FOOD FILES

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Why we struggle to eat less meat – and what can help

Switching to more plant-based diets is important for fighting climate change, but it's not easy, especially in countries such as Australia and Denmark, where meat is a big part of the culture. This study looked at what makes people more or less likely to eat plant-based meals.

Researchers surveyed 592 adults who regularly eat meat, asking about their attitudes toward food. They found that people who strongly believe meat is the "main part" of a proper meal tend to eat fewer plant-based meals. This mindset was common in both countries and was linked to lower rates of plant-based eating.

However, people who were more familiar with plant-based meals were less likely to hold this meat-focused view and to eat more plant-based meals as a result. Fear of trying new foods (food neophobia) also made people less likely to eat plant-based foods, especially in Denmark.

Interestingly, being more reflective or thoughtful didn't seem to affect people's eating habits.

Bottom line: The belief that meat is essential to a "real" meal is a major barrier to eating more sustainably. Helping people become more familiar with plant-based meals and reducing the fear of new foods could be key to encouraging greener eating habits.

Source: Rao R, Liem DG, Wang QJ. Understanding the barriers to plant-based dietary change: The role of meat-centric meal perception among adults in Australia and Denmark. *Appetite*, Vol. 215, 1 November 2025, 108240

Red alert: enhanced detection of ferric oxide in chilli powder using multimodal analytics

Food powders are commonly accessible to consumers, yet their vulnerability to intentional adulteration with chemicals or additives presents a serious concern for food safety. While often motivated by economic gain, such adulteration can also be malicious and potentially threaten public security. Well-known documented cases include the adulteration of food powders with substances such as starch, curry powder, wheat gluten and turmeric.

Vignesh and co-authors highlight that chilli powder – a staple spice in global cuisines – is frequently subject to adulteration, posing considerable health risks to consumers. A prevalent adulterant, ferric oxide red, is particularly difficult to detect through visual inspection alone. To combat this issue, the authors employed multiple analytical methods to identify ferric oxide red in chilli powder. Samples collected from various regions were deliberately adulterated with differing concentrations of ferric oxide red. Analytical techniques, including Fourier Transform Infrared (FTIR) Spectroscopy, Raman Spectroscopy and Ultraviolet–Visible (UV–Vis) Spectroscopy, were used for detection.

The authors identified via FTIR analysis characteristic peaks of chilli powder at 1385 cm^{-1}, 1600cm^{-1}, and 2935cm^{-1}, while ferric oxide red exhibited distinct peaks at 460cm^{-1} and 540cm^{-1}. Raman spectra showed peaks at 260cm^{-1}, 615cm^{-1}, and 1315cm^{-1} for chilli powder, and at 225cm^{-1}, 306cm^{-1}, and 670cm^{-1} for ferric oxide red. UV–Vis spectra revealed an absorption band at 478nm for ferric oxide red. Elemental mapping further differentiated between adulterated and pure samples. In addition, multivariate statistical tools such as Principal Component Analysis (PCA) and

Soft Independent Modelling of Class Analogy (SIMCA) were effectively used to distinguish adulterated from unadulterated samples. The study demonstrated the effectiveness of combining advanced spectroscopic techniques with robust statistical modelling, particularly DD-SIMCA, for the accurate detection of ferric oxide adulteration in chilli powder.

The study's scope will be broadened to identify a wider range of common adulterants in spices and other food products. Additionally, the development of portable, user-friendly devices for on-site testing will facilitate rapid and accessible detection. While the author's current study focuses on ferric oxide adulteration in chilli powder, upcoming research will expand target adulterants, enhancing detection capabilities, and optimising methods for field deployment, ultimately supporting more robust food safety monitoring across the supply chain.

Source: Vignesh T, Selvakumar D and Jayavel R (2025) Detecting ferric oxide adulteration in chilli powder: a multimodal analytical approach for enhanced food safety. *Microchemical Journal* 208, 112332.

Why people eat or avoid meat and how it shapes their choices

A study of 4,447 Swiss adults investigated how motivations for and against eating meat relate to different forms of meat engagement, including meat consumption, preferences, dietary identity and reduction goals.

Meat-eating motives, such as taste or believing meat is natural, were strongly linked to higher consumption and stronger identification as a meat eater. Vegetarian motives, such as health or environmental concerns, were instead tied to lower meat engagement and greater likelihood of setting reduction goals. Notably, eating motives best predicted actual consumption and identity, while avoidance motives were strongest predictors of reduction intentions.

Taste was the strongest driver, shaping preferences and identity beyond general eating motives. Disgust was the most influential aversive factor for meat reduction,

associated with lower consumption and weaker identity. Environmental concerns uniquely promoted daily reductions and meat reduction goal setting. Social influences had a paradoxical effect - perceiving meat as 'normal' related to lower engagement, but social pressure to avoid meat sometimes increased engagement.

Distinct motivations for and against eating meat influence behaviour, identity and reduction efforts differently. Strategies to shift diets may need to address both approach motives (eg. enhancing taste of plant-based foods) and avoidance motives (eg. emphasising environmental impact).

Source: Trenkenschuh, M., Graça, J., & Hopwood, C. J. (2025). Associations between motivations for and against eating meat with four types of meat engagement. *Appetite*, 108237.

Consumer expectations of protein sources for meat alternatives

With growing consumer demand for meat alternatives, understanding consumer expectations of different protein sources is an important area of research. A recent study published in Appetite examined the consumer expectations of some promising protein sources for meat alternatives, including legumes (faba bean, soy, peas, and lentils), cereals (rice and oats), nuts (almond), tubers (potato), oilseeds (rapeseed and sunflower), insects (crickets), cultured beef, chicken eggs and algae.

In this online survey, 1,953 meat-eating participants from across Europe evaluated the 14 protein sources for meat alternatives on the following parameters: expected taste, expected healthiness, and expected environmental friendliness. The participants also completed a survey on their personal beliefs and attitudes, which was used to quantify their food neophobia, meat commitment and meat alternative rejection. Lastly, they completed a survey on their frequency of consuming meat, traditional meat alternatives (eg. tofu, falafel) and meat-like meat alternatives.

Eggs, potatoes, rice and peas were identified as the most promising protein sources for best consumer expectations and acceptance. Algae and crickets had low expected taste ratings, cultured beef and crickets had low expected health ratings,

and soy, cultured beef and crickets had low environmental friendliness ratings. Higher food neophobia and meat alternative rejection scores were associated with reduced consumption of traditional and meat-like meat alternatives, while people with higher meat commitment scores were more likely to reject traditional meat alternatives.

For the food industry, these findings highlight both the opportunities and challenges of developing meat alternatives. Eggs, potatoes, rice and peas are highly accessible, familiar, and have optimal consumer expectations, although some are lacking in protein quality. Novel protein sources, such as algae, insects and cultured meat, may require more consumer education before they are widely accepted. As meat alternatives continue to rise in popularity, accounting for consumer expectations is key to developing successful products.

Source: Pronk K, Etter B, Michel F, Siegrist M (2025) Consumer acceptance of different protein sources for meat alternatives: a multinational study. *Appetite* 215; 108246.

Are your plastic food containers serving up microplastics?

We rely on plastic containers to store leftovers, pack lunches and keep food fresh. But when those plastics go into the dishwasher, they may be releasing something you do not want anywhere near your dinner – microplastics.

In a recent study, scientists put everyday food plastics, such as takeaway boxes, lunch containers and utensils, through a regular dishwasher cycle. The results? Each wash could release up to around 920,000 tiny plastic particles into the water system. Over a year, that adds up to around 33 million particles from just one household.

These microscopic fragments (micro- and nanoparticles) are far too small to see, but they can travel through wastewater pipes, into treatment plants, and eventually back into the environment. And since plastics have been found in seafood, fresh produce, and even salt, what leaves your dishwasher today could circle back onto your plate tomorrow.

Different types of plastics behaved differently. For example, common food container plastics such as polypropylene and polyethylene tended to shed larger pieces, while PET (commonly used for drink bottles) and nylon released a mix of small and large particles.

The good news – compared with other microplastic sources, such as synthetic clothing in the laundry – dishwashers are a relatively small contributor. However, this research is a first step in understanding how our everyday kitchen habits may add to the global microplastic story.

Source: Okoffo ED, Tscharke BJ, Thomas KV (2025) Release of micro- and nanosized particles from plastic articles during mechanical dishwashing. *ACS ES&T Water 5* (6), 2870-2881, https://doi.org/10.1021/acsestwater.4c00768.

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