

Nutritional adequacy of plant-based dairy alternatives (PBDA)



Energy

Energy values of plant-based drinks (PBD) were comparable to semi-skimmed milk and values for plant-based alternatives to yogurt (PBAY) (excluding coconut) were comparable to low fat yogurts.



Sugars

The majority (70%) of PBDA were unsweetened. For the majority of PBD, there was little difference in total sugars between sweetened and unsweetened varieties. PBDA's total sugars levels were comparable or lower than dairy, with the exception of rice PBD.



Saturated fat



PBDA were low in saturated fat with the exception of coconut varieties.

Protein



Soya and some pea protein PBDA have the same protein and amino acid profile as their dairy counterparts.

Other non-soya PBDA contain lower levels of protein and amino acids. However, it is highly improbable that this would compromise protein intakes in the context of a Western mixed diet which offers a cornucopia of protein-rich foods like beans, lentils, fish, and meat and results in general population groups consuming protein in excess.

Non-soya PBDA do not match the amino acid profile of dairy. However, **in developed countries with diverse food sources, this has little relevance to overall amino acid adequacy**, as nitrogen balance relies on amino acid intake from a variety of foods eaten over the course of the day, rather than relying on a single food or meal.

Micronutrients in non-organic variants*

Calcium per 250ml serving



Calcium is the most common fortification added to 76% of PBDA. Studies have demonstrated marginal differences in calcium bioavailability between dairy and fortified PBDA. One study found calcium bioavailability to be 21.7%, 21.1%, and 18.1% for cow's milk and soya drinks fortified with calcium carbonate or tricalcium phosphate, respectively. This translates to a minimal difference of 2–11 mg in bioavailable calcium for a 250 mL serving. Whether this difference is physiologically significant remains unclear.

"Calcium from fortified plant-based drinks is typically absorbed at a rate similar to cow's milk."

*European organic food regulations do not permit fortification of plant-based dairy alternatives and therefore they have been excluded from our micronutrient analysis

Medici E, Winston CJ and Rowland I. A comprehensive analysis of the nutritional composition of plant-based drinks and yogurt alternatives in Europe. *Nutrients* 2023;15:3415. DOI: 10.3390/nu15153415

Craig WJ, Messina V, Rowland I, et al. Plant-based dairy alternatives contribute to a healthy and sustainable diet. *Nutrients* 2023;15:3393. DOI: 10.3390/nu15153393

Iodine

Natural iodine-rich foods are few. Dairy is a significant iodine source in European countries where cattle fodder is fortified. For those countries, it would seem prudent for more PBDA to be fortified with iodine. Currently, few (11%) of non-organic PBDA are fortified.

Vitamin B12

A significant proportion (66%) of PBDA are fortified with vitamin B12. Unless an individual chooses to avoid all animal foods from the diet, which is not the usual PBDA consumer, vitamin B12 should not be an issue.

Vitamin D

The second most common fortification in European PBDA: 71% of PBD and half of PBAY. It's essential to note that dairy is not a natural source of vitamin D and is not commonly fortified in Europe, except for a handful of countries like Sweden, Norway, Finland, Belgium, and Spain.

Vitamin B2

Milk is a key source due to its prominence in the diet. 43% of PBDA are fortified with this vitamin. Vitamin B2 deficiency is not a concern in Europe, as a diverse and healthy diet typically provides sufficient quantities.

Other

Total fat levels were generally comparable to lower-fat dairy. Fibre levels in PBDA were relatively low, with most products containing a maximum of 2g per serving. Despite some criticism for added salt, 98% of PBDA products contained less than 0.3g per 100g/ml, similar to levels found in dairy products.

SUMMARY

Fortified PBDA can play a valuable role in the transition towards more sustainable plant-based diets and align well with current national Food Based Dietary Guidelines.

They offer a low saturated fat option (with the exception of coconut) and, in the main, have energy and total sugar levels comparable to dairy. Although non-soya PBDA have lower protein levels compared with dairy, this is unlikely to compromise status in Western population groups consuming a varied diet and currently exceeding recommended intakes.

The majority of non-organic PBDA provide bioavailable calcium comparable to dairy and many are fortified with vitamin D and vitamin B12. Enhancements can be made to address the iodine fortification gap, particularly in countries where dairy is a primary source, and to ensure more consistent fortification practices.

