Info shared by Pitbull SA.

Manjaro APBT kennel.

South Africa.

My Website http://www.pitbullsa.co.za/

My E mail "manjaro@pitbullsa.co.za"

My Facebook "Gawie Manjaro"

My Facebook page "Manjaro Kennel"

My mobile +27827838280.

Survive vs. thrive: is a vegan diet healthy for dogs?

by Plear

There is sufficient evidence that dogs can survive on vegetarian and even vegan diets.

But whether or not a dog *survives* on a particular diet should not be the determining factor in deciding whether or not that diet is healthy.

When choosing a diet for our dogs, we must consider multiple factors: physiology, digestibility, bioavailability, and nutrient balance, to name a few.

Based on these factors, there are a number of concerns associated with feeding dogs a vegetarian or vegan diet unless a particular dog has a health condition that warrants such a restricted diet.

There are far healthier and more efficient options than vegetarian or vegan diets for most dogs.

Physiology.

Due to the domesticated dog's ancestral history as scavengers, their digestive system is built to be able to handle a variety of different food items.

Over hundreds of years of domestication, their evolution process has fine-tuned the ability to utilize nutrients from the scraps of human civilization even more effectively than their wild ancestors.

Yet still, characteristics of their digestive system imply **that they have remained facultative carnivores**.

The guts of carnivores are usually shorter and less complex than those of herbivores because meat is easier to digest than plant material.

Like humans, a dog's digestion process begins in the mouth. Unlike humans, dogs do not possess the same salivary enzymes that we do that start the process of breaking down starches. Instead, a dog's mouth serves only as a means of crude mechanical digestion.

Dogs technically don't "chew" their food, at least not in the same sense that humans do; instead, their hinged jaw is efficient at tearing pieces of meat into small enough pieces to swallow. Thus, the burden of the digestive process is handled in the stomach and intestines.

The dog's stomach is highly acidic, a pH range around 1 to 2.

This gastric acid liquefies the food into chyme which is then moved into the small intestine.

Protein is broken down into amino acids, which participate in virtually every metabolic process in the body.

It is the small intestine where the process of starch digestion finally begins, thanks to enzymes produced by the pancreas and liver.

The last step of digestion occurs in the large intestine, where water and electrolytes are absorbed, and more enzymes are produced in the presence of any remaining difficult-to-digest material.

The longer food remains in the intestines, the more gas is produced.

A dog's digestive system is not very effective at hindgut fermentation; unlike herbivores like cows or some omnivores like rats, dogs do not possess a functional cecum, where indigestible material is fermented and cellulose is broken down by bacteria.

Digestibility & bioavailability.
The dog's digestive process takes much less time than an herbivore's because a dog's digestive system is much shorter.

It is far more effective at digesting meat and bone, while carbohydrates require more time and effort to break down.

Dogs are very capable of digesting carbs, but while carbs can be beneficial to dogs in moderation, **a high carb diet is not optimal for this reason**.

The liver and pancreas have many functions beyond producing

enzymes for starch digestion, but making them work overtime to produce more enzymes than necessary can be a heavy burden throughout the life of the dog.

Carbs simply aren't bioavailable to a dog in large quantities; they are not efficiently digested and utilized, requiring the dog to consume much more food in order to receive adequate nutrition.

High fiber diets also decrease absorption of other nutrients.
According to Small Animal Clinical Nutrition 5th edition (Hand et al, 2010), "Excess fiber may have undesirable effects.
For instance, certain fiber types decrease mineral absorption. [...] Excess fiber can dilute the energy and nutrient content of the food to such an extent that an animal may have difficulty eating enough of the food to meet its needs."
Excess fiber increases excretion of fecal bile acids and decreases protein digestibility, thus decreasing the bioavailability of amino acids.
When dogs can't utilize enough amino acids, their health can suffer; for example, it has been documented that high fiber diets can play a role in taurine deficiency, resulting in a heart condition called DCM that can be fatal. Vegan diets for dogs have been implicated in causing DCM.

Starches aren't the only concern when considering the bioavailability of a diet;

Protein is an incredibly important aspect as well.
Protein quality can be measured by the amino acid profile of a

particular food item.
Dogs require ten essential amino acids - arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine – and studies have shown that other "conditionally essential" amino acids should also be obtained in the diet for optimal health.

Plant-based protein sources **do not have optimal amino acid contents for a dog's needs**, while meat-based proteins are generally far more bioavailable for dogs.

Without a proper amino acid content, the amount of protein in the diet isn't beneficial; in fact, a diet containing high amounts of protein that is not bioavailable can cause health issues in dogs. When proteins are ingested but are not able to be properly digested, more waste products of protein metabolism are created which the body then must dispose of.
This places more work on the kidneys to remove those waste products from the body.

This raises the issue of the validity we can award to the results of short term feeding trials that concluded that dogs could survive on a vegetarian or vegan diet.

The concern of **"survive" short term versus "thrive" long term** must be considered.
To many people, dogs are considered family members, and owners want their beloved pet dogs to live as long as possible. Diet plays an enormous role in the health and longevity of our dogs.

Nutrient balance.
Unfortunately, none of the dog food companies that I contacted that offer vegetarian or vegan formulas would provide the amino acid content of their foods.
However, the concern that commercial vegetarian diets for dogs **may not contain adequate amino acids is valid**; a 2015 study that analyzed 24 commercial vegetarian diets for dogs and cats found that **6 out of the 24 diets analyzed did not contain the minimum amino acid content established by AAFCO, while 8 of the 24 diets did not comply with AAFCO's established labelling regulations.**

There are many homemade vegetarian and vegan recipes for dogs available on the internet.
I analyzed one recipe found on PETA's website and found that **it did not meet AAFCO recommended allowances for amino acids, even with the addition of the multivitamin supplement recommended in the recipe.**

I then found a recipe guideline that seemed to be supported by multiple sources and constructed 5 different recipes that I then analyzed.
None of the recipes I came up with following those guidelines **were complete or balanced**.

First of all, the amount of food required in one meal to even meet the calorie requirement was massive, **due to the inefficient ingredients.**

Every recipe was **severely deficient in multiple amino acids, calcium, vitamin B, vitamin D, iodine, selenium, and some omega fatty acids.**
Many also had **deficiencies in copper, zinc, vitamin A, and chloride.**

These deficiencies would result in serious health problems.

Further, these analyses were created by a computer program **that does not take bioavailability into account**. Thus, it would be safe to assume that the dog would not be able to utilize all of the nutrients, accounting for further deficiencies.
Homemade vegetarian and vegan diets must be heavily supplemented by owners in order to meet minimum dietary requirements.
Research shows that up to 73.9% of owners may leave out ingredients – **especially supplements** – when preparing homemade diets.

This can result in deficiencies, especially in a diet that requires heavy supplementation in order to be balanced.

Antinutrient factors.
Plant ingredients can contain compounds that interfere with nutrient absorption and hormone regulation, thus negatively affecting the health of dogs.
Some of these compounds, like protease inhibitors found in legumes which inhibit the digestion of protein**, can be**

inactivated by high heat and pressure such as the processing that kibble goes through.
However, this can still be an issue in homemade diets that don't use the same extent of food processing required in the production of kibble.

Phytates, found in nuts, seeds, and grains, **are compounds that bind with minerals like calcium, magnesium, iron, copper, and zinc, making them unavailable for metabolism by the dog.**

Similarly, oxalates found in leafy greens can bind to calcium and prevent absorption.
Goitrogens, found in **cruciferous veggies like broccoli, cabbage, and brussel sprouts, interfere with iodine uptake, thus affecting thyroid hormone production.**
Other antinutrients include antigens, phytoestrogens, lectins, and more.

Antigens can generate antibody production in the bloodstream, initiate inflammatory reaction, damage intestinal surface (causing "leaky gut syndrome"), and reduce the absorption of nutrients.

Phytoestrogens found in nuts and oilseeds, soy products, cereals, and legumes **act as endocrine disruptors that adversely affect health**.

Lectins, similar to protease inhibitors, are found in legumes and interfere with the digestion of carbohydrates.

Although **antinutrients** are generally not a concern **in meat based diets that include plant matter because the plant matter is not the majority of the diet, these antinutrients are much more significant of a concern when we are talking about diets composed of all or mostly plant materials.**

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