

A practical guide for dietitians

Other sources of protein

A more sustainable diet does not necessarily have to exclude red meat or dairy altogether – therefore meat and dairy nutrient intakes need not be compromised.

This information sheet provides some useful and practical guidance with regard to plant food sources of nutrients associated with meat and dairy consumption. References and information sources are available [here](#).

Plant food sources of protein

Tofu, soya mince / chunks, Quorn™ (mycoprotein), soya beans – fresh, frozen or roasted (soya nuts), other beans, peas, pulses, nuts and seeds, soya alternatives to yogurt.

Did you know?

- An environmentally sustainable diet does not mean a vegetarian or vegan diet i.e. complete exclusion of dairy and meat proteins is not necessary.¹⁻³
- Cereal products are low in protein, however, due to the quantities they are consumed in they contribute significantly to protein intakes.⁴ Cereal products contribute to 22-29% of total protein intakes whilst meat contributes to 29-37% and milk and dairy 13-20%.
- All age groups and sexes are overconsuming protein.⁴ Therefore, the current government recommendations for a more sustainable diet to reduce red meat to no more than 70g per day per person and reduce dairy by a third, whilst increasing plant-food sources of protein will not compromise protein status.
- Plants contain all essential amino acids – be it some at lower levels compared to animal proteins.⁵⁻⁸
- Terms ‘high biological’ and ‘low biological’ value and ‘complete’ and ‘incomplete’ proteins are misleading as they only reflect the ability of one food to meet all essential amino acid needs.⁷ It does not reflect the ability of a whole day’s consumption to meet essential amino acid needs.
- Studies have repeatedly shown that a diet based purely on plant foods that meets energy requirements will meet all essential amino acid needs.⁸⁻¹²
- There is no need to compliment plant protein food sources at each meal – nitrogen balance is achieved over the course of a day’s essential amino acid intakes.⁷
- Spread protein load evenly throughout the day:¹³⁻¹⁷ it is now well established that protein loads should be spread throughout the day to optimise muscle protein synthesis. Protein uptake and utilisation plateaus at around 20g of animal protein – for plant proteins this will be higher at around 30g and for elderly even higher.



Tips for using plant proteins

- Have three helpings of plant protein foods daily.
- Tofu – 75-100g: Cut into bite size pieces added to curries and stir fries.
- Meat replacers – 100g: swap your meat or go half and half with soya or Quorn™ mince or chunks.
- Go meat free a couple of days a week.
- Beans – 100g: go for canned beans and add to your salads, to replace some meat in your dishes or how about beans on toast.
- Quinoa (40g dry weight): use in salads or instead of rice.
- Nuts (a handful) and seeds (1 tbsp): sprinkle over breakfast cereals, porridge and salads and add to main meals or have as a snack.
- Snack time: a handful (30g) of soya nuts (roasted edamame beans), a small pot (150g) of soya alternative to yogurt or Greek-style yogurt, a handful of nuts or a tbsp. of seeds.
- Starchy foods and wholegrain cereals: although low in protein content, due to the quantities they are consumed in, they will significantly contribute to an individual's intake.

How much do we need?

	DRV for protein g ¹⁸		Who needs to up their intakes?
	Male	Female	
2-3 year olds	14.5		<ul style="list-style-type: none">• All age groups and sexes are exceeding government protein recommendations (0.75g/kg body weight).• <i>*Elderly & sarcopaenia</i>. International and European groups are recommending that the elderly (>65 years) should aim for higher protein intakes to offset inflammatory and catabolic conditions.¹⁹<ul style="list-style-type: none">○ At least 1-1.2g protein/kg body weight1.2-1.5g/kg body weight for those regularly exercising or have an acute/chronic disease.
4-6 year olds	19.7		
7-10 year olds	28.3		
11-14 year olds	42.1	41.2	
15-18 year olds	55.2	45.0	
19 – 64 year olds	55.5	45.0	
65 year and older*	53.3	46.5	

An environmentally sustainable diet does not mean a vegetarian or vegan diet i.e. complete exclusion of dairy and meat proteins is not necessary.¹⁻³



Plant food sources of protein²⁰

Food	Serving size household	Serving size g	Protein g /serving
Quorn™ (mycoprotein) pieces / mince ²¹	1/5 th of a pack	~100g	10.9
Soya mince (chilled or frozen) ²²⁻²⁶	1/5 th of a pack	100g	16.6
Tofu, firm silken	~1/4 block	75g	17.6
Tofu, marinated ²⁷	~1/3 pack	75g	12.8
Quinoa, raw	One serve	40g	5.5
Soya beans, soaked, boiled and drained	4 tbsp	100g	14.0
Red kidney beans, canned and drained	4 tbsp	100g	6.9
Chickpeas, canned and drained	4 tbsp	100g	7.2
Butter beans, canned and drained	4 tbsp	100g	5.9
Baked beans	1 small can	200g	10.0
Soya nuts / Roasted edamame beans ²⁸	Small handful	28g	10.8
Lentils, green/brown, boiled and drained	4 tbsp	100g	8.8
Lentils, split red, boiled and drained	4 tbsp	100g	6.9
Peanuts, plain or mixed nuts	Handful	30g	7.0
Almonds	Handful	30g	6.3
Cashews	Handful	30g	6.2
Pistachios	Handful	30g	5.4
Walnuts	Handful	30g	4.4
Brazil nuts	Handful	30g	4.3
Hazelnuts	Handful	30g	4.2
Pecans	Handful	30g	2.8
Peanut butter – smooth	Thickly spread on 2 slices	40g	9.1
Pumpkin seeds	1 tbsp	10g	2.7
Sunflower seeds	1 tbsp	16g	3.2
Sesame seeds	1 tbsp	7g	1.3
Flaxseeds / linseeds ²⁸	1 tbsp	10g	1.8
Chia seeds ²⁸	1 tbsp	10g	1.6
Pine nuts	1 tbsp	8g	1.1



Tahini paste	1 heaped tsp	19g	3.5
Hummus	2 tbsp	60g	4.1
Falafel	2	60g	3.8

Useful links

Click [here](#) to access the One Blue Dot Nutritional Considerations: Protein document which summarises the evidence around protein intakes in the UK.

References

1. Scarborough P, Allender S, Clarke D et al. Modelling the health impact of environmentally sustainable dietary scenarios in the UK. *Eur J Clin Nutr.* 2012;66(6):710-5.
2. Biesbroek S, Verschuren W, Boer J et al. Does a better adherence to dietary guidelines reduce mortality risk and environmental impact in the Dutch sub-cohort of the European Prospective Investigation into Cancer and Nutrition? *Br J Nutr.* 2017;118(1):69-80.
3. Horgan G, Perrin A, Whybrow S et al. Achieving dietary recommendations and reducing greenhouse gas emissions: modelling diets to minimise the change from current intakes. *Int J Behav Nutr Phys Act.* 2016;13:46.
4. PHE. Results of the National Diet and Nutrition Survey (NDNS) rolling programme for 2014 to 2015 and 2015 to 2016 [Internet]. 2018 [cited 5/11/2018]. Available from: <https://www.gov.uk/government/statistics/ndns-results-from-years-7-and-8-combined>
5. McDougall J. Comment: Plant foods have a complete amino acid composition. *Circulation.* 2002;105(25):e197.
6. Young V, Pellett P. Plant proteins in relation to human protein and amino acid nutrition. *Am J Clin Nutr.* 1994;59(5 Suppl):1203S-12S.
7. Novick J. The Myth of Complementary Protein [Internet]. 2013 [cited 9/17/2018]. Available from: https://www.forksoverknives.com/the-myth-of-complementary-protein/#gs.Y_DzcDA
8. Rand W, Pellett P, Young V. Meta-analysis of nitrogen balance studies for estimating protein requirements in healthy adults. *Am J Clin Nutr.* 2003;77(1):109-27
9. Craig W, Mangels A. Position of the American Dietetic Association: vegetarian diets. *J Am Diet Assoc.* 2009;109(7):1266-82.
10. Palmer S. Plant proteins. *Today's Dietitian.* 2017;19(2):26.



11. Millward D, Forrester T, Ah-Sing E et al. The transfer of ^{15}N from urea to lysine in the human infant. *Br J Nutr.* 2000;83(5):505-12.
12. Fuller M, Reeds P. Nitrogen cycling in the gut. *Annu Rev Nutr.* 1998;18:385-411.
13. Wolfe R. The underappreciated role of muscle in health and disease. *Am J Clin Nutr.* 2006;84(3):475-82.
14. Witard O, Wardle S, Macnaughton L et al. Protein Considerations for Optimising Skeletal Muscle Mass in Healthy Young and Older Adults. *Nutrients.* 2016;8(4):181.
15. Macnaughton L, Wardle S, Witard O et al. The response of muscle protein synthesis following whole-body resistance exercise is greater following 40 g than 20 g of ingested whey protein. *Physiol Rep.* 2016;:10.
16. Cardon-Thomas D, Riviere T, Tieges Z et al. Dietary Protein in Older Adults: Adequate Daily Intake but Potential for Improved Distribution. *Nutrients.* 2017;:10.
17. van V, Burd N, van L. The Skeletal Muscle Anabolic Response to Plant- versus Animal-Based Protein Consumption. *J Nutr.* 2015;145(9):1981-91.
18. PHE. Government recommendations for energy and nutrients for males and females aged 1 – 18 years and 19+ years [Internet]. 2016 [cited Aug 2018]. Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/618167/government_dietary_recommendations.pdf
19. Bauer J, Biolo G, Cederholm T et al. Evidence-based recommendations for optimal dietary protein intake in older people: a position paper from the PROT-AGE Study Group. *J Am Med Dir Assoc.* 2013;14(8):542-59.
20. Forestfield Software Ltd.. Diet Plan7. McCance & Widdowson 7th summary edition of the composition of foods plus the revised composition of food integrated data set (CoFids). Patent Diet Plan7. 2018.
21. Quorn. Vegetarian, Meat Free & Vegan Products [Internet]. 2018 [cited 9/28/2018]. Available from: <https://www.quorn.co.uk/products>
22. Morrisons Groceries. Morrisons Meat Free Mince 400g [Internet]. 2018 [cited 9/28/2018]. Available from: <https://groceries.morrisons.com/webshop/product/Morrisons-Meat-Free-Mince/248429011>
23. Tesco Groceries. Tesco Meat Free Vegetarian Mince 454G [Internet]. 2018 [cited 2018]. Available from: <https://www.tesco.com/groceries/en-GB/products/257974340>



24. ASDA. ASDA Meat Free Mince [Internet]. 2018 [cited 9/28/2018]. Available from: <https://groceries.asda.com/product/mince-fillets-pieces/asda-meat-free-mince/910003000847>
25. Waitrose & partners. Meet the alternative beef style mince made with soya [Internet]. 2018 [cited 9/28/2018]. Available from: https://www.waitrose.com/ecom/products/meet-the-alternative-beef-style-mince-made-with-soya/801038-344433-344434?gclid=CjwKCAjworfdBRA7EiwAKX9HeCZQEFWIBjhJMTbyuiuDfvDQFbQqLHDDLDem7iuWCuFObzE_5we-RxoCc_0QAvD_BwE&gclid=COae6tLG3d0CFVJi0wodGs4DSQ
26. Sainsbury's. Sainsbury's Vegetarian Mince 500g [Internet]. 2018 [cited 9/28/2018]. Available from: https://www.sainsburys.co.uk/webapp/wcs/stores/servlet/gb/groceries/sainsburys-vegetarian-mince-500g?dclid=CPPzhLzG3d0CFUXS3godl7IP3Q&langId=44&gclid=CjwKCAjworfdBRA7EiwAKX9HeE-p3AG6JalkmsJFcSJFNdhR-V4d8YApjkYV-YF-LIAjZR9FPtcD7RoCTyYQAvD_BwE&storeId=10151&krypto=zlx0PfkziEc7hOijVC9r18xvlj0oHa7gba4GxTK7%2Bn91cjj%2FmTEbJku14gKvQvNbGpjGihHYTghC8ooPb7zn2nSnTBnOhA1iw3wg4pe2l6PVVOi8WC36E0zGXceVAPPCOjyBbiUif1CUbWJf%2FWVsbyPkdxwJH%2F2byUERuNUoz%2F30UxnkpntKcYbUSHgbK7Lnkp3Czxclj4l0RioQQ8k0IHu3o%2FK70C9kjkcmbyuUV4%3D&ddkey=https%3Agb%2Fgroceries%2Fsainsburys-vegetarian-mince-500g
27. Cauldron Products. Organic Marinated Tofu Pieces [Internet]. 2018 [cited 9/28/2018]. Available from: <https://www.cauldronfoods.co.uk/products/range/organic-marinated-tofu-pieces>
28. USDA Agricultural Research Service NDL. USDA National Nutrient Database for Standard Reference, Release 28 [Internet]. 2018 [cited Apr 2018]. Available from: <https://ndb.nal.usda.gov/ndb/>

