## APPENDIX A:
### LOW PROTEIN LABELLING CONSENSUS STATEMENTS FOR PEOPLE WITH PKU ON ≤10G/DAY OF NATURAL PROTEIN

**Foods best avoided**

| FOOD GROUPS                                                                 | STATEMENTS                                                                                     | % agreement |
|----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-------------|
| Meat (lamb, beef, pork, ham, bacon, chicken, turkey, duck, game, beef jerky, sausages, beef or chicken burgers, meat paste, meat pies). Offal (liver, kidney, tongue). Canned meats (e.g. corned beef) | High in protein and are best avoided.                                                          | 83          |
| Fish (all varieties including shellfish, frozen or tinned fish)             | High in protein and are best avoided.                                                           | 83          |
| Eggs — boiled, poached, fried, scrambled, omelette                         | High in protein and are best avoided.                                                           | 100         |
|                                                                              | However, any foods with eggs as an ingredient (e.g. cakes or sweets), must be calculated/weighed as an exchange food if they contain protein >0.5g/100g. |             |
| Cheeses (all dairy based cheese and cheese spreads)                        | High in protein and are best avoided.                                                           | 100         |
|                                                                              | However, any foods with cheese as an ingredient (e.g. in baby foods or sauce), must be calculated/weighed as an exchange food if they contain protein >0.5g/100g. |             |
| Nuts                                                                        | High in protein and are best avoided.                                                           | 82          |
|                                                                              | **Exception:** whole chestnuts                                                                 |             |
| Aspartame (E951) or neotame containing food and drinks                     | All foods, drinks and tabletop sweeteners containing aspartame or neotame are best avoided.   | 100         |
| Seeds                                                                       | High in protein and so are best avoided.                                                         | 100         |
|                                                                              | However, any food products with seeds as an ingredient (e.g. cereal bar) must be calculated/ weighed as an exchange food if they contain protein >0.5g/100g. |             |
| Soya based foods                                                            | High in protein and are best avoided.                                                           | 100         |
| Tofu                                                                        | High in protein and best avoided.                                                               | 100         |
| Quorn based foods                                                           | High in protein and are best avoided.                                                           | 100         |
| Goji berries                                                                 | High in protein and are best avoided.                                                           | 100         |
| Yeast extract spreads                                                        | High in protein and are best avoided.                                                           | 90          |
| Pork crackles/pork scratching                                                | High in protein and are best avoided.                                                           | 82          |
**Exchange-free foods**

**Definition:** Any food given without protein measurement/restriction is referred to as an *exchange-free food.*

| FOOD GROUPS | STATEMENTS | % agreement |
|-------------|------------|-------------|
| Fresh, canned, frozen or dried fruit & vegetables ≤75mg Phe/100g | Fruits and vegetables (except potatoes) containing a Phe content ≤75 mg/100g weight of fruit & vegetable are exchange-free. | 100 |
| Sugar – granulated, white, brown, demerara, muscovado, castor, icing sugar, glucose, fructose, lactose, maltose, maltodextrin | Exchange-free *excluding tabletop sugars containing aspartame.* | 100 |
| Syrup – golden, maple, agave, flavoured syrups | Exchange-free if they contain exchange-free ingredients only. | 100 |
| Black Treacle | Exchange-free as it contains exchange-free ingredients only. The protein content appears higher than other sugars due to its processing. Treacle is made from the ‘remaining’ syrup after sugar is refined. | 100 |
| Fruit syrups/fruit sauces | Exchange-free if they contain exchange-free ingredients only. | 100 |
| Sweet spreads e.g. Jam/marmalade/honey | Exchange-free if they contain exchange-free ingredients only. | 100 |
| Artificial sweeteners e.g. acesulfame, cyclamate, erythritol, fructose, isomalt, lactitol, maltitol, maltodextrin, mannitol, saccharin, sorbitol, stevia, sucralose, thaumatin, xylitol | All artificial sweeteners/sugar substitute *except aspartame or neotame,* are exchange-free. Aspartame and neotame are best avoided. | 96 |
| Fats (butter, margarine, low fat spreads, oils, vegetable fats, oil sprays) | Exchange-free, irrespective of the protein content on the food ingredient label, due to the small quantities consumed. | 96 |
| Vinegar-based sauces: Worcester sauce, mint sauce/jelly, vinegar | Exchange-free if they contain exchange-free ingredients only or are used in small quantities. | 80 |
| Natural fruit juice (no added sugar) | Exchange-free if they contain exchange-free/aspartame-free ingredients only. | 100 |
| Fruit smoothie | Exchange-free if made with exchange-free, aspartame-free fruit/vegetable juice. | 100 |
| Soft drinks e.g. squash, fizzy drinks, coke | Exchange-free, providing aspartame-free. | 100 |
| Sugar-free drinks e.g. squash, fizzy drinks, cola | Exchange-free, providing aspartame-free. | 100 |
| Tea - black, green, mint, camomile, fruit, herbal, and iced. | Exchange-free, providing aspartame-free. | 100 |
| Chewing gum/Bubble gum | Chewing gum/bubble gum that is aspartame-free is exchange-free. Chewing gum that contains aspartame is best avoided. | 95 |
| Coffee - black ground, instant, expresso | Exchange-free if it contains exchange-free ingredients only. White coffee (including dried reconstituted from sachets), frappuccino’s, cappuccino, lattes, coffee pods/capsules with added milk, iced coffee, macchiato must be calculated/measured as exchange drinks. | 100 |
| Herbs, spices, seasonings (fresh or dried), salt & pepper | All herbs, spices and seasonings fresh or dried (irrespective of the protein content on the food ingredient label) are exchange-free, due to the small quantities consumed. | 100 |
| Custard powder containing exchange-free ingredients only | Custard powders containing exchange-free ingredients only (e.g. cornflour, colour, flavourings) are exchange-free. Prepare with protein-free milk. | 100 |
| Milshake powders/syrups containing exchange-free ingredients and aspartame-free. | Milshake syrups or powders containing exchange-free ingredients only (e.g. cornflour, colour, flavourings) are exchange-free. Prepare with protein-free milk. | 100 |
| Food colouring (gel, liquid or paste) and flavouring/essences (e.g. vanilla, peppermint, almond) | Exchange-free if they contain exchange-free ingredients only. | 100 |
| Flours - arrowroot, cornflour/maize starch/corn starch, cassava/tapioca starch, sago | Exchange-free. Note: Cornmeal is high in protein and is an exchange food. Ready-to-serve milk puddings made with tapioca and sago are not exchange-free. | 100 |
| Baking ingredients – bicarbonate of soda, baking powder, cream of tartar | Exchange-free. | 100 |
| Fibres/gums – psyllium fibre, psyllium husks, xanthan gum | Exchange-free. | 100 |
| Konnyaku | Exchange-free. | 100 |
| Cassava crisps | Exchange-free if ingredients are all exchange-free. | 100 |

**Foods that require measuring/weighing as an exchange food if they contain protein >0.1g/100g or 0.1g/100ml. If they have a protein content no more than 0.1g/100g or 0.1g/100ml, they are exchange-free.**

| FOOD GROUPS | STATEMENTS | % agreement |
|-------------|------------|-------------|
| Milk (animal based– full fat, semi-skimmed, skimmed, condensed, soya | Any milk product (plant or animal) containing protein >0.1g /100ml must be measured/calculated as an exchange food. | 80 |
| Plant milks e.g. coconut, oat, rice, almond, hemp | Any milk product (plant or animal) containing protein >0.1g /100ml must be measured/calculated as an exchange food. Coffee either containing or made with animal/plant milk must be calculated/measured as an exchange drink. Exchange-free if it contains exchange-free ingredients only. | 80 |
Foods that require measuring/weighing as an exchange food if they contain protein >0.5g/100g. If they contain exchange-free ingredients only or have a protein content no more than 0.5g/100g, they are exchange-free.

| FOOD GROUPS                                           | STATEMENTS                                                                 | % agreement |
|-------------------------------------------------------|---------------------------------------------------------------------------|-------------|
| General food groups                                    |                                                                           |             |
| Gluten-free foods                                     | Gluten-free foods with a protein content >0.5g/100g must be calculated/weighed as exchange foods. | 96          |
| Gelatine containing foods                             | All foods containing gelatine and with a protein content >0.5g/100g must be calculated/weighed as exchange foods. | 93          |
| Dairy products and alternatives                       |                                                                           |             |
| Vegan, free-from or soya/plant cheese or regular cheese as an ingredient | Any foods with added regular cheese as an ingredient (e.g. in baby foods or sauce), and with a protein content >0.5g/100g, must be calculated/weighed as an exchange food. | 94          |
|                                                       | Any vegan or ‘free-from’ cheese is exchange-free if the protein content is ≤0.5 g/100g or if they contain exchange-free ingredients only. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. |             |
| Soft cheese, cheese spread, cream cheese              | Soft, cream cheeses with a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 87          |
|                                                       | Any vegan or free-from soft cheese is exchange-free if the protein content is ≤0.5 g/100g or if they contain exchange-free ingredients only. If they contain protein >0.5g/100g and contain exchange ingredients, they must be calculated/weighed as exchange foods. |             |
| Ice-lolly milk based                                  | Exchange-free if the protein content is ≤0.5g/100g of food. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 96          |
| Ice-lolly fruit/ juice based                          | Exchange-free if the protein content is ≤0.5g/100g of food. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 96          |
| Cream e.g. double, single, clotted, cream alternatives, sour, spray cream | Any cream with a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 100         |
| Ice-cream (dairy and dairy-free)                      | Any ice-cream (dairy or dairy-free) with a protein content >0.5g/100g must be calculated/ weighed as an exchange food. | 100         |
|                                                       | **Weight** rather than the volume of ice-cream must be used to calculate the protein exchange amount. |             |
| Dairy or soya yogurt e.g. flavoured or plain, drinking, soya | Any yoghurts with a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 100         |
|                                                       | However, if they contain exchange ingredients and protein ≤0.5g/100g, it is best to limit to 1 portion/pot per day. |             |
| Dairy desserts e.g. fromage frais, dairy desserts, custard, mousse, instant dessert, rice pudding | Any desserts with a protein content >0.5g/100g must be calculated/weighed as an exchange food. | 97          |
|                                                       | However, if they contain exchange ingredients and protein ≤0.5g/100g, it is best to limit to 1 portion/pot per day. |             |
| Category                        | Description                                                                                                                                                                                                 | Exchange Rate |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Coconut-based desserts         | Any coconut desserts with a protein content >0.5g/100g must be calculated/ weighed as an exchange food. If they contain ≤0.5g/100g, they are considered exchange-free. However, if they contain exchange ingredients and protein ≤0.5g/100g, it is best to limit to 1 portion/pot per day. | 97            |
| Coconut products               | Dried coconut products with a protein content >0.5g/100g protein must be calculated/ weighed as an exchange food.                                                                                               | 93            |
| Breads & cereals               |                                                                                                                                                                                                            | 100           |
| Bread e.g. bread roll, English muffin, bagels, crumpet, pitta, naan, ciabatta, wrap, breadsticks, croissants, brioche (including gluten-free)                   | All breads and bread products, including gluten-free varieties, with a protein content >0.5g/100g must be calculated/ weighed as an exchange food.          | 100           |
| Breakfast cereals – wheat based e.g. muesli branflakes, multigrain, shredded wheat, Weetabix and corn, rice or oat based e.g. Cornflakes, Rice krispies, Cheerios, Sugar puffs, Frosties, oats/porridge (cooked), including gluten-free | All breakfast cereals and breakfast oats (including gluten-free varieties) with a protein content >0.5g/100g must be calculated/ weighed as an exchange food. | 100           |
| Cereal grains e.g. wheat, bulgar wheat, quinoa, barley, oats, corn, rice, semolina, millet sorghum, buckwheat, quinoa, chia, triticale, amaranth             | All cereals with a protein content >0.5g/100g must be calculated/ weighed as exchange foods.                                                                                                                   | 100           |
| Yorkshire pudding, stuffing balls, pancakes, waffles (including gluten-free) | All Yorkshire puddings, pancakes, waffles, stuffing balls, (including gluten-free varieties) with a protein content >0.5g/100g must be calculated/ weighed as an exchange food. | 100           |
| Spreads & dips                 |                                                                                                                                                                                                            | 100           |
| Lemon curd                     | All lemon curd with a protein content >0.5g/100g must be calculated/ weighed as an exchange food.                                                                                                            | 100           |
| Chocolate spread               | All chocolate spread with a protein content >0.5g/100g must be calculated/ weighed as an exchange food.                                                                                                     | 100           |
| Nut spread/chocolate nut spread e.g. peanut butter, Nutella | All nut spreads with a protein content >0.5g/100g must be calculated/ weighed as an exchange food.                                                                                                            | 87            |
| Hummus                         | Hummus with a protein content >0.5g/100g must be calculated/ weighed as an exchange food.                                                                                                                     | 100           |
| Dips – sweet and savoury       | Any sweet or savoury dips (e.g. sour cream, Tzatziki, nacho cheese dip) require measuring/ weighing as exchange foods if they contain protein >0.5g/100g and contain exchange ingredients. If they contain exchange-free ingredients only or have a protein content no more than 0.5g/100g, they are exchange-free. | 100           |
| Sauces, dips, gravy & soup     |                                                                                                                                                                                                            | 100           |
| Gravy                          | Exchange-free if the protein content is ≤ 0.5 g/100 ml when prepared. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/measured as an exchange food.                                             | 100           |
| Cheese or milk-based sauces e.g. cheese, white, parsley, carbonara | All cheese sauces must be calculated/measured as part of exchange system unless dry powder ingredients are exchange-free and are made up with water or protein-free milk. | 100           |
| Herby/spicy rubs or coatings   | Exchange-free if the protein content is ≤0.5g per serving. Any that contain exchange ingredients with a protein content >0.5g/100g per serving must be calculated/ weighed as an exchange food. | 96            |
| Category                              | Description                                                                                                                                                                                                 | Exchange Value |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| **Pesto**                             | Any pesto, mustard, tapenade or plant-based spread, including homemade, with a protein content >0.5g/100g must be calculated/weighed as an exchange food (unless it contains exchange-free ingredients only).                          | 100             |
| **Soup**                              | If soups contain exchange ingredients and their protein content is >0.5g/100g, then they must be calculated/measured as an exchange food (unless they contain exchange-free ingredients only).                                | 79              |
| **Pasta & rice**                      | All regular or gluten-free pasta, rice or pasta products with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                    | 100             |
| **Pot Noodles**                       | All pot noodles with a protein content >0.5g/100g when reconstituted, must be calculated/weighed as an exchange food.                                                                                       | 100             |
| **Meat & Alternatives**              | Any vegan meat replacements must be calculated/weighed as an exchange food if it contains protein >0.5g/100g and contains protein exchange ingredients.                                                       | 83              |
| **Vegan fish**                        | Any vegan fish replacements must be calculated/weighed as an exchange food if it contains protein >0.5g/100g and contains protein exchange ingredients.                                                       | 83              |
| **Vegan Eggs, including aquafaba**    | Any vegan egg replacements must be calculated/weighed as an exchange food if it contains protein >0.5g/100g and contains protein exchange ingredients.                                                       | 100             |
| **Legumes/pulses e.g. Lentils, chickpeas, dried peas, split peas. Beans – baked, red & black, kidney, haricot, pinto, cannellini, turtle, butter, adzuki** | All pulses and beans with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                                               | 95              |
| **Drinks**                            | Flavoured milk powders, milkshake powders/liquids and hot chocolate powders/liquids with a protein content >0.5g/100g must be calculated/measured as an exchange food. These are best prepared with protein-free milk.            | 94              |
| **Sweet snacks**                      | Biscuits with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                                                                    | 100             |
| **Cake, muffin, doughnut, tart, scone, pastries, brownies, flapjack, fruit loaves, fruit pies, scones, cupcakes, cake bars, teacakes (including gluten-free varieties).** | Cakes and pastries, including gluten-free varieties, with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                | 100             |
| **Breakfast or cereal bars**          | Breakfast and cereal bars with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                                             | 100             |
| **Fruit bars**                        | Any fruit bars with a protein content >0.5g/100g must be calculated/weighed as an exchange food (unless they contain exchange-free ingredients only).                                                             | 97              |
| **Puddings – cheesecake, crumble, pie, tart, sponge, trifle, meringue, sponge**      | Any desserts with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                                                                            | 100             |
| **Frozen puddings e.g. pies, pastries, crumbles (including gluten-free varieties).** | All frozen pastry, pies, crumbles (including gluten-free varieties) with a protein content >0.5g/100g must be calculated/weighed as an exchange food.                                                         | 100             |
| Food Category                          | Exchange Conditions                                                                 | Note                                                                 | Exchange Value |
|---------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------|----------------|
| Jelly (aspartame-free)                | Exchange-free if the protein content is ≤0.5g/100g. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 97             |
| Chocolate/chocolate bars, fudge, toffee | Exchange-free if the protein content is ≤0.5g/100g. All with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Gummy sweets, vegetarian gummy sweets (aspartame-free) | Exchange-free if the protein content is ≤0.5g/100g. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 91             |
| Marshmallows                          | Exchange-free if the protein content is ≤0.5g/100g. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. | Note: only gelatine-free mallows are likely to contain ≤0.5g/100g protein. | 95             |
| All other sweets e.g. boiled, chewy, mints, candy (aspartame-free) | Exchange-free if the protein content is ≤0.5g/100g. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 91             |
| Liquorice                             | Liquorice with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Savoury snacks                        |                                                                                      |                                                                      |                |
| Potato crisps                         | All potato crisps with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Vegetables crisps                     | All vegetable crisps with a protein content >0.5g/100g must be calculated/weighed as an exchange food. | Exceptions: Cassava crisps are exchange-free if ingredients are all exchange-free. Vegetable crisps containing exchange-free vegetables are calculated/weighed as exchange foods due to the concentration of protein associated with cooking methods; their protein content per 100g must be used to determine the exchange amount. | 100            |
| Corn and rice-based snacks            | All corn and rice-based snacks with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Popcorn                               | All popcorn with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Pretzels                              | All pretzels with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Crackers, crispbread, breadsticks     | Crackers, crispbreads and breadsticks with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Rice, corn or oat cakes               | Rice, corn or oat cakes with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Flours and Starch                     | All flours with a protein content >0.5g/100g must be calculated/weighed as an exchange food. |                                                                      | 100            |
| Sugars                                |                                                                                      |                                                                      |                |
Icing – e.g. Buttercream, fondant icing  
All icings with a protein content ≤0.5g/100g or if they contain exchange-free ingredients only, are considered exchange-free. Any with exchange ingredients and a protein content >0.5g/100g must be calculated/weighed as an exchange food.

Marzipan  
Marzipan with a protein content >0.5g/100g must be calculated/weighed as an exchange food

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**Foods that require measuring/weighing as an exchange food if they contain protein >1g/100g. If they contain exchange-free ingredients only, or have a protein content no more than 1g/100g, they are exchange-free.**

| FOOD GROUPS                      | STATEMENTS                                                                 | % agreement |
|----------------------------------|---------------------------------------------------------------------------|-------------|
| **Sauces & dressings**           |                                                                           |             |
| Table top sauces, brown sauce,   | Require measuring/weighing as exchange foods if they contain protein >1g/100g and contain exchange ingredients. If they contain exchange-free ingredients only or have a protein content no more than 1g/100g, they are exchange-free. | 80          |
| tomato ketchup, BBQ, chilli,     |                                                                           |             |
| fat-free dressings, chutney,     |                                                                           |             |
| pickles, mint sauce, salad       |                                                                           |             |
| dressings, vinaigrette,          |                                                                           |             |
| Horseradish, and tartare.        |                                                                           |             |
| Mayonnaise, salad cream, oil-based dressings | Require measuring/weighing as exchange foods if they contain protein >1g/100g and contain exchange ingredients. If they contain exchange-free ingredients only or have a protein content no more than 1g/100g, they are exchange-free. | 91          |
| Cook-in/pour over or liquid      | Require measuring/weighing as exchange foods if they contain protein >1g/100g and contain exchange ingredients. If they contain exchange-free ingredients only or have a protein content no more than 1g/100g, they are exchange-free. | 87          |
| sauces e.g. Italian, curry,      |                                                                           |             |
| sweet & sour, tomato, vegetable  |                                                                           |             |
| **Sugars**                       |                                                                           |             |
| Cake decorations                 | All cake decorations are exchange-free if they contain exchange-free      | 97          |
| ingredients only or if the       | protein content is ≤1g/100g. If they contain >1g/100g and contain       |             |
| exchange ingredients, they must  | exchange ingredients, they must be calculated/weighed as exchange foods. |             |
Foods that require measuring/weighing as an exchange food if they contain protein >1.5g/100g. If they contain exchange-free ingredients only or have a protein content no more than 1.5g/100g, they are exchange-free.

| FOOD GROUPS                                  | STATEMENTS                                                                                                                                                                                                 | % agreement |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Soya sauce                                   | Exchange-free if it contains protein ≤1.5g/100g. Any with a protein content >1.5g/100g must be calculated/measured as an exchange food                                                                   | 79          |

Special low protein food containing Phe >25 mg/100g and containing exchange ingredients such as milk or seeds

| FOOD GROUPS                                                                 | STATEMENTS                                                                                                                                                                                                 | % agreement |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Low protein special foods (including bread, bread rolls, baguettes, pizza bases, breakfast cereals, chocolate spread, pasta, noodles, rice, couscous, sausage/burger mix, snack pots, biscuits/cookies, cakes, cereal bars, puddings, chocolate, crackers, sauces, flour, cake mix, dessert mix) | Exchange-free if they contain exchange-free ingredients only. If low protein special prescribed foods contain exchange ingredients but contain Phe ≤25mg Phe/100g of prepared product, they are exchange-free. If they contain exchange ingredients and contain Phe ≥26/100g of prepared product, they are an exchange food. | 83          |

Low Protein Milk Replacements

| FOOD GROUPS                                                                 | STATEMENTS                                                                                                                                                                                                 | % agreement |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Low protein milks replacements (available on prescription)                | Any low protein special milk that provides a Phe intake of >5mg/100ml must be calculated/measured as an exchange food.                                                                                     | 80          |
**Fruit and Vegetables as exchange foods**

| FOOD GROUPS | STATEMENTS | % agreement |
|-------------|------------|-------------|
| Fresh fruit & vegetables 76-100mg Phe/100g | Fruit and vegetables containing a Phe content **76–99 mg/100g** weight of fruit and vegetable, are calculated/weighed as exchange foods. A standard exchange amount of **60g** for any fruit or vegetables containing Phe between 76-99 mg/100 g is used. | 80 |
| Fresh fruit & vegetables ≥100mg Phe/100g | Fruits and vegetables with a Phe content of **≥100 mg/100g** weight of fruit and vegetable, are calculated/weighed as exchange foods. Their phenylalanine content is used to calculate exchange amounts. | 100 |
| Manufactured fruit & vegetables e.g. frozen, canned, passata, tomato puree | Any manufactured fruit or vegetables (e.g. frozen or canned products) that are exchange-free in their fresh form, are exchange-free foods if they contain exchange-free ingredients only, e.g. herbs, oil. However, if they contain added ingredients that are protein containing (e.g. milk or wheat), they are calculated/weighed as exchange foods. | 96 |
| Dried fruit e.g. apricot, dates, cranberries, banana chips, mango, raisins, sultanas, fruit bars | Any dried fruits that are exchange-free in their fresh form, are exchange-free foods. However, if they contain added ingredients that are protein containing (e.g. milk or wheat), they are calculated/weighed as exchange foods. | 100 |

**Potato and potato products**

| FOOD GROUPS | STATEMENTS | % agreement |
|-------------|------------|-------------|
| Potato - boiled, mashed (no milk), jacket, baked | **80g = 1 exchange of protein, based on phenylalanine analysis.** Fresh/frozen potatoes are calculated/weighed as exchange foods. If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
| Canned potato | **100g = 1 exchange of protein, based on phenylalanine analysis.** If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
| Roast potato (fresh/frozen) | **55g = 1 exchange of protein, based on phenylalanine analysis.** If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
| Chips/fries (fresh/frozen) | **45g = 1 exchange of protein, based on phenylalanine analysis.** If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
| Instant mashed potato | **10g (dry weight) = 1 exchange of protein based on phenylalanine analysis.** If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
| Processed potatoes – waffles, croquettes, wedges, Alphabites, hash browns, Smiley faces, potato salad | Fresh/frozen potato products are calculated/weighed as exchange foods. If Phe analysis is unavailable, the protein content is used to calculate exchange amounts. If potato products contain additional exchange ingredients (e.g. wheat flour, or milk), the protein analysis on the packet is used to determine its exchange amount. | 96 |
**General statements**

| STATEMENTS |
|-------------|
| **Rounding values up or down if protein is <0.5g or >0.5g/100g** |

**Definition:** 1g protein exchange = the amount of food that is calculated/measured to provide 1g protein from the protein food analysis.

Food ‘exchange’ amounts for food portions must be rounded up or down based on the ‘rule of maths’ (Table 1* below for guidance).

| **General guidance** |
|---------------------|

Patients/caregivers are advised to read ingredient lists as well as the protein content per 100g on food labels.

As guidance:

- If ingredients are protein containing (but the protein analysis appears very low), it is important to establish more accurate protein analysis before consuming.
- If ingredients are ‘clearly’ exchange-free, then it is appropriate to give as an exchange-free food even if the protein analysis is unavailable on the label.
- If there is no nutritional analysis on the product but it contains ingredients that are exchange foods, then further food protein analysis must be obtained before consuming.
- If a label states protein content is 0 g but one or more ingredients is a protein source (e.g. gelatine), then an accurate food protein analysis must be obtained before consuming.

*previously reported in: Evans S, Ford S, Adam S, Adams S, Ash J, Ashmore C, et al. Development of national consensus statements on food labelling interpretation and protein allocation in a low phenylalanine diet for PKU. Orphanet J Rare Dis. 2019;14:2.

**Table 1:** Calculating food protein exchanges from protein analysis on the food label

| Protein content per item when calculated from label | Calculated exchange |
|-----------------------------------------------------|---------------------|
| 0g protein per food portion                         | Exchange free       |
| 0.1g protein per food portion                       | Exchange free (if total volume consumed is ≤ 0.5g protein) |
| 0.2g protein per food portion                       | Exchange free (if total volume consumed is ≤ 0.5g protein) |
| 0.3g protein per food portion                       | Exchange free (if total volume consumed ≤ 0.5g protein). Suggest 1 portion is exchange-free, 2 portions is ½ exchange* |
| 0.4 to 0.7g protein per food portion                | ½ exchange protein  |
| 0.8 to 1.2g protein per food portion                | 1 exchange protein  |
| 1.3 to 1.7g protein per food portion                | 1.5 exchange protein |
| 1.8 to 2.2g protein per food portion                | 2 exchange protein  |
| 2.3 to 2.7g protein per food portion                | 2.5 exchange protein |
| 2.8 to 3.2 per food portion                         | 3 exchange protein  |

*This may apply to ice cream lolles, gluten-free cakes, very small packets crisps, sweets