Low Protein Diet for Phenylketonuria (PKU)

A healthy diet contains protein for growth and repair, carbohydrates and fats for energy, activity and growth, and essential fats, vitamins and minerals to keep us healthy and well. Protein is made up of building blocks called amino acids.

Phenylketonuria (PKU) is a condition in which the body is unable to break down one of the protein building blocks from the diet; the amino acid called phenylalanine (PHE).

In PKU the PHE cannot be metabolised normally and builds up in the blood and tissues. Infants with this condition are started on a low protein (PHE) diet from birth and this should be followed for life.

PHE is an essential amino acid which means some is needed for growth and to make the body's protein, but only in small measured amounts. This ensures normal growth and development while keeping the blood PHE level in a 'safe' range.

Women's & Children's Hospital

Protein Supplement

People without PKU get all the protein they need from the food they eat.

Because protein intake is low in the diet for PKU, a protein supplement is needed to make up what is missing from not eating foods high in protein. For people with PKU the protein supplement is essential for health and to maintain PHE levels in the target range. It provides all the essential amino acids (except PHE), tyrosine, vitamins, minerals and trace elements.

A variety of protein supplements are available in Australia. Protein supplements are made to suit the nutritional needs of people at different ages, and are available in various forms to suit different lifestyles and preferences. Your dietitian will advise which protein supplements are suitable for you or your child.

The protein supplement should be taken with meals and evenly spread over the day. This helps to keep the PHE levels steady throughout the day.

Dietary Protein (phenylalanine)

- Depending on how much protein is in a food, food in the PKU diet is either:

  Free (uncounted) or Counted or Avoided

Counting protein

Traditionally in Australia, the PHE in the diet for people with PKU has been counted as units, 1 unit being equal to 15mg of PHE.

With greater food knowledge and an improvement in commercial food labelling, another method of counting PHE has been developed (Reference 1).

This diet counts the grams of protein in food, remembering that PHE is one of the building blocks of protein. 1 gram of dietary protein is equal to 50mg PHE.

It is also best to spread the protein allowance over the day and try to avoid a big protein load at one meal.

Low protein foods are important for variety and providing energy (calories). If the energy intake is too low the body breaks down its own protein stores (i.e. muscle) to use as an energy source. This can cause the PHE levels in the blood to rise. Too high an energy intake and low activity levels can lead to overweight. Your clinic will advise on whether weight is appropriate for height and age.

The steps in a low protein diet for PKU

Step 1 – Include low protein and protein free foods such as uncounted vegetables/fruit at each meal.

Step 2 – Count the amount of protein in higher protein foods, so that each day you or your child has the amount of protein prescribed. Try and spread this protein throughout the day.

Step 3 – Make sure the protein supplement is taken throughout the day.

Step 4 – Talk to your child about the special diet from a young age, so that he/she learns about it and gradually takes responsibility for it.

Use this food list, along with food labels on commercial foods to count your daily protein intake.

Reference 1: “Dietary protein counting as an alternative way of maintaining metabolic control in Phenylketonuria”

Sweeney, A. L., Roberts, R. M., and Fletcher, J. M. (2012)

JIMD Reports, 3, 131-139, doi: 10.1007/8904_2011_31

Commercial foods

The nutritional panel on the packet of food can help you count the protein in commercial foods.

See pages 47 - 51 of the PKU Handbook (2005) for more information.

Reading nutrition panels

If a food contains less than or equal to 0.3g protein per serve it does not need to be counted. You will need to check that the serve size and the quantity you eat is the same as the packet to be able to accurately count the protein.

Round any values to the nearest half gram i.e. 2.3 rounds up to 2 ½ grams and 1.2 rounds down to 1 gram of protein.

Do not count ¼ grams of protein.

The following guide may help:

0.0 - 0.3	negligible
0.4 - 0.7	½ gram
0.8 - 1.2	1 gram
1.3 - 1.7	1½ grams
1.8 - 2.2	2 grams
2.3 - 2.7	2½ grams
2.8 - 3.2	3 grams of protein etc

Consumption of many foods containing less than or equal to 0.3g protein per serve in one day can accumulate and affect PHE levels in some cases.

Sweeteners

The ingredient list is useful to check for PHE containing sweeteners.

All additive numbers are free **except** additive numbers- **951** (Aspartame) and **962** (Acesulphame-Aspartame) which contain PHE. NutraSweet, Equal and Canderal are other names used.

Weighing versus using household measures

The following lists give the protein content for average serve sizes as well as the amount of food that contains 1 gram of protein. Weighing is likely to be more accurate than household measures.

Standard metric measures are used and all measures are level:

1 teaspoon = 5 ml

1 cup = 250 ml

Note:
in Australia 1 tablespoon = 20 ml
in New Zealand 1 tablespoon = 15ml

How to use the food list

- The following lists contains information about the protein content of foods that do not have a nutritional panel or have a label e.g. potato.
- Use the nutritional panel on commercial foods whenever possible to calculate the amount of protein in food.
- When counting protein in foods or from food labels always round to the nearest ½ gram of protein
- As with commercial foods do not count in ¼ grams of protein. Counting in ½ grams is accurate enough. Values in tables have been rounded to ½ gram.
- Round any values you have calculated to the nearest ½ gram: i.e. 2.3 rounds up to 2 ½ grams and 1.2 rounds down to 1 gram of protein.
- The higher a food is in protein the more accurate you need to be in measuring the food. Weighing is likely to be more accurate particularly if blood PHE levels are high. If PHE control is appropriate household measures are accurate enough
- The protein value is listed in 2 ways:
  - The value given under the “protein per serve” column is the number of grams of protein in an average serve, rounded up or down (shown under “SERVE”).
  - The size of the average size in grams or mls is given under “SERVE SIZE”.
- In the case of fruits and vegetables the serve size is expressed as “EDIBLE WEIGHT”. This is the weight of the fruit or vegetable that you actually eat e.g. for a banana it does not include the weight of the skin. Where possible with fruits and vegetables the weight with skin and other non-edible parts is included underneath in small print.
- The value given in the “WEIGHT CONTAINING 1 G PROTEIN” is the most accurate value to use if you are weighing food. It is the amount that exactly contains 1g protein.

Special note about fruit and vegetables

- Fruit and vegetables do not contain as much PHE per gram of protein as other foods. Therefore the values for fruit and vegetables have been adjusted to account for this. The protein count for fruits and vegetables are called 'protein equivalents' with 1 protein equivalent (PE)" = 50mg PHE. This is why labels on canned vegetables or fruit often have a higher protein count than this chart.
- Where you may find some difference is in label reading.
    - If the food contains only free (uncounted) fruit/vegetable e.g. canned pears use the counting information in this handout
    - If the fruit/vegetable is combined with other foods which you would normally count e.g. with flour in a fruit bar use the value as per the packaging (nutrition panel).
- You will notice in this food list a lot of the fruit and vegetables have negligible protein content and therefore do not need to be counted.
- Do remember that some fruit and vegetables contain protein so may need to be counted if eaten in larger quantities. Talk to your dietitian if you eat a lot of a particular fruit or vegetable if it is not listed on pages 7 - 9.

Basic Principles of the diet for PKU

People with PKU get some of the protein they need from the protein supplement. The remaining protein, which includes the essential amount of PHE the body needs for growth and functioning, comes from food.

The diet for PKU consists of:

- Fruit and vegetables
- Low protein foods- e.g. bread made with low protein flour, low protein pasta, rice and low protein breakfast cereal
- Small amounts of cereal based foods- e.g. crackers and biscuits
- Fat and sugar

Foods such as red meat, chicken, fish, eggs, milk, yoghurt, cheese, nuts and legumes (e.g. lentils, chick peas, kidney beans) are too high in protein to include in a diet for a person with PKU.

The amount of PHE needed and tolerated by each person with PKU is quite different. The grams of protein are adjusted according to blood PHE levels and are likely to vary from time to time. Your dietitian will guide you.

There are commercial low protein products which contain very little protein and may be eaten freely, unless indicated otherwise. Along with many of the fruits and vegetables they form the basis of the diet low in PHE.

Other foods, such as fats and sugars, are also free of counted protein; however they contain a large amount of energy and if eaten often in large amounts may cause you or your child's weight to increase excessively.

Commercial low protein products

There are a number of low protein commercial foods available directly from the manufacturer/importer. Others are available on-line or in the supermarket. Examples include low protein pasta, rice, cereal, flour, cheese and milk substitutes. Ask your dietitian for information on these foods and how to order.

Fruit

Healthy eating guidelines for Australians recommend at least 2 serves of fruit per day.

Most fresh, frozen, dried or canned fruit do not need to be counted in a low protein diet for PKU, as in normal quantities most fruits only contain a small amount of phenylalanine. If eaten in very large quantities they may cause the blood PHE to rise.

Exceptions:

- Dried fruit including banana chips - it is easy to eat more of dried fruits and banana chips than the equivalent amount of the fruit fresh so check the list below. If large amounts of amounts of dried fruit and banana chips are eaten it will need to be counted.
- Only a few of the fruits need to be counted as these contain more PHE when compared with other fruits. See table below for protein count:You do not need to count them if less than the following amounts are eaten.
    - Banana - ½ small
    - Mulberry - ½ cup
    - Pomegranate - 1-2 teaspoons

If you buy foods in which a free fruit is mixed with another ingredient – such as custard, cereal or breadcrumbs, use the value for the protein on pack. For example:

- Canned apple is free but baby canned apple with cereal or baby canned apple with custard needs to be counted using the protein value on the pack
- Fruit slice biscuits need to be counted using the protein value on pack.

Fresh fruit	Type	Serve	Edible weight g	Protein equivalent (PE) per serve	Weight containing 1 PE
Banana common, sugar (weight with skin:110g)	fresh	½ large	70	1.0	60
Mulberry	fresh	1 cup	130	1.5	77
Pomegranate	fresh	½ fruit	120	1.5	87

Dried fruit	Type	Serve	Edible weight g	Protein equivalent (PE) per serve	Weight containing 1 PE
Apricot	dried	10 halves	50	1.0	55
Date	dried	1 cup	104	1.0	84
Fig	dried	3 figs	45	1.0	47
Mixed Fruit	dried	½ cup	88	1.0	84
Raisin	dried	2 tablespoon	70	1.0	73
Sultana	dried	4 tablespoon	80	1.0	80
Banana chips	dried	¼ cup	25	0.5	45

Vegetables

Healthy eating guidelines for Australians recommend at least 5 serves of a variety of vegetables each day.

Many vegetables (see below for exceptions) do not need to be counted in a low protein diet for PKU, if eaten in usual serves as they only contain a small amount of PHE. For example artichoke, beetroot, bok choy, cabbage, capsicum, carrots, celery, cucumber, eggplant, leek, lettuce, onion, parsnip, tomato and zucchini are all low in PHE. If eaten in very large quantities they may cause the blood PHE to rise; talk to your dietitian if you eat large serves.

Exceptions:

The following vegetables usually **need to be counted** unless only having 'tastes'. See page 9

- Potato
- Peas
- Sweet corn
- Broccoli
- Cauliflower
- Pumpkin
- Spinach
- Sweet potato
- Avocado

If the following vegetables are eaten in small amounts and used in dishes such as stews, stir fries, salads, sauces etc. you do not need to count if less than the following amounts are eaten. Check the table on page 9 if large amounts are eaten at one time.

- Asparagus - 2 spears
- Brussel sprouts - 1 sprout
- Mushrooms - 3 small
- Celeriac - ¼ vegetable
- Snow peas - 6 pods

If you purchase foods in which a free vegetable is mixed with another ingredient such as counted vegetable, rice, pasta or breadcrumbs, use the value for protein on pack. For example:

- Canned carrots are free, but canned carrots with rice or couscous needs to be counted using the protein value on pack.
- Frozen carrots are free but a frozen mix of corn, carrots and peas should be counted using the protein value on pack if you count corn and peas.
- Sun-dried tomatoes are free but a sun-dried tomato pesto with pine nuts and parmesan is counted using the protein value on pack.

Dried beans and lentils are too high in protein for most people with PKU and should be avoided e.g. baked beans, dried beans, lentils, chick peas. See page 17.

Ideas for including fruit and vegetables in the diet:

- Serve fruit at breakfast
- Serve snacks of fruit (fresh, canned, dried or frozen) or raw vegetables (carrot and celery sticks, capsicum and cucumber slices, and tomato wedges)
- Serve a salad for lunch or include salad ingredients in sandwiches
- Serve at least 3 different vegetables at the main meal and finish with fruit for dessert
- Use readymade pasta sauce as a base for meals (see sauces section page 11)
- Make up vegetable soups and casseroles.

	Type	Serve	Edible weight g	Protein equiv. per serve	Wt. containing 1 protein equivalent
Asparagus	raw, boiled, canned	5 spears	70	1.0	65
Avocado	raw, flesh only	½ avocado	80	1.0	75
(weight of whole avocado with skin and seed: 240g = 2.0g protein)					
Bean sprouts (mung)	raw	½ cup	45	1.0	53
Broccoli	raw, cooked	1 cluster	45	1.5	37
Brussel sprout	raw, cooked	4 sprouts	75	1.0	65
Cauliflower	raw, boiled	1 cluster	70	1.0	60
Celeriac	raw, boiled	½ veg	120	1.0	95
Corn					
Corn baby	canned	8 spears	130	2.0	70
Corn creamed	canned	¼ cup	65	1.0	55
Corn kernels	canned, frozen boiled	¼ cup	44	1.0	40
Corn on the cob	raw, frozen, boiled	1 cobette or ½ med. cob	100g i.e. 10cm cob	2.0	43
Mushroom common	raw, sliced	1 cup	80	1.5	60
Peas, green	raw, frozen, cooked	2 tablespoons	27	1.0	25
Snow peas, sugar snap peas	raw	8 pods	26	0.5	55
Potato					
Potato	peeled, raw, boiled, or baked in jacket	1 medium or 2 small	120	2.5	50
Potato	roasted in oil	1 medium	100	2.5	40
Potato chips	take away, oven fried*	1 cup	95	3.5	30
Potato hash brown	fried*	2 cakes	110	2.0	53
Potato salad	commercial*	1 cup	180	2.5	67
Potato scallop	fried*	½ scallop	48	2.0	23
Pumpkin all types	raw, boiled, peeled	½ cup	70	1.0	70
Pumpkin	baked	1 small piece	30	0.5	60
Spinach	frozen, boiled	¼ cup	45	1.5	33
Spinach english	raw	1 cup	35	1.0	42
Sweet potato orange	raw boiled peeled	1 small piece	50	1.0	50
Sweet potato orange	roasted in oil	1 small piece	40	1.0	41
Sweet potato white	raw boiled peeled, baked	½ cup	120	2.0	70

*check packets

Flours, grains, pasta and cereals

Low protein alternatives are recommended in most cases (see page 6). Regular Flours, grains, pasta and cereals may be appropriate in small amounts for some people. Discuss with your dietitian

Most flours, grains and pasta are quite **high in protein** and need to be counted or avoided.

The following can be used freely in cooking:

- Arrowroot
- Cornflour
- Custard powder
- Sago
- Tapioca
- Potato flour (see below for large serves)
- Baking powder, baking soda, cream of tartar
- Yeast from the low protein flour mix
- Egg replacer (see pages 92 and 106 of PKU handbook)
- Bean thread vermicelli (check food labels)

	Type	Serve	Weight of serve g	Protein g per serve	Weight containing 1g protein
Barley, pearl	raw	2 tablespoons	30	3.0	10
Barley, pearl	boiled	½ cup	90	3.0	30
Bulgur	boiled	½ cup	133	4.0	32
Bulgur (cracked wheat)	dry	¼ cup	40	4.5	9
Coconut	desiccated	½ cup	40	2.5	15
Couscous	dry	¼ cup	46g	6.0	8
Couscous	cooked	½ cup	70g	2.5	28
Flour white, wholemeal, plain, self-raising	raw	½ cup	70	7.5	9
Oat bran unprocessed	Raw	1 tablespoon	11	2.0	6
Pasta white, wholemeal	boiled	½ cup	75	3.0	25
Pasta white, wholemeal	raw	¼ cup	26	3.0	9
Noodle, rice stick boiled	boiled	½ 160g dry pack	300	5.0	60
Polenta	raw	¼ cup	38	3.0	12
Potato flour	raw	2 cups	300	1.0	333
Quinoa	raw	¼ cup	43	5.5	8
Rice brown	boiled	½ cup	100	3.0	35
Rice brown	raw	1 tablespoon	20	1.5	14
Rice white	boiled	½ cup	100	2.0	47
Rice white	raw	1 tablespoon	20	1.5	15
Rice flour	raw	½ cup	83	5.0	17
Rolled oats	raw	¼ cup	24	3.0	8
Semolina	dry	1 tablespoon	20	2.0	9
Wheat bran	raw	1 tablespoon	6	1.0	7
Wheat germ	dry	1 tablespoon	10	1.5	5

Seasoning, stocks, sauces and condiments

The following are low in protein and do not usually need to be counted in normal amounts, but labels need to be checked for some products as brands do vary in protein content

- Salt, pepper, herbs and spices
- Vinegar
- Flavouring essences and food colourings
- Tomato, Barbeque and Worcestershire sauce
- Curry powder and pastes (check food labels)
- Salad dressings e.g. French, Italian, coleslaw dressing, 1000 island dressing, mayonnaise (check food labels)
- Fruit chutney, mustard pickles (check food labels)
- Mustard (check food labels)
- Gravy powder and ready-made gravy (check food labels) – do not make gravy with pan drippings
- Ready-made pasta and casserole sauces (check food labels)
- Stock cubes and stock (check food labels for the lowest) - do not make stock from bones or meat
- Coconut milk can add a nice flavour to dishes, check the label as may need to be counted if large amount used.

These following sauces/condiments are not recommended unless on a high protein allowance (discuss with your dietitian). If used check the food label.

	Type	**Serve**	**Weight of serve g**	**Protein g per serve**	**Weight containing 1 g protein**
Marmite		1 teaspoon	6	1.0	6
Marzipan		1cm slice	15	1.0	14
Mustard	dry	1 tablespoon	8	2.5	3
Mustard	made-up paste	1 tablespoon	22	1.5	17
Peanut butter		1 tablespoon	25	7.5	3
Soy sauce		1 tablespoon	24	1.5	19
Vegemite		1 teaspoon	6	1.0	5

Sugar, desserts, confectionary and snack foods

Sugar is naturally low in protein but other ingredients can increase the protein content of lollies and desserts. For example jelly beans and jelly snakes can vary from 0 to 6g protein per 100g.

Sugar free lollies and chewing gum may contain aspartame- check the label

The following contain very little protein and maybe used without counting the protein:

- Sugar (all types)
- Jam, honey, golden syrup, maple syrup, marmalade, treacle
- Jelly thickened with vegetable gum (not gelatine) Check the ingredient list: the numbers 406, 407, 410, 412, 413, 414, 415, 416 are vegetable gums. Ready-made jellies (in the refrigerator cabinet) are usually set with vegetable gum. These are low in protein- 1 or 2 are free, but if more than 3 in one day, count as 0.5g protein
- Lollies without chocolate, gelatine, ice cream, milk, or nuts – check the labels of barley sugar, boiled lollies, toffee, jelly beans, pastilles, jelly lollies, candy floss, fairy floss
- Low protein chocolates (see page 6)
- Ice blocks without ice cream or milk e.g. icy poles
- Ice cream toppings, 100's and 1000's sprinkles
- Ice-cream cones are low in protein but most need to be counted, check the label usually 0.5grams per cone
- Some ice-creams in small amounts as a treat can be suitable, check the food label
- Home-made popcorn can be a good snack for older children but needs to be counted
  1 cup= 1.5 g protein (11g = 1 gram of protein) check the label for flavoured popcorn.

Frequent eating of high sugar foods can cause tooth decay. Clean teeth regularly with fluoride toothpaste, check that your water supply is fluoridated and take your child regularly to the Dentist.

See chapter 13 of the PKU Handbook (2005) for more information on 'Dental care and PKU'.

Fats and oils

Most fats and oils are very low in protein but cream contains moderate amounts and may need to be counted (see below)

Some reduced fat versions of butter and margarine may also be higher in protein so check the label.

The following contain very little protein, and do not need to be counted

- Butter, margarine, milk-free margarines
- Copha
- Cooking fat
- Ghee
- Oil
- Aerosol or whipped cream with less than 0.3g protein per serve
- Bacon fat, no rind or bacon meat

Creams

Cream, sour cream, imitation cream contain some protein (see table) but are lower than many alternatives. Reduced fat creams are higher in protein, and may need to be counted, check the nutritional panel.

Creams in small amounts do not need to be counted, try and use the full fat creams as these are lower in protein. If used in large amounts check the food label or use the table below. Creams are high in energy and should be used in moderation

	Type	**Serve**	**Weight of Serve g**	**Protein g per serve**	**Weight containing 1g protein**
Coconut cream	canned	¼ cup	62	1.0	65
Cream	sour, light (~18% fat)	1 tablespoon	20	1.0	26
Cream	sour, full fat	2 tablespoons	40	1.0	43
Cream	rich or double thick	3 tablespoons	60	1.0	63
Cream	thickened, pure, UHT (35% fat)	2 tablespoon	40	1.0	43
Cream	thickened, reduced fat (~18%)	1 ½ tablespoon	30	1.0	33
Cream	whipped, aerosol (~28% fat)	1/3 cup	17	0.5	30

Drinks

The PHE-free supplement is a vital part of the management of PHE blood level, it is important the prescribed amount is consumed each day.

Other drinks can include water (best choice), substitutes for milk and limited amounts of juice, soft drink and cordials.

Juice, soft drinks and cordial can dull a child's appetite for food, cause tooth decay, and lead to excessive weight gain.

- Cordials, soft drinks, mineral and soda water (plain and flavoured) contain no protein
- Some juices contain more protein than others. Limit 100% juice to one cup a day for older children - it is better to drink water and eat fruit!
- Remember diet drinks may contain aspartame and should be avoided (see page 3)
- Tea, (black, green, herbal) and coffee without milk does not need to be counted for older children and adults.
- Flavoured 'milk' drinks can be made using low protein milk substitutes (below) and low protein flavourings such as Nesquik or Sippah flavoured straws (check protein content on label)
- Remember water is the best drink to have, apart from supplement, - offer some water after each supplement drink and often during the day.
- See chapter 13 of the PKU Handbook for more information on 'Dental care and PKU'.

Substitutes for milk

Milk is high in protein so low protein milk substitutes are useful for cereal, to make low protein milk drinks, custards, puddings and other cooking.

If these substitutes contain more than 0.3g protein per serve you may need to count them (check the label and use the one with the lowest protein content).

Suitable low protein milk substitutes include:

- Rice or oat drinks from supermarket (long life milk section) or health food shops.
- Mixture of cream and water (1Tbsp cream and 100 ml water)
- Coffee creamer e.g. coffee mate mixed with water, count if more than 0.3g per serve
- Vance's DariFree
- Specific low protein milk replacers which are available via low protein food companies or on prescription (speak with your Dietitian for details)

The following drinks need to be counted. Choose low protein alternatives:

	Type	Serve	Serve size g/ml	Protein g per serve	Wt containing 1g protein/PE
Cocoa	powder	1 tablespoon	7g	1.5	5
Fruit juice	Tomato, vegetable	1 cup	250mls	1.0	237
Malted milk	powder	1 tablespoon	10g	1.0	9
Milk	full cream, liquid	1½ tablespoon	30mls	1.0	30
Milo	powder	1 tablespoon	7g	1.0	8
Ovaltine	powder	1 tablespoon	8g	1.0	9

Alcohol

Alcoholic drinks are **NOT** suitable for children but can be used in cooking e.g. in casseroles.

Beer and Stout need to be counted (see below). Pre-mixed drinks may contain artificial sweeteners may contain artificial sweeteners aspartame (951) or acesulphame-aspartame (962), which contain phenylalanine, check the drink label.

The following drinks have little or no protein and do not need to be counted:

- Wine - red, white, champagne, wine coolers
- Port
- Sherry
- Spirits e.g. rum, whiskey, gin, vodka

See page 112 of the PKU handbook 2005 for guidelines on responsible drinking for adults. Remember that these guidelines refer to standard drink sizes. Alcoholic drinks are often purchased in larger sizes than one standard drink so some drinks can add up to a significant and serving sizes

Beer and stout contain protein and need to be counted

	Serve	**Serve size ml**	**Protein g per serve**
Beer, lite beer	1 can	375	1.0
Stout	1 bottle	375	2.5

Bread, cakes, pastry

Low protein versions are better choices unless protein tolerance is high.

Most bread, cakes and pastry have nutrition labels on the packaging. Use the label where possible. Remember if your child gets the taste for ordinary bread and pasta they may not eat the low protein varieties.

	Type	Serve	Weight of serve g	Protein g per serve	Weight containing 1g protein
Bread	white, wholemeal, brown, multigrain	1 slice	30	3.0	10
Bread	lebanese	½ bread	55	5.0	11
Bread	pumpernickel	1 slice	60	4.0	16
Bread roll	white, small dinner roll	1	35	4	9
Breadcrumbs	commercial	½ cup	50	6.0	8
Crumpet	white	1	50	2.5	20
Doughnut iced	commercial	1	80	4.5	18
Lamington	commercial	1	75	3.5	21
Meringue	commercial	1 small	25	0.5	38
Muffin	english	½	40	4.0	10
Pastry filo	raw	2 sheets	27	2.5	10
Pastry puff	Raw 313mg/100g	½ sheet	85	4.5	18
Pastry short crust	raw	½ sheet	90	5.5	19
Yeast	dried	1 sachet	7	2.5	3

Most people on a low protein diet will not be able to eat the following foods or only be able to include them in small amounts only. Talk to your dietitian.

	Type	Serve	Edible weight g	Protein equiv. per serve	Wt. containing 1 protein equivalent
Beans and Legumes					
Beans baked	canned	½ cup	138	7.5	18
Bean, broad	Raw, boiled, frozen	¼ cup	42	2.0	20
Bean haricot	dried & boiled	½ cup	85	8.5	10
Bean, lima	dried & boiled	½ cup	85	6.5	13
Bean, mixed	canned, drained	¼ cup	50	4.0	13
Bean, red kidney	canned, drained	¼ cup	48	3.5	13
Bean, soya	canned & drained	¼ cup	49	5.0	10
Chickpea	canned	¼ cup	46	3.0	16
Lentil	dried & boiled	¼ cup	50	3.5	14
Lentil	dried, uncooked		20	5	4
Split pea	dried & boiled	¼ cup	49	2.5	20
Nuts and Seeds					
Almonds, peanuts	edible portion	¼ cup	36	9	4
Cashews, walnuts	edible portion	¼ cup	30	5	6
Nuts mixed	edible portion	¼ cup	40	8.5	5
Peanut butter	paste	1 tablespoon	25	7.0	4
Pine nut	nuts	1 tablespoon	14	2.0	8
Sesame seeds	raw	1 tablespoon	9	2.5	4
Sunflower seeds	raw	1 tablespoon	11	3.0	4
Tahini	paste	1 tablespoon	25	5.0	5
Snack foods, confectionary, ice-cream and desserts					
Chocolate dark	dark	6 squares	29	2.0	16
Chocolate milk	milk	6 squares	29	2.5	12
Gelatine	regular	1 tablespoon	13	6.5	2
Jelly crystals	gelatine based	1 packet	85	6.0	14
Jelly made-up	gelatine based	1 cup	280	3.0	100

High protein foods

These foods are **NOT** recommended. For information only.

	Type	Serve	Weight of serve g	Protein g per serve	Wt. containing 1g protein
bacon	raw	1 rasher	39	7.5	5
beef mince	raw	¼ cup	60	12.0	5
beef topside	raw	1 slice	50	11.0	5
cheese	cheddar	1 slice	21	5.0	4
cheese	ricotta	2 tablespoon	40	4.0	10
chicken breast	raw	¼ breast	56	12.5	4
egg (whole)	raw	1 egg	48	7.0	7
lamb leg	raw	1 slice	50	10.5	5
pork leg	raw	1 slice	45	9.0	5
sausage raw	raw	½ thick	47	5.5	9

Acknowledgments to:

The PKU Handbook (HGSA 2005)

Low Protein Handbook (HGSA 2007)

www.hgsa.com.au

The original and educational content of this booklet has been reviewed by specialist dietitians at the Women's and Children's Health Network, Department for Health and Ageing, and Australasian Society for Inborn Errors of Metabolism (ASIEM).

Food product and vitamin supplementation information contained in this booklet was up to date at the time of revision. If you are not sure about food, check with the manufacturer.

Updated July 2015

For more information

Women's and Children's Health Network
Nutrition Department
72 King William Street
North Adelaide S.A. 5006
Telephone: 08 8161 7233
www.wch.sa.gov.au