muesli, whole grain, natural	Pasta
Bread (e.g. graham), wholegrain	Muesli, wholegrain, fruit and berries	Muesli, whole grain, natural
Muesli, whole grain, natural	Bread (e.g. graham), wholegrain	Muesli, wholegrain, fruit and berries
Flat bread, with milk	Flat bread, with milk	Bread (e.g. graham), wholegrain
White bread, 3,5% fiber	White bread, 3,5% fiber	Crispbread, rye
Muesli, wholegrain, fruit and berries	Breakfast cereals, wholegrain	Rice
White bread, 5% fiber	White bread, 5% fiber	White bread, 3,5% fiber
Pasta	Pasta	Breakfast cereals, wholegrain
Rice	Oat porridge	White bread, 5% fiber
Breakfast cereals, wholegrain	Rice	Flat bread, with milk

Foods are color-coded according to the Swedish dietary guidelines [1]: yellow indicates foods that represent healthier alternatives and should hence be preferred; red indicates foods whose consumption should be reduced.

### Supplementary references

1. Swedish Food Agency. Hitta ditt sätt att äta grönnare, lagom mycket och röra på dig (Find your way - To eat greener, adequate and to do physical activity) [in Swedish], 2017. [https://www.livsmedelsverket.se/globalassets/publikationsdatabas/broschyrrer/kostraed\\_webb.pdf](https://www.livsmedelsverket.se/globalassets/publikationsdatabas/broschyrrer/kostraed_webb.pdf) (accessed on )
2. Nordic Council of Ministers. Nordic Nutrition Recommendations 2012, 2014. <https://www.norden.org/en/publication/nordic-nutrition-recommendations-2012> (accessed on )