BDA The Association of UK Dietitians

ONE BLUE DOT®

Frequently asked questions

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The One Blue Dot reference guide was compiled over many months and aimed to cover the broad range of issues associated with environmentally sustainable diets. It's such a huge topic however that we expect reading the documents will prompt many new questions from dietitians and other nutrition experts. This document starts to collate some of these and will be added to as the discussions continue. See the original reference guide at bda.uk.com/onebluedot

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What about alternative sources of animal protein such as insects?

The practice of eating insects is known as entomophagy and has been a key part of diets in some cultures for many thousands of years. More recently, insects have been viewed as potential sustainable source of animal protein for the population at large. Insects are cheap, plentiful, thrive in a wide range of climates and use much less water, feed and space to farm than traditional sources of meat. Overall, they emit far less greenhouse gas per kg of protein produced than meat.

However, at the moment further research is needed regarding the allergy risk, safety and wider nutritional benefit (beyond protein) of products such as insect flours. There are also significant challenges overcoming public opposition to the consumption of insects. Other, plant based, sources of protein have similar low environmental impacts without these concerns.

Dietitian Claire Chaudhry has written a comprehensive article on the role of insects in nutrition for NHD magazine. The FAO has an ongoing project looking at insects for food and feed and have produced a report on The Contribution of Insects to Food Security, Livelihoods and the Environment.

What about the environmental sustainability of plant based dairy alternatives?

Plant alternatives to dairy can be an easy swap for most consumers and most non-organic variants are calcium fortified with a similar content and bioavailability to dairy milk.[1,2]

Additionally, most plant-based drinks are also fortified with vitamins B2, B12 and D[3] and some are now also fortified with iodine.[4]

As well as considering greenhouse gas (GHG) emissions, it is important to also take note of other environmental factors such as land and water use which could mitigate any benefits of a lower GHG emission value from plant based dairy alternatives.

Table 1[5] highlights that soya dairy alternatives (tofu and soya drinks) are significantly more sustainable compared to dairy (cheese and milk) across all measures: GHG emission, land use and water use.

Table 1: Average environmental impact of Californian dairy milk vs almond drinks based on LCA from farm up to and including production and packaging.

Californian almond drink vs cow's milk	Serving size	GHG emissions kg CO_2eq	Land use m^2	Water Use (litres)
Cow's milk	200ml	0.33	Not available	58
Almond drinks	200ml	0.1	Not available	1,220

Data on plant-based drinks other than soya is unfortunately limited. However, the data that does exist indicates that GHG emission levels will be similar to soya and therefore significantly lower than dairy milk.[6] However, production of rice and some nuts is known to be extremely water intense and could mitigate the benefits of a lower GHG emission level.[v,7] Ho and colleagues evaluated the GHG emissions and water use of Californian almond drinks vs cow milk production.

Although GHG emissions are impressively lower for almond drinks one publication states that water use may be significantly higher (21 times higher) for drinks using Californian almonds compared to dairy milk (see Table 1). The high water use relates to the cultivation of nuts and not to almond drink production per se. Water use for nut cultivation is extremely variable depending on country of origin with significant disparities between almonds grown in California and those grown in the Mediterranean. This large variance can also be seen in figure 4.4 and table 4.5 in the reference guide which demonstrates water use for nut cultivation to range anywhere from 0 (where rainwater only is used) to 500,000 litres per 100g protein produced. In the overall scheme of things, it is safe to assume that almond drinks have an overall lower environmental impact compared to dairy milk. Additionally, there are plenty of other plant-based drinks which have less uncertainty around their environmental foot prints such as soya and oat drinks.

Additionally for oat drinks, one leading manufacturer has extensively investigated a multitude of environmental impacts of oat drink and dairy milk production (see Table 2).[8]Interestingly, differences in water use and fresh water contamination exist between the fresh and long-life oat drink, however, overall oat drink production is more sustainable than dairy for the majority of measures including GHG emissions, land use, soil acidification etc.

Table 2: Comparison of the environmental impact of oat drinks from one leading manufacturer and semi-skimmed milk. Full lifecycle included (from farm right through to consumer waste) in Europe.

Oat drink vs semi-skimmed milk	Average serving size	GHG emissions kg CO_2eq	Land use m^2	Water Use (litres)
Oat drink (long-life)	200ml	0.08	0.12	0.10
Oat drink (fresh)	200ml	0.10	0.12	1.60
Semi-skimmed dairy milk	200ml	0.26	0.58	0.18

What are the environmental considerations of mycoprotein-based meat alternatives (Quorn™)?

Mycoprotein is produced through fermentation and has a significantly smaller carbon footprint than producing some animal proteins, as well as using 90% less land. It is an example of a more sustainable protein source. At the moment, the only mycoprotein available for sale in the UK is Quorn.

The Carbon Trust has certified the carbon footprint of Quorn mycoprotein since 2012, making it the first meat free protein source to have third party carbon footprint accreditation. Mycoprotein is a high quality, complete protein source which is high in protein, high in fibre, low in saturated fat and contains no cholesterol. To produce Quorn mycoprotein a natural fungus that grows in the soil (a strain of Fusarium) is fermented, which causes it to convert carbohydrate into protein. The solid is then harvested and the result is mycoprotein which is used as an ingredient in all Quorn products.

The environmental impact of the final Quorn product depends on its format – there are now more than 100 varieties. The most popular, Quorn mince, has 90% lower greenhouse gas emissions than beef mince and 70% lower than chicken. In addition, the water footprint of Quorn mince is up to 10 times smaller than that of beef mince[9].

Other questions which will be under consideration:

What are the environmental impact of:

- Nuts as a replacement for animal proteins?
- Palm oil as a replacement for animal fats?
- Soya production for food and animal feed?
- GM foods

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[9] To find out more visit https://www.quorn.co.uk/sustainable-nutrition.

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