



Meat-free mutts and moggies

Pet food has a massive impact on the environment, so is it safe to feed your cat or dog a vegan diet, asks **Graham Lawton**

WHEN I finally gave up eating meat, I found that I couldn't actually stop buying meat. My two teenage sons were both big fans of the stuff and my two cats ate nothing but meat. And while I thought the boys might be weaned off it, the cats not so much. I knew that vegan dog diets were available, but assumed that they were suboptimal, and it never even crossed my mind that cats could do the same without losing a few of their nine lives.

Now though, the boys have left home and the cats have sadly passed away. I'm meat-free at last. And when we get our next cat, and possibly dog, I'm considering making them meat-free too. Because far from being biologically impossible, the evidence is growing that cats and dogs can be perfectly content on a veggie or even vegan diet. Indeed, they may be healthier than those fed conventional pet food.

Nevertheless, vets still tell owners not to impose plant-based diets on dogs and cats, warning that they are probably

unhealthy, possibly cruel and potentially illegal. So what is the truth about plant-eating pooches and moggies?

Cats, dogs and their dinners are big business. In 2018, there were about 370 million pet cats and 470 million pet dogs in the world, together wolfing down \$134 billion of chow each year. And the pet food market is growing. In the UK, it rose 17 per cent in the five years to 2019.

Thousands of new pet food products come onto the market every year. In recent years, a lot of those have been plant-based, as the human trend for vegetarianism, veganism and flexitarianism grows and people also think more about the diet of their pets. "Many people these days are much more concerned than they used to be about the environmental impacts of food production, in particular the livestock sector," says Andrew Knight at the University of Winchester's Centre for Animal Welfare in the UK. "They're looking at changing their own lifestyles, and they're starting to look at their cats and dogs as well." Concerns over the healthiness of standard

pet foods is also driving the trend, he says.

This concern is also pushing some owners towards premium pet foods and paleo-style diets consisting of raw meat, blood, offal and bone marrow, which are also called biologically-appropriate raw food diets, or BARF for short.

But plant-based diets are where the real growth is. The market for these is expanding faster than the market as a whole – it was worth \$9 billion globally in 2020 and is projected to almost double by 2028, says Knight. Current estimates suggest that under 1 per cent of the world's pet cats are fed a vegan diet, alongside 1.6 per cent of dogs.

However, just because so many owners are buying into these diets doesn't mean that their pets are thriving on them – or that the environment is benefiting (see "Environmental paw prints", page 46).

Any look at the merits of plant-based pet diets must first delve into the basic nutritional biology of cats and dogs. Left to their own devices, both like to eat meat, which is a big reason why people find it hard to believe they can survive without it.

Dogs are clearly the more veggie-friendly of the two. Though descended from wolves, which eat almost exclusively meat, tens of thousands of years of coevolution with humans have bent the diets of dogs towards omnivory. They will eat meat given half a chance, but there is nothing a dog needs nutritionally that can't ultimately be obtained from plants, says Knight.

Cats, meanwhile, are still only semi-domesticated and remain obligate carnivores, which means they need certain nutrients only present in meat. One of these is the amino acid taurine, which is virtually non-existent in plants and which cats can't synthesise. They also need a dietary source of arachidonic acid, which is found mainly in animal fat. Their metabolisms are poor at converting carotenoids from plants into vitamin A, so need to get it from animal sources, and they also prefer an animal-derived form of vitamin D called cholecalciferol over the plant-based form ergocalciferol. Last but not least, they derive most of their energy from amino

ENVIRONMENTAL PAW PRINTS

One of the main motivators for putting cats and dogs on a vegan diet is the environmental impact of pet foods containing meat. “The livestock sector is a significant contributor to land and water use, climate change and biodiversity loss,” says Andrew Knight at the University of Winchester, UK. “The environmental impacts of pet food are potentially enormous.”

There is a widespread belief that pet foods contain mostly abattoir waste and are therefore environmentally sound. But this isn't true, says Knight. In the US, about a third of meat going into pet food is diverted from the human food supply. In the UK and the rest of Europe, all the meat going into pet food has to be fit for human consumption. However, as the British Veterinary Association points out, “fit for” doesn't mean “wanted for”. A lot of what goes into pet food is technically edible but rarely eaten – tripe, offal, pigs' trotters, udders and chicken feet.

In 2017, Gregory Okin at the University of California, Los Angeles, estimated that 25 to 30 per cent of the environmental impacts of animal agriculture in the US are directly attributable to pet food, which would make pet food responsible for about 5 per cent of global greenhouse gases. That is probably an overestimate, as Okin didn't consider how much food comes from abattoir by-products, says Knight, but even if its footprint amounts to 2 per cent of emissions, that would be significant.

Knight has made some initial calculations on the environmental impacts of switching all the world's domestic cats and dogs to veganism. He reckons that the resources used to create meat-based pet food could be diverted to feed 10 million people a year. Plus, it would mean more than a billion land animals each year wouldn't need to be slaughtered and there would be vast savings in terms of land, water, fossil fuels and greenhouse gas emissions as well.

acids and fats instead of dietary glucose, which means they have much higher protein and fat requirements than dogs. Feral cats obtain about half of their calories from protein and half from fat, mostly by eating small mammals and insects, and about 2 per cent from carbohydrate-rich sources such as grass.

This doesn't look like a promising starting point for quitting animal products, but, in fact, all of these needs can be fulfilled from plants and supplements, says Knight. Taurine is a bit of a red herring: standard cat meats already need to be fortified with synthetic taurine because the heat treatment used to pasteurise these pet foods destroys a lot of the naturally occurring protein, he says.

“No species has any particular need for meat, or any other particular ingredient,” says Knight. “What they have requirements for is a set of nutrients in a formulation that's sufficiently digestible and palatable.” That applies equally to other carnivorous pets, including ferrets, snakes, lizards and fish.

From that perspective, it also matters little what the main source of protein is. For this, some plant-based pet foods rely on vegetables, others on yeast or other fungi or seaweed. Eggs,

Feral cats obtain most of their calories by eating small mammals, birds and insects



SHUTTERSTOCK/LOSONSKY

milk and fish are also used in vegetarian and pescatarian foods. But it hardly matters as long as the diet is “nutritionally sound”, meaning it conforms to the legal requirements to meet all the animals' nutritional needs.

Happy hounds

The proof of any pudding is, of course, in the eating. Just because nutritional needs can be met doesn't mean the diet is acceptable. “Some people have claimed that it's cruel to maintain cats and dogs on vegan diets,” says Knight.

To find out whether happiness was being compromised, Knight and his colleagues surveyed nearly 4000 dog and cat owners about the extent to which their animals were enjoying their food, guided by established behavioural indicators.

For dogs, signs that food is highly palatable include wolfing it down, begging for more, hanging around the empty bowl, stealing it from cupboards and bins, and becoming aggressive over food. Dogs don't necessarily turn their noses up at less palatable food, but eat it with less obvious gusto. If cats like what they just ate, they lick their chops, groom their faces and half-close their eyes; if not, they flick their tails and ears, lick their noses and groom their bodies.

Knight's survey included 2300 dogs and 1100 cats on a variety of diets and found no significant differences in terms of palatability between them. “The animals eating the vegan diets seemed to enjoy their meals just as much as those on the meat-based diets,” he says.

Of course, food that tastes good isn't necessarily healthy. The first large-scale study of the health effects of veganism on pets was published last year. A team led by Adronie Verbrugghe at the University of Guelph in Ontario, Canada, surveyed over 1000 cat owners, 18 per cent of whom fed their cats a strict plant-based diet. The researchers upped the proportion of vegan animals by inviting customers of Ontario's largest plant-based pet food retailer to take part. The survey asked owners to detail their cats' health problems, examine their stools, give them a “body condition score” and report their overall perception of the health of the cats.

Given cats' meaty nutritional needs, the researchers expected to find plant-eating cats to be in poorer health than the meat-eaters.

If anything, they found the opposite, with lower incidences of gastrointestinal disorders, better body condition on average and a higher proportion reported to be in very good health.

“We were surprised by these findings,” says team member Sarah Dodd. “We certainly expected there to be a couple of increased health conditions with the plant-based diet, so it was interesting to see that wasn't the case.”

Dodd accepts that the study has limitations. Respondents were self-selected, possibly opening up the results to bias. Nonetheless, says Knight, who has a similar study of 1400 cats ongoing, “that was hugely exciting because it's contrary to the widespread expectation that many people have, which is that cats couldn't do well on vegan diets”.

Dogs also do well. A recent study by Knight surveyed more than 2500 dog owners, about half of whom fed their dogs conventional dog food, a third raw meat and the rest a vegan diet. He asked them to track, over the course of a year, seven indicators of health, including visits to the vet, diagnoses, medications and their personal perception of their dog's health. The healthiest dogs were those on raw meat, while the sickest were eating conventional food. However, the raw meat dogs were significantly younger than the others, and when Knight factored this in, the vegan diet turned out to be the best.

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GOLERO/GETTY IMAGES

“Dogs maintained on nutritionally-sound vegan diets have health outcomes at least as good or better than those maintained on conventional or raw meat-based diets”

One limitation of the study is that it only considered the dogs' main meals, not treats, table scraps or food scrounged from elsewhere. Nonetheless, says Knight, “I think our study represents what occurs in the real world. When you look at the weight of evidence, it's very clear that dogs maintained on nutritionally-sound vegan diets have health outcomes at least as good or better than those maintained on conventional or raw meat-based diets.”

Two words are key here: “nutritionally sound” (see “How to turn your cat or dog meat-free”, left). For dogs and cats, that means a diet meeting rules issued by authorities such as the European Pet Food Industry Federation and the US Association of American Feed Control Officials, both based on nutritional requirements established by the US National Research Council in 2006.

That is a potential problem for all pet diets, not just vegan ones. A number of studies have found that conventional meaty pet foods sometimes fall short of these standards, can contain DNA from animals not listed on the packaging and often include animal proteins that some cats and dogs are allergic to.

BARF diets, meanwhile, have been found to be deficient in certain micronutrients and often come with an unwelcome garnish of bacterial pathogens and intestinal parasites.

Vegan diets have similar problems. When Dodd analysed 26 plant-based pet foods available in her local area in 2018, she found that only four – all for dogs –

HOW TO TURN YOUR CAT OR DOG MEAT-FREE

If you decide it is time to wean your cat or dog off meat, it can be tempting to design a DIY diet. But advocates and critics alike agree that this is barking up the wrong tree.

“Although we wouldn't recommend it, it is theoretically possible to feed a dog a vegetarian diet,” says Justine Shotton, president of the British Veterinary Association and a critic of vegan pet diets – especially

for cats, which she says must eat meat. “But owners would need to take expert veterinary advice to avoid dietary deficiencies and associated disease.”

“It's technically possible to make a homemade diet by following recipes and adding supplements,” says Andrew Knight at the University of Winchester, UK, who disagrees that cats cannot go vegan (see main story). But there have been quite a lot of

studies showing homemade diets are often nutritionally incomplete. His own surveys also found that vegan pet foods were more likely to live up to the nutrient profiles on the packaging, perhaps because the companies are trying harder to create nutritionally-sound diets. “I would suggest people just purchase a diet which has been formulated by a reputable company produced to good standards,” he says.



SHUTTERSTOCK/ALERSEY BOYKO

Signs your dog likes a food include wolfing it down, stealing it from cupboards and begging

plant-based food analysed and discovered that it didn't meet the minimum requirement for folate and several other B vitamins.

Such cases notwithstanding, dogs and cats fed a nutritionally sound vegan diet can thrive. This is probably down to two main factors, says Knight. One is a lack of food allergens in vegan diets. Another is that, as with humans, vegan cats and dogs tend to be leaner, possibly because conventional pet food is packed with calories. "This is important, because being overweight and obese is one of the most common and important health concerns in cats and dogs today," he says.

Vets, however, remain deeply sceptical. "There is currently a lack of robust data mapping the health consequences of feeding a vegan diet to a large number of dogs over many years," says Justine Shotton, president of the British Veterinary Association (BVA). "We look forward to seeing further research on whether non-animal protein sources can meet a dog's dietary requirements over the long term. Cats are obligate carnivores and should not be fed a vegetarian or vegan diet."

Vets and professional organisations have also, on occasion, issued vague legal threats to people who put their pets on vegan diets. The authors of the French cats case study, based at the National Veterinary School of Toulouse, point out that the law in France specifies that animals "must be placed by their owners in conditions compatible with the biological imperatives of the species", which they say calls into question the legality of giving cats a plant-based diet. The BVA has similarly pointed out that under the UK's animal welfare legislation, owners have a duty of care to provide an adequate diet and could face prosecution if they don't.

Despite the hurdles, Knight and his team are confident that there is enough evidence that cats and dogs on a nutritionally-sound, meat-free diet will prosper. "There's a revolution under way in this sector, driven by consumers and the concerns that they have over climate change and the health and well-being of their cats and dogs," says Knight. "This isn't a fad." ■

met US standards and only one the stricter European ones.

A more recent analysis by Knight found that the problem wasn't the diets per se, but the way they were produced. He analysed 19 meat-based and 10 alternative diets, including vegan, vegetarian and insect-based, and found that if they actually delivered what was listed on the tin, they would be nutritionally sound. However, they fall short for a number of reasons, including seasonal variability in the nutritional quality of the ingredients and glitches such as overcooking and the addition of additives that can degrade nutrients.

Caution needed

Still, some vegan diets aren't cutting the mustard, as illustrated by a recent case study from Toulouse, France. Two young cats from the same household were taken to a vet after they became lethargic and bloated and lost their appetite. Tests found that the animals were anaemic, had lost muscle mass and were profoundly deficient in vitamin B9, or folate. The vet ascertained that, five months earlier, the cats had been put onto a plant-based diet and suggested switching back to their old food. The owners – both vegan – refused, and so the vet prescribed nutritional supplements.

Three months later, the cats were still ill and the owners caved in. Once on meat, both cats recovered completely. The vet had the original

LAB-GROWN MOUSE MEAT

For cat and dog owners who don't want to buy traditional food, but also don't want to deprive their pets of meat, there is an alternative on the horizon: cultured, or lab-grown, meat. This edible tissue, grown from stem cells, has been in development for human consumption for more than a decade and recently made a breakthrough onto a restaurant menu at 1880 in Singapore.

The only company currently in the cultured pet food space is Because, Animals, based in Vienna, Austria. It already sells plant-based treats, but is working on cultured mouse meat for cats. It has tested a prototype on about 20 cats and hopes to launch the product in 2023. It is also working on cultured rabbit meat for dogs, but sees cats as the priority. Many people aren't willing to feed their cats a non-meat-based diet, says CEO Shannon Falconer. "So what are they supposed to do? This product provides the first humane and sustainable meat-based product that they could feed their cat."



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