

# Greyhound Sports Nutrition

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## Introduction

Nutrition has the potential to have a real impact on the performance of racing greyhounds. There is evidence in both dogs and human athletes of the importance of nutrition and every trainer should be aware of this. However, often trying to determine what constitutes 'best nutrition' is not easy and there is a lot of "he says, she says." This seminar is about encouraging trainers to question and review their own practices and be critical of the claims that may be made regarding certain nutrients or supplements.

## Aims of Nutrition

In terms of greyhound nutrition, trainers have two main goals. Firstly they hope to maximize performance which means faster race times, greater stamina and improved recovery. The second goal is to minimize injury and illness. This can reflect direct consequences (e.g. contamination of food with bacteria causing gastroenteritis, or insufficient vitamin B12 intake causing anaemia) or indirect consequences (e.g. the nutritional effects on muscle injury and fracture occurrence). Trainers also need to remain aware of the risk certain foods pose to the development of excessive levels of measured urine chemicals in race day swabs (e.g. the risk of procaine in some pet meat).

## Energy

There is no reliable data that estimates the energy requirements of racing greyhounds. It is logical that the energy requirements would be significantly higher than companion dogs due to the excess work, however some sources have suggested that it is not uncommon for trainers to overestimate the energy requirement. There is also evidence in one study of 9 dogs that feeding at 85% of the 'normal' diet produced better performance. This produced a very marginal loss in condition (3.5/9 compared with 3.75/9).

Obviously what is considered as 'normal' will have a huge impact on this trend. What little literature there is reports that between 6500 and 8500 kilojoules (for a 30kg animal) is ideal. Because of this variation trainers should start somewhere in this range and adjust feed to maintain an ideal body condition.

## Note on Terminology

When percentages are used, unless otherwise stated, that generally refers to percent of energy intake. This unit is used as it is more consistent across diets and ignores the impact of water content, fibre and non digestible bulk in feeds. A diet with 25% energy from protein does not mean that for every 100g of the diet there is 25g of protein. It means that for every 100kj, 25kj come purely from protein.

## Protein

There is good evidence that working greyhounds require a higher intake of protein than resting companion animals. However there is also evidence that excessive protein intakes (above ~30% total energy from protein) can actually reduce performance. It is advised that around 25-30% of energy from protein is ideal. Less than this can lead to anaemia and muscle wasting.

## Fat

Fat is a very important nutrient in feeding greyhounds. Greyhound muscle is uniquely able to metabolize and break down fat for energy. Higher fat diets repeatedly show an improvement in stamina and muscle recovery and help prevent muscle damage following exercise.

The reason fat is so useful to greyhound muscle tissue is that it promotes 'aerobic metabolism'. Aerobic metabolism is the production of energy from food using oxygen. Because oxygen is available the food can be more efficiently metabolised to unlock more energy and the production of toxins during this process is reduced. In a very basic sense fitness is largely determined by the body's capacity for aerobic metabolism.

The opposite of aerobic metabolism is anaerobic metabolism. This is the metabolism that occurs when there is no oxygen available. This metabolism is still useful to the greyhound as it allows rapid energy production and allows production of energy beyond the limit of the available oxygen but can be harmful as it generates lactic acid. Lactic acid lowers the pH (makes the muscle more acidic) and this can have multiple impacts on the tissue including cramping, muscle cell damage (rhabdomyolysis) and increased chance of muscle tears and other injuries.

The aim of feeding lots of fat is to maximize the amount of energy that can be unlocked to the muscle from aerobic metabolism so it need not rely as much on anaerobic metabolism.

The reported ideal dietary content of fat ranges widely. This range is from 30-50% energy from fat. It would seem logical that dogs who have been noted as having poor fitness, low stamina and/or recurrent cramping may benefit from fat percentages at the higher end of this range but there is no evidence to support this.

## Carbohydrates

In human athletes, and in particular sprint athletes, carbohydrates are one of the most important nutrients. They allow the muscle cells to store glucose (the basic carbohydrate sugar) within their cells and this can be used when required for rapid energy production. This can be added to the energy that can be unlocked by aerobic metabolism. Muscle cells can produce a lot of energy really quickly which has obvious benefits in a sprint race. The limitation of high carbohydrate feed is that over long periods when it replaces other nutrients, it promotes the anaerobic or lactic acid producing pathways in the muscle and may actually reduce fitness. For this reason in general the carbohydrate energy should be below 40% of total energy. In human athletes there is benefit in giving higher carbohydrate intakes immediately before and after exercise. It is possible that this may also be useful in greyhounds but there has been no research to look at this.

## Supplements

The term "supplements" is used in this fact sheet to refer to anything that is added to the diet beyond the key macro nutrients (fat, carbohydrates and protein). Supplements are used by many trainers to deliver additional vitamins and minerals and help to fortify the diet. It is important that we are aware of how much we supplement the diet and question if each nutrient supplementation is actually required.

The evidence in humans suggest that commonly the benefit of supplements is often exaggerated however, in general, supplements in low levels of excess are 'usually' harmless. Trainers using multiple supplements should be aware of the total amount they supplement and should have a clear understanding of why they give each supplement.

The following is a brief examination of the most commonly supplemented ingredients and the evidence to support their use.

## Calcium

There is very good evidence for supplementation of the diet with calcium. Meat on its own is particularly deficient in calcium. Commercial feeds will have added calcium to meet requirements of most animals but when part or all of the diet is homemade, there is particular risk of calcium deficiency. Equally, home-made diets are also at risk of being low in vitamin D which is required to absorb calcium. There is no solid evidence that greyhounds have higher requirements of calcium than other dogs. As there appears to be little evidence of harm from over supplementing with calcium and the high rates of calcium deficient diets, it would seem appropriate to supplement with calcium supplementation if a balanced commercial diet is not fed.

It should be noted that younger animals have a significantly higher calcium needs than adults, however, there is some weak evidence that excessively high calcium supplementation in younger dogs can be harmful to joint development as it may cause premature hardening of the bones.

When calcium supplementation does occur, it should always occur with phosphorous to keep a ratio or around 1:1.

## Iron

Iron is commonly reported to treat anaemia or low red blood cell concentration in greyhounds. There is evidence in humans that in most anaemia supplemental iron does have some beneficial role even when the cause is not directly related to true iron deficiency.

The term “sports anaemia” is commonly used to describe the higher rates of anaemia in athletes. There is considerable discussion as to the cause of this and as to its significance (some sources say this may be a normal adaptation of the body to exercise). There is very little good research into the cause of anaemia in dogs but there is excellent evidence that if iron deficiency or excessive loss of blood cells is the cause, then iron supplementation would be beneficial. Further to this it seems reasonable that even when iron deficiency is not the direct cause it may still have a beneficial role as a supplement.

The requirements for iron in dogs are relatively high and despite popular opinion diets high in red meat may still fail to meet that requirement. Iron is very poorly absorbed in all species. Iron in the form of “haem iron” (e.g. the iron in blood) is most easily absorbed but even then this absorption is below 15%. Other forms of inorganic iron are variably absorbed. Iron sulphate, ascorbate or chelated iron are recommended. Iron oxide or carbonate should never be used. They are not absorbed at all and may be irritant to the gastrointestinal tract.

In general around 3.6mg of iron is needed per 100g of feed for healthy dogs with higher doses required for dogs with low red cell counts.

An appropriate quantity of iron is present in commercial dog foods.

## Magnesium

There is lots of anecdotal evidence that magnesium is useful in cramps and there is excellent evidence that magnesium deficiency causes cramps. The evidence that magnesium deficiency is the cause of cramping in greyhounds remains unanswered and in human athletes that recurrently cramp generally magnesium is not to blame. Despite this magnesium is a relatively safe supplement and supplementing above recommended intakes (0.07mg/100g feed) does not appear to be associated with any harm (though whether it actually makes a difference remains unproven).

## Vitamin B12

B12 deficiency is commonly reported as a cause of anaemia in dogs. It is possible that the role of B12 may be overestimated. However the requirement for Vitamin B12 in dogs as set by the national research council should be met by most diets which include red meat. It is commonly reported that greyhounds have higher need for vitamin b12 but there is not a lot of good evidence for this. It has been shown however that surplus Vitamin B12 can stimulate some red blood cell production and it seems logical that this effect would be beneficial in healthy dogs and those with mild anaemia.

Vitamin B12 is very safe and so there is low risk to the animal's health from over supplementation however Vitamin b12 contains cobalt and care should be advised regarding new rules involving cobalt urine thresholds.

Vitamin B12 deficiency causes a typical anaemia known as a "macrocytic and megaloblastic anaemia." If this anaemia is identified and B12 fails to resolve this then other causes should be considered including folate (vitamin B9) or defective vitamin absorption. Vitamin B12 has an extremely complex method of absorption and despite adequate dietary intake errors with absorption may occur. Injectable Vitamin B12 should overcome these issues.

It should also be noted that the liver has significant capacity to store Vitamin B12. Three weeks after injection of a single dose of B12 the liver reaches its maximum level. Some trainers report the need for dosage of B12 injections around race day. Whilst there are many people who report this need there doesn't appear to be a lot of good evidence for this and in humans Vitamin B12 dosages are usually every 1-3 months depending on the severity.

## Other Supplements

Name	Rationale	Evidence
Bearberry	Antioxidant	Very poor. Is an excellent antioxidant but effect in the body has never been demonstrated.
Vitamin C	Antioxidant	No evidence of benefit and one study showed harm at quite high doses
Vitamin E	Antioxidant	No real evidence for supplementation above the level recommended for normal dogs
Citrates	Natural Diuretics	This is true but evidence of benefit for this is unclear. Diuretics are becoming less and less popular in renal injury in people and likely veterinary medicine will follow same trend.
Carnosine	pH buffer	Some evidence in people of benefit in athletes
Carnitine	Aid in oxygen transport	Some evidence in people and in dogs of benefit.
Glucosamine	Joint protectant	Poor evidence in dogs apart from lab studies on cell cultures. Some evidence in people
Fish Oils	Joint protectant and anti-inflammatory	Good evidence but often requires very high doses (much higher than achieved by most supplementation regimes)
Potassium	Electrolyte	Theory that acidosis induces potassium loss but little evidence for this. Over supplementation of potassium can be harmful.
AMP	Vasodilator	Unable to find any evidence to support this role.
Amino acids	Amino acid	leucine, isoleucine, and valine, or other amino acids including arginine, lysine, ornithine, histidine, phenylalanine, methionine have demonstrated some benefit but in general benefit probably has been over reported in media.



Just for fun...

*Who gives their greyhound a post-race treat of a MacDonald's soft serve?*

*Ever curious as to what it's made of?*

*You can find all its nutritional values (see left below) online!*

### All foods

To determine the nutrient content of almost any food, go to the website of the United States Department of Agriculture National Nutrient Database for Standard Reference, where you [www.ndb.nal.usda.gov/ndb/foods](http://www.ndb.nal.usda.gov/ndb/foods)

	Average Quantity Per Serve
Energy (kJ)	627
Energy (Cal)	150
Protein (g)	3.9
Fat, total (g)	4.6
Saturated (g)	2.9
Carbohydrate (g)	22.9
Sugars (g)	17
Sodium (mg)	58

### Supplements

You can go to the website of the Australian Institute of Sport, who have reviewed all common supplements for human athletes and classified them based on their efficacy and safety.

[www.ausport.gov.au/ais/nutrition/supplements/classification](http://www.ausport.gov.au/ais/nutrition/supplements/classification)

