Attachment 1

Food item scoring for calculation of the animal source energy proportion

In the following text, the principles used in food item scoring are described in more detail. The complete list of the food items and the scores attained to them is available at Github (1).

Information on the food items was searched from the Finnish National Food composition database, Fineli (www.fineli.fi) (2). In addition, websites of the three largest grocery trade groups (S-group, K-group and Lidl), which together account for by far the greatest market share in grocery retail in Finland (3), were used. These are available at www.foodie.fi (4), www.k-ruoka.fi (5) and www.lidl.fi (6). Foodie is a service maintained by the Finnish retailing cooperative organization S-group, with information on over 90 000 products (4). In some cases, information was sought directly from the producers' websites.

To perform the scoring, first the weight proportion of the energy-yielding ingredients originated from animal sources was estimated for all food items appearing in the food record data. Food items strictly of animal origin (with regards to the energy-containing ingredients) were given a score of 1, whereas those originating strictly from non-animal sources were assigned a score of 0. Foods containing ingredients of both animal and plant sources were generally scored in between 0 and 1, with a few exceptions. Altogether, 488 of 719 food items (67.9%) were classified as exclusively of plant origin and therefore scored 0. Similarly, 168 food items (23.3%) were considered to be completely of animal origin. In the following, the principles of calculating the food scores are discussed in more detail.

All dairy products, such as yogurts, cheeses, ice-creams, were classified as 100% animal origin, even though a certain fraction of the energy-yielding ingredients (fruits, berries, sugar) in some of those products was of plant origin. Similarly, all meat containing sausages and cold cuts were assigned a score of 1. Even though the meat content of different sausages and cold cuts varies,

in the products we reviewed (i.e., products that appeared in the food records) the energy-yielding ingredients in these products were mainly of animal origin. Contrarily, the honey marinated chicken was assigned a score of 0.7. In Finland, the honey marinated chicken products from different manufacturers seem to contain only around 70% of chicken, and rapeseed oil is another major ingredient.

The food items with both ingredients of animal and non-animal origin appeared the most challenging to score. Fortunately, their number was low (8.8% of all food items). The scores given on these food items were rounded to the closest decile. Ingredients present in extremely small amounts only, for instance, food additives announced with a standard E code, were not taken into account. The contribution of individual food items for the ACE proportion is likely to be fairly small, and due to the methodology used some error will be present in these estimates. However, the accuracy was considered sufficient with regards to the study hypothesis.

For some food items, the calculation was done based on searched online recipes. When measurement unit conversions were required, they were carried out as instructed by the Finnish National Institute of Health (7). As an example, when estimating the percentage of animal origin ingredients for Karelian pie, a recipe from a Finnish home economics organization (Martha organization, (8)) was used (available at https://www.martat.fi/reseptit/karjalanpiirakat/). Calculating the total weight from all energy-yielding ingredients in the recipe (1 tablespoon of oil: 13.5 grams, 4 dl of flour: 220grams, 2 dl of dry rice: 170 grams, 1 egg: 60 grams, 7.5 dl of milk: 750 grams) resulted in a total weight of 1213.5 grams, when Karelian pies are baked with milk. Out of these ingredients, only milk (750 grams) and egg (60 grams) accounted for the animal origin ingredients. Therefore the animal origin percentage could be calculated as follows: 810 grams/1213.5 grams ≈ 67%. However, some of the Karelian pie recipes might include cream instead of milk, or butter instead of oil. When this information was available, it was taken into account in the estimate, which was adjusted upwards or downwards according to the number of animal products in the ingredient list.

Information on many of the fat products, such as margarines and vegetable oil spreads, butter, and their mixes, could be obtained from the producers' websites or foodie.fi. However, this was not the case for all of the products. For instance, Valio, which is the producer of a popular spread called Oivariini®, does not reveal the ratio of animal fat (butter) to rapeseed oil in the

product in their website. From Fineli the calcium content of the product was available and could be used to provide a crude estimate of the proportion of butter in the product. According to Fineli, one gram of butter contains approximately 24 mg of calcium and one gram of Oivariini® contains 12.7 mg of calcium (only from butter). Therefore, Oivariini® was estimated to contain approximately 53% of butter (12.7mg/24mg≈0.53). Oivariini® (75% fat) contains approximately 71% (53g/75g≈71%) animal fat, which resulted in a score rounded to 0.7. Similarly, one gram of low-fat Oivariini® contains 10.2 mg of calcium (again, only from butter). Therefore, low-fat Oivariini® contains approximately 42.5% of butter (10.2/24≈0.425). From this data, the animal fat percentage of low-fat Oivariini® (60% fat) can also be approximated (42.5g/60g≈71%), yielding a score of 0.7.

Concerning different mayonnaises, it proved difficult to evaluate the exact proportion of the animal origin ingredients. Some of the mayonnaises on the markets are vegan, even though not marketed as such (for instance, X-tra light mayonnaise). In non-vegan mayonnaise, the egg content varies. An estimate was given based on example products reviewed from foodie.fi.

A similar approach was taken when establishing the scores for cookies and biscuits. In this food group, the percentage of animal origin was estimated to be 10%, unless the product appeared to be vegan. The estimate was based on ingredient lists reviewed at the foodie.fi, as well as some cues provided from Fineli (for instance, presence and the amount of lactose or cholesterol in the product).

Dark chocolate was estimated to be completely of plant origin (with a score of 0), whereas milk chocolate was given a score of 0.14. The latter value was based on EU-regulation, which states that in the EU any milk chocolate needs to contain a minimum of 14% of total dry milk solids.

For broth cubes, and fish, chicken, and meat broths a score of 0.5 was given. Most broth cubes found in Finnish markets seem to contain some amount of vegetable fats and some amounts of animal origin ingredients. Unfortunately, the exact proportions of these could not be determined. It is, however, likely that their overall contribution to the children’s energy intake remains small.

References:

(1) Github. Available at: https://github.com/elinakettunen/masters-thesis.
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(4) Foodie.fi . Available at: https://www.foodie.fi. Accessed Oct 21, 2020.
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(6) Lidl Suomi KY. Available at: https://www.lidl.fi/. Accessed 21 October, 2020.
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