Are all kilojoules in nuts absorbed?

A FACTSHEET FOR HEALTHCARE PROFESSIONALS

Evidence consistently shows that regular nut consumption is associated with good health. Yet most Australians aren't eating enough, with only two per cent meeting the target of a healthy handful (30g) of nuts a day[1].

One of the reasons for this shortfall is concern over the energy and fat content of nuts[2]. But recent research suggests we may not actually absorb up to 26 per cent of the kilojoules in nuts[3-8].

What the research says

In the laboratory, the Atwater system has been used (for more than 100 years) to calculate the energy content of different foods. But new research suggests the 'Atwater factors' assigned to certain foods, including nuts, may not be accurate.

A series of studies, from the US Food and Drug Administration (US FDA), looked at almonds, cashews, pistachios and walnuts, over a period of six years[4-7]. The results suggest the average nut offers significantly less energy (or kilojoules) than what nutrition labels suggest.

A recent systematic review of all the evidence in this area, by Australian-based researchers, supports these findings. It found the actual kilojoules absorbed by the body from nuts is between 5–26% less than that estimated by Atwater factors – depending on the nut type.

A new way of looking at energy in nuts

Over the past decade, studies have collected and analysed samples of urine and faeces from study participants on either a 'control diet' or a 'nut-containing diet'[3-8]. They've then used this to work out how much of the fat from nuts is actually metabolised and converted into energy in the body, and how much is excreted.

These carefully-controlled feeding trials have revealed that Atwater factors overestimate the actual energy content of nuts.

It's been suggested that this is because the naturally-occurring fat in nuts is held (or trapped) within the cell walls of the nut, making it hard for the body to digest and absorb. Instead, nut eaters excrete some of this dietary fat in their stools – without it ever being used by the body as a source of energy.

> *"The energy available from nuts is thought to be around 5–26% lower than that estimated by the laboratory-based Atwater factors."*

Energy absorption of certain tree nuts

	Atwater factor calculation for energy content (kJ)/30g serve	Average available energy content from feeding trials (kJ)/30g serve	Possible overestimation of the energy from nuts
Almonds[3,4,8]	760	555	26%
Cashews[3,7]	730	615	14%
Pistachios[3,5]	711	678	5%
Walnuts[3,6]	828	654	22%

Human studies on the digestible kilojoules of other nut varieties, such as peanuts, hazelnuts, macadamias, pecans, Brazil nuts and pine nuts, are not available. But researchers believe a similar pattern of overestimation would apply to all nuts[3].

What about different forms of nuts?

Studies suggest that the more 'intact' nuts are, the less kilojoules are absorbed from them. In an almond study for example, less energy was available to the body after eating whole almonds, compared with almond butter[9]. So, the form of nuts makes a difference.

Nuts and weight

Decades of evidence shows that nuts are not associated with weight gain.

In fact, research shows the opposite to be true. Nut intake has been linked with a reduced risk of overweight and obesity, and a reduced body weight, body mass index and waist circumference[10-13].

One of the likely reasons for this is that some of the fat in nuts is 'trapped' in the fibrous cell walls of the nut, so is not absorbed by the body. Nuts also contain an abundance of fibre and protein, which help with satiety and appetite control.

> *"Just 2% of Australians meet the daily target for nuts. Concern about the energy and fat of nuts is a major barrier to intake."*

What does all this mean?

Research suggests the energy content of nuts, as listed on nutrition labels, may be an overestimate.

The kilojoule values outlined in the Nutrition Information Panels on food packages in Australia are based on the laboratory-based Atwater system. But this now appears outdated, given the outcomes of more recent studies[3-8].

We now need more research into what this means for nuts in areas such as food labelling and dietary guidance in Australia.

What your clients need to know

If your clients enjoy eating nuts, but worry about their energy content, these studies are good news. Research clearly and consistently shows that nuts are essential for good health, and are not associated with weight gain. So, continue to advise your clients to enjoy the recommended healthy handful (30g) of nuts daily.

For good health,
enjoy a healthy handful
of nuts every day.

References

1. Nikodijevic CJ., et al. Nut consumption in a representative survey of Australians: A secondary analysis of the 2011–2012 National Nutrition and Physical Activity Survey. *Public Health Nutr*, 2020:1–11.
2. Neale EP, Tran G, Brown RC. Barriers and facilitators to nut consumption: A narrative review. *Int J Environ Res Public Health*, 2020. 17(23):9127.
3. Nikodijevic CJ., et al. 'A systematic review of the ins and outs of nut energy balance'. Oral presentation, Dietitians Australia conference, August 2022.
4. Novotny JA., et al. Discrepancy between the Atwater factor predicted and empirically measured energy values of almonds in human diets. *Am J Clin Nutr*, 2012. 96(2):296–301.
5. Baer D., et al., Measured energy value of pistachios in the human diet. *Br JNutr*, 2012. 107(1): 120-5.
6. Baer DJ., et al. Walnuts consumed by healthy adults provide less available energy than predicted by the Atwater factors. *J Nutr,* 2016. 146(1):9–13.
7. Baer DJ., Novotny JA. Metabolizable energy from cashew nuts is less than that predicted by Atwater factors. *Nutrients*, 2018. 11(1):33.
8. Gebauer SK., et al. Food processing and structure impact the metabolizable energy of almonds. *Food & function*, 2016. 7(10): 4231-8.
9. Mandalari G., et al. Understanding the effect of particle size and processing on almond lipid bioaccessibility through microstructural analysis: From mastication to faecal collection. *Nutrients*, 2018. 10:213.
10. Eslami O, Shidfar F, Dehnad A. Inverse association of long-term nut consumption with weight gain and risk of overweight/obesity: A systematic review. *Nutr Res*, 2019. 68:1–8.
11. Flores-Mateo G., et al. Nut intake and adiposity: Meta-analysis of clinical trials. *Am J Clin Nutr,* 2013. 97:1346–55.
12. Guarneiri LL., Cooper JA. Intake of nuts or nut products does not lead to weight gain, independent of dietary substitution instructions: A systematic review and meta-analysis of randomized trials. *Adv Nutr,* 2020.
13. Li H., et al. Nut consumption and risk of metabolic syndrome and overweight/obesity: A meta-analysis of prospective cohort studies and randomised trials. *Nutr Metab*, 2018. 15:46.

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