

Feeding the Racing Greyhound

Feeding for Performance

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The sport of greyhound racing has become more popular and competitive over recent years, with the breeding and purchase of finer, sprint bred greyhounds, improved race track geometry and surfaces, which have all helped to lift the standard of performance. Training methods have changed based on exercise physiology research and with it, the 'science' of feeding has provided new guidelines for feeding to optimise performance. It is now even more important that nutrition is not a limiting factor to performance. A nutritionally adequate and well balanced diet is paramount to health, performance and adaptation of the greyhound to the physical and metabolic stresses of racing. The racing diet for successful competitive racing has been refined since lure racing became the industry standard for grading wagering odds relative to body weight and performance.

Although diets were traditionally based on fresh red meat and cereal meals, with zoonotic disease risks such as BSE and the rising cost of inspected meat in many countries, there has been a change in the staple diet for racing greyhounds to scientifically formulated high energy dense compounded dry foods to partly or fully replace meat. As every trainer is looking for an 'edge' in performance to win and an improvement in nutrition can help ensure optimum speed and competitive racing. Traditionally, both the training and feeding of the racing greyhound has been largely considered an 'art' passed on by older trainers to younger trainers, based on 'trial and success' rather than a 'science'. Although scientific calculations can provide an estimate of the relative nutritional intake, based on the established nutritional value of each constituent in the diet, the exact scientific requirements of racing greyhounds have not been established. Not all trainers are able to purchase the best quality feed as there is a limit to the feeding budget in a racing kennel. When the price of a certain meat increases, trainers switch to alternatives or feed a larger proportion of dry feed. Feeding remains one of the areas of animal nutrition still influenced by tradition and folklore, with many time honoured feeding practices.

The 'Science' of Feeding

Over recent years, there have been a number of extensive reviews on the traditional methods of diet composition and feeding practices of racing greyhounds. A number of reviews of greyhound nutrition and feeding have been published over the last three decades, summarizing the scientific and practical aspects of dietary needs, ration formulation, and feeding methods.¹⁻⁸ Some of the data has been extrapolated from the established nutritional needs of working dogs, with adaptations to meet the often higher needs of racing greyhounds. The 'art' is knowing how much feed, when to feed, and the likes and dislikes of an individual animal.² The 'science' is understanding the nutritional needs of the greyhound, the relative value of different feeds and the benefits or disadvantages of individual ingredients or combinations.² A racing greyhound needs an adequate intake of energy for maintenance and exercise, which besides water, is the most important nutrient in a diet and often the one that is limiting to performance.

Nutritional Aims

In addition to maintaining health and vitality, the diet should meet the following criteria:

1. Provide an economical, palatable, low bulk, highly digestible ration to maintain body weight within set limits and ensure optimal performance.^{2,7,8}
2. Provide optimal proportions of carbohydrate, protein, fat and fibre to maximize energy density while minimising gut weight and volume compatible with efficient digestive function.^{3,7}
3. Maintain optimal hydration, electrolyte, anaerobic buffering capacity and fluid balance over a variety of climatic conditions and racing distances.^{3,6,7}
4. Ensure energy and nutrient balance to counteract imbalances and inadequate levels in the diet and meet the specific metabolic demand for performance.²
5. Provide a diet formulated to counteract physical stress on the musculoskeletal system, ensure adaptation to and optimal recovery from racing and injury, and maintain the immune response and resistance against disease under high-stress situations of housing and repeated physical exercise.⁵

Nutritional Aims (cont.)

These aims can be achieved by careful selection of feed ingredients, regular monitoring of body weight, and use of specific supplements to correct low or inadequate feed levels relative to performance requirements and level of stress.^{1-8.}

Highly Digestible, Minimum Bulk Diet with Adequate Nutrient Content

In addition to maintaining health and vitality common to all canine species, greyhounds are a specific athlete with important performance related nutritional needs.

The diet must provide optimal and balanced proportions of carbohydrates, protein, fat and fibre to maximise energy density, while minimising gut weight and feed volume compatible with efficient digestive function and power-to-weight ratio. Greyhounds have the highest power-to-weight ratio of any athlete. Gut fill and body weight has a large influence on the speed and ultimate performance of a greyhound running over a range of distances between 300-700 metres. The traditional meat based diets with a total intake of 1000g daily (as fed) containing an average of 50-70% fresh red meat by weight or 500-700g for an average 30 kg (66 lb) greyhound, combined with 30-50% of a low protein, low fat dry food or kibble (300 g daily) are still popular. However, these feed combinations may be excessively bulky for greyhounds to consume, especially as it is often fed as a single meal daily. The actual dry matter content of raw meat in the fresh state is only 20% with water contributing the major portion of the weight and bulk. The advent of low bulk, highly digestible extruded dry foods manufactured on a cereal and oil seed meal base, with high fat (20-30%) and high crude protein (20-30%) as the major energy and protein sources, theoretically distends the gastrointestinal tract to a lesser extent and are digested leaving a minimal bulk of stool.

Low bulk, complete feeds have not been well accepted in greyhound kennels because of a preference for traditional meat-based feeding practices, as well as the perceived higher cost of these dry foods on a per kilogram basis (Table 1). Dry foods processed by steam extrusion are designed to gelatinise starch to facilitate its digestion, enabling a reduced feeding rate of 350-400g daily for a 30kg racing greyhound.

The negative aspect of a high protein, high fat, minimum bulk diet is that many trainers consider that the small bulk of food leaves the greyhound appearing hungry, rather than full and content, when fed once daily compared to a more bulky meat-based diet. The positive benefit of a low bulk, highly digestible diet is the lower stool bulk, which reduces kennel and turn-out clean up time and less faecal odour in kennels when fresh meat is eliminated from the diet.

In countries with a warm climate, the amount of water consumed to maintain hydration can negate any weight benefit obtained from feeding low bulk, high protein and high fat dry foods.

Various studies have found that high protein dry foods may be detrimental to speed and performance. On average, a racing greyhound is able to run 0.1 metre/sec faster (about 2 lengths of the winning margin) over 500 metres when fed a moderate protein diet (20-25% crude protein) as compared to a high protein diet containing in excess of 30% crude protein.^{1.}

These studies concluded that a dry food based diet, which contained 42% of the energy from carbohydrates, 33% from fat and 24% from protein, provided the best dietary balance to optimise speed and performance over a standard 500 metre race distance. However, greyhounds on this diet were slightly heavier in body weight compared to greyhounds fed a diet containing higher protein and fat, with a lower content of carbohydrate. This difference in body weight was attributed to a greater muscle bulk in greyhounds fed on the medium protein diet.^{9.}

How to Achieve the Optimum Carbohydrate, Fat and Protein Balance for Performance

A proportion of 50% of meat by weight in the total diet has been shown to be of benefit in helping to improve overall speed in a racing greyhound. The ration ideally should contain a blend of meat and dry food to provide energy from an optimum ratio of carbohydrate, fat and protein. This important balance must be provided in bulk that can be consumed easily without adding excess gut weight.

Traditionally, Australian trainers feed a carbohydrate-based meal for breakfast in the form of cooked cereal biscuits.

The traditional evening meal is based on lean meat and dry food, with additional vegetables if required.

How to Achieve the Optimum Carbohydrate, Fat and Protein Balance for Performance (cont.)

A simple calculation (in the table below) based on the energy content of carbohydrates, proteins, and fats can be used to determine the balance needed between these foods to meet the average daily energy requirement for a greyhound in training under moderate conditions (15-25°C). Under cold conditions below 8°C, it is best to increase the carbohydrate content of the diet by 10%. During hot weather above 30°C, an increase in the fat content by 5-7% will help meet the elevated energy expended as a greyhound pants to cool.

A good quality dry food can be combined with a meat base to provide the energy intake in the optimum ratios between carbohydrate (CHO), protein and fat.

GREYHOUND BALANCED DIET

Energy Content provided by a ratio of:-

Carbohydrate 40-42%
Crude Protein 22-24%
Fat 30-33%

Basic Ratio on per kg body weight basis

Breakfast	Kibble 12% crude protein	5g/kg bwt
Main Meal	Lean Beef 10% fat	20g/kg bwt
	Dry Food 20% protein	
	10-12% fat	15g/kg bwt
	Omega 3/Omega 6 oil	0.75-1.0ml/kg bwt

The amount fed must be monitored to avoid excess body weight as the diet is very efficient in providing energy for exercise and excess will result in weight gain.

Greyhound Body Weight		25 kg	30 kg	32 kg
<u>Breakfast</u>	Kibble 12% protein and milk	125g	150g	160g
<u>Main Meal</u>	Lean Beef 10% fat	500g	600g	650g
	Dry Food 20% crude protein 10-12% fat	375g	450g	500g
	Oil Omega 3 – Omega 6 Oils	15ml	18ml	20ml
		Increasing to 20ml	Increasing to 25ml	Increasing to 30ml

A slightly higher protein diet is beneficial to greyhounds racing on a regular basis.

Notes:

1. Where a greyhound requires extra energy to maintain body weight in hard work, increase the dry food by 50-100g per day, whilst still maintaining the optimum carbohydrate balance for energy.
2. Where an excitable greyhound becomes dehydrated in hot weather, add an additional 1 tablespoon (17g) of fat (lard/suet, meat trimmings, copha) per 300g meat in the diet.
3. Where lean meat, such as very lean or trimmed beef, horse meat, kangaroo or chicken is used in place of lean 10-12% fat beef, add 1 tablespoon (17g) of fat (lard, suet, meat trimmings) to the diet to maintain the optimum energy balance with the correct CHO:Protein:Fat ratio for speed and performance. Do not use fat (dripping) from roasted meat.
4. Additional supplements of vitamin E (100iu daily), vitamin C (max 250iu daily¹³) and iron (15mg daily) can be provided, along with electrolytes.

The traditional meat-based diet contains a higher level of carbohydrates provided by cereals, rice or bread.² Another study suggested that greyhounds run faster race times when meat was added to a low protein and semi-lean diet, presumably because the meat provided extra fat as an energy source.⁹

Provide an Economical and Palatable Ration

The high energy density of fat and the lower cost of freshly trimmed and rendered animal fat by-product of the beef, sheep, pork and chicken meat industries, makes the combination of a fat-boosted minimal meat and commercial dry food diet more economical as well as more palatable to racing greyhounds. Therefore, there is an increasing tendency to feed a minimum meat diet, higher in fat and protein, to reduce feeding costs.²

	Use	Energy (Kcal ME)/100g	Crude Protein (%) g/100g	Fat (%) g/100g	Approx. Daily Amounts for a 30 kg Dog
Group 1	Meat-based diets	270	13	2-3	200-250g daily mixed with 700g medium 12-15% fat meat.
Group 2	Minimum meat diets	290-300	17-20	8-19	250-300g daily mixed with 500-600g medium 12-15% fat meat.
Group 3	Complete feeds	330-340	20-24	8-10	550-600g daily or 250-300g mixed with 200-250g medium 12-15% fat meat.
Group 4	High-energy complete feeds	400	25-30	20-25	400-450g daily.

Table 1: Classes of dry food for racing greyhounds relative to meat content in diet.

Optimum Mineral, Trace Mineral, Vitamin and Electrolyte Supplementation

The provisions of nutritional supplements to correct low, imbalanced or adequate levels in meat and cereal-based dry food rations is paramount to meet the elevated needs for minerals and electrolytes imposed on the musculo-skeletal and metabolic system by racing. When trained and fit to race, a sound greyhound can be successfully raced twice weekly. Adequate intake of minerals for bone development on a meat-based diet is particularly important to maintain skeletal strength.

It is estimated that the daily calcium intake needed by a sedentary 30kg dog to maintain optimum skeletal strength is 357mg (NRC, 2006), compared to 6000-8000mg daily for a greyhound in full race training (Kohnke, 1998). It is also recommended to add 20% more vitamin D than NRC (2006) guidelines to dry food formulations; as cereal based dry foods, even with added calcium, have been associated with an increased incidence of bone fractures (Kohnke 1998). The estimated requirement for most other minerals and trace minerals is 2-3 times higher in a racing greyhound as compared to a resting dog.² Recommendations for B vitamin intake and fortification of feed is at least three times higher than NRC (2006), which reflects the higher metabolic rate during anaerobic exercise of a racing greyhound (Kohnke, 1998; Table 2).

Demineralisation of skeletal and joint structures as a result of high-loading athletic exercise and cortisone-induced muscle catabolism during exercise and respiratory lead to losses of fluid and complementary electrolytes, particularly potassium.

The diet must be fortified with a large range of macro and micro nutrients to meet athletic demand and maintain body reserves, optimum metabolic function and racing soundness.

Maintain Immune Competency

It is recommended that the ration provided for racing greyhounds contain additional nutrients such as vitamin A, vitamin E, vitamin C and selenium to counteract immune suppression resulting from higher circulating cortisol levels in greyhounds subjected to the stress of training and racing. This will help to maintain optimum resistance against disease and assist recovery from racing and injury.²

Energy Requirement

Please Note: These notes were taken from Kohnke 1998 (Adapted) as the text is no longer in print.

Energy, with the exception of water, is the most important constituent of the greyhound diet.² Diets can be manipulated to improve oxidative yields and utilise short and medium chain carbohydrates and fatty acids over a wide range of race distances and climatic conditions.² Short-term, high-intensity exercise in the greyhound is fuelled mainly from muscle glycogen and blood sugar to meet the predominantly anaerobic exercise demand.³

The energy supply and exercise duration, intensity, and frequency are all interrelated and can be influenced by the individual greyhound's temperament, kennel and environmental temperature, and efficiency of metabolism.² The total energy requirement for a racing greyhound is a summation of *maintenance, thermoregulation, exercise, and racing expenditure*, including behavioural influences and pre-race anticipation expenditure.^{2,4} Regular monitoring of body weight at least once weekly will assist in equating energy intake relative to expenditure.² All estimates are as metabolisable energy (ME) in kilocalories (Kcal). To convert kcal to kilojoules (kJ), multiply by 4.184.

Useful Energy Equivalents for Feed Adjustment²

Each 100gm (3 1/3 oz) of:

- Lean raw beef (10 to 12% fat) provides approximately 200 kcal ME.
- Dry food 24 to 28% crude protein, 8 to 10% crude fat provides approximately 300 to 310 kcal ME.
- Dry food 30 to 32% crude protein, 15% crude fat provides approximately 400 kcal ME.
- Each 17 gm (about 1/2 oz) or 20 ml (1 tablespoonful) of animal fat or vegetable oil provides approximately 150 kcal ME.

Maintenance. A greyhound requires approximately 132 kcal ME/kg body weight^{0.75} daily under temperature (15 to 25°C or 60 to 77°F) conditions.⁹ For greyhounds weighing between 25 and 35 kg, this equates to 55 to 60 kcal per kg body weight. An average 30kg (66 pound) racing greyhound housed under temperature conditions requires approximately 1700 kcal ME/day.^{2,3} An excitable greyhound or one housed in a larger enclosure will have a higher basal metabolic expenditure because of panting, barking, or hyper-activity in the kennel, and may require up to 2100 kcal ME daily additional fat included in the diet will increase energy input without significantly increasing ration bulk.² A weight check once weekly will enable adjustment of the fat intake to maintain body weight.

Thermoregulation. A greyhound housed and raced under *cold weather conditions*, between 10 and 15°C, will require an increase in energy at low range ambient temperatures to maintain body warmth.^{2,5-7}

As a guide, for every 1°C (2°F) decrease in ambient temperature below 15°C (60°F), add 3 kcal ME/kg body weight^{0.75}, or approximately 40 kcal ME daily for a 30kg (66 pound) greyhound.⁶

Under cold conditions increasing the amount of dry food (see energy equivalents above) relative to the decrease in the ambient temperature will help to maintain body heat and body weight. Most greyhounds can consume up to a maximum of 100 gm extra dry food (about 3 1/3 oz) daily without exceeding bulk or appetite limits. The greyhound should be weighed at least once weekly to ensure that it is maintaining body weight. If a greyhound loses weight or requires more energy under cold conditions, extra fat should be added to boost energy intake so as to avoid a significant increase in the volume of feed the animal has to consume above the additional 100gm of dry food.^{2,6} The housing should be heated to a more comfortable temperature and a rug and adequate bedding provided under very cold ambient temperatures.

During *hot*, and especially humid, *weather*, the energy expended by panting to eliminate excess heat may increase daily requirements up to 3000 kcal ME for a 30kg greyhound.² Exercise under these conditions may deplete glycogen stores more rapidly.³ In addition, hot climates suppress appetite, and a more energy-dense diet boosted with fat will help limit the ration volume, provide a useful source of metabolic water and minimise heat production from hindgut fibre fermentation.^{6,7}

High ambient temperatures for longer than 4 hours a day when a greyhound is panting will increase energy requirements. As a guide, for a 30kg (66 pound) animal, each 1°C (2°F) increase between 26 and 30°C (70 and 86°F), will require an extra 130 kcal ME daily and 160 kcal ME daily for a similar rise between 31 and 35°C (88 and 95°F).

Thermoregulation (cont.)

Under hot conditions, up to a maximum of 100 gm dry food will provide energy as well as fibre to maintain hindgut water reserves against panting losses.⁶ However, for energy needs in excess of this input under hot conditions, as appetite and feed intake are often reduced, additional fat will meet the shortfall in energy requirement and provide a metabolic source of water to counteract dehydration.^{2,6} A weight check once a week will enable dietary adjustment, which should also be matched to weather conditions.^{2,6} Adequate electrolyte and fluid replenishment is also essential during hot weather to avoid dehydration and weight loss.

Racing Expenditure. Total energy expenditure for a greyhound in training and raced under temperature conditions ranges from 150 to 190 kcal ME/kg body weight^{0.75}, or approximately 1890 to 2390 kcal ME for a 30kg (66 pound) greyhound.⁵ It has been estimated that an additional 75 kcal ME is expended in each 30 second trial or race, or 4 – 5% increase over maintenance requirements. Under temperature conditions the expenditure for racing can be provided by the standard diet.

Behavioural Influences. Excitable, barking and “hard-walking” or hyperactive greyhounds may expend valuable energy reserves and dehydrate during training and particularly during traveling or when kennelled in the pre-race period. Although the amount has not been quantified scientifically, a diet boosted with 30 to 60 gm (1 to 2 oz) of fat or vegetable oil in the pre-race meal about 6 to 8 hours before racing will provide extra energy expended in pre-race anticipation. Additional fat is recommended for nervous or hyperactive greyhounds that lose body weight, dehydrate, or perform below optimal levels.² Regular body weight and condition assessment with appropriate dietary adjustment are essential to maintain racing weight limits.

ENERGY SOURCES

Carbohydrates, proteins and fat included in the ration blend provide the major sources of energy to meet requirements.

Carbohydrates

Energy Yield and Food Content. Carbohydrates (sugars and starches) yield 3.5 kcal ME gm,^{3,9} and on average, contribute 40 - 45% of the energy in traditional racing diets.² Meat is low in carbohydrates, contributing only to 5% of the total carbohydrate intake from the traditional 70% meat by weight diets.² Dry foods contribute varying amounts of carbohydrates, mainly from cereal grains, ranging from 35 - 40% carbohydrates in dry foods containing 27 - 30% crude protein and 15% crude fat, to 55% carbohydrates in lower protein (13% crude protein, 2 - 3% crude fat), dry foods or kibbles.²

Excess Carbohydrates. Excess intake of carbohydrates in the form of cereal grain starches can have a number of adverse effects in racing greyhounds. High starch intake may increase potential glycogen over storage in muscles, with resultant accumulation of higher lactate levels and lower clearance rates, and ultimate earlier onset of metabolic fatigue and risk of exercise rhabdomyolysis or cramping.^{1,2,5,8}

High intakes of poorly digested carbohydrates, particularly in the form of cereal-based lower-protein human breakfast or dry dog foods, may also reduce protein and fat digestibility and uptake of sodium, potassium, and calcium because of their higher fibre content.⁵ The higher fibre, while helpful in maintaining faecal bulk, increases iliocecal water flow and results in wetter faeces,^{5,6} with less retained as an intestinal reservoir against dehydration during hot weather.⁶

Feeding pre-race snacks provide soluble short-chain sugars, such as sucrose (sugar) and glucose (dextrose) and can lead to increased insulin sensitivity.^{2,7,10} When excess amounts are ingested in the immediate pre-race period, rebound hyperinsulinemia may be triggered, leading to lowering of blood sugar levels. The combined hypoglycaemia and the effect of insulin decrease on mobilisation of fatty acids and glycerol from lipid stores may also delay liver and muscle glycogen replenishment during the pre-race kennel period.^{2,7,10} Both these effects, in theory, can cause a risk of earlier metabolic fatigues and reduced race performance. In practice, it is widely recommended to avoid feeding large amounts of soluble sugars in a pre-race “snack” feed, limiting to 15 gm (½ oz) glucose or 60 ml (2 oz) honey within 4 to 6 hours before racing.^{2,6,7,10}

Proteins

Energy Yield and Food Content. Proteins yield 3.5 kcal ME per gram.^{3,9} Proteins provide a source of energy, as well as essential amino acids, for protein synthesis. As a source of available amino acids, greyhound diets should contain 30 - 35% high quality crude protein on a dry matter basis.^{2,4} Protein sources contribute, on average, between 35 - 40% of the total energy needs for a racing greyhound.^{2,4} Lean meat ranges from 17 - 21% crude protein on an as-fed basis, or approximately 60% crude protein on a dry-matter basis.^{2,9} Dry foods contain a wide range of crude protein, depending on the content of meat by-products and oilseed protein sources, and commercial products range from 17 - 35% on a dry-matter basis.² Most greyhound diets based on meat and/or dry foods to satisfy energy demands contain adequate protein to meet daily requirements.

Excess Protein. High intakes of protein increase the cost of the ration blend, and the elimination of excess poor-quality protein, such as contained in cereal-based dry foods, is an energy-consuming process. It is much more economical, and metabolically more efficient, to feed a diet containing adequate protein, with additional energy provided by fat to greyhounds, during hot weather or those competing in longer-distance races.²

Fats or Lipids

Energy Yield and Food Content. Fat or lipids yield 8.5 kcal ME/gram, or approximately 2.25 times that of carbohydrates or protein.^{3,9} Fats are a useful energy-dense feed that provide an energy boost without adding excessive volume or weight to the ration.² The lipids in fats and oils are a palatable, highly digestible source of energy; greyhound diets should contain at least 12 - 15% fat on an as-fed basis, and greyhounds can tolerate up to 25 - 30% fat on a dry-matter basis.² Higher fat intake is recommended for excitable, hyperactive greyhounds and during hot or very cold weather conditions.²

Both animal and plant oils and fats are highly digestible. Lipids with a high percentage of short-chain (unsaturated) fatty acids remain liquid (oils) at room temperature.² As the percentage of long-chain fatty acids increases, the lipid becomes solid at room temperature as a fat and digestibility is reduced in fats with high long-chain saturated content.^{2,6} Short to medium chain saturated triglycerides, as contained in coconut, canola, palm, and copha are considered better utilised, as these lipids are digested by pancreatic enzymes without need for bile emulsification.⁴ Although it is suggested that up to 25% of the total fat be provided by these sources of short to medium chain triglycerides,⁴ greyhounds may not readily accept these items in their diet. Stepwise introduction over 7 to 10 days may be necessary to obtain acceptance.⁶

Excess Fat. High intakes of long-chain saturated fats, such as beef and mutton fat (trimmings or suet) or butter fat, can reduce overall lipid digestibility, although greyhounds find these animal fats naturally more acceptable.^{2, 4} Animal fat sources are generally cheap to purchase as trimmed fat or omental fat from carcasses. However, if more than 60 gm (2 oz) of animal-derived fat is required to boost energy content in the ration during hot weather, or in dehydrated greyhounds, it is preferable to provide additional fat in the form of vegetable oil.²

Essential Fatty Acids. Greyhounds require essential fatty acids. The diet should contain at least 1% of linoleic acid, an omega-6 fatty acid, on a dry matter basis, or 2% of ME intake, to prevent the characteristic dry, flaking dermatitis associated with a deficiency in dogs.¹¹ Linoleic acid is the precursor of other linoleic acid family members, linolenic and arachidonic acid, if adequate linoleic acid is available in the diet.¹¹

CONCLUSION

Greyhounds are elite athletic animals which are subjected to extreme physical exertion during racing and the cumulative effects of environmental, metabolic and physical stress when trained and raced on a regular basis. They must be provide with a palatable, low bulk, high energy-dense ration, with a medium crude protein and fat content to maintain competitive speed and stamina within set limits of body weight. An adequate intake of minerals, trace minerals, electrolytes and vitamins to correct low, imbalanced or inadequate levels in meat-based diets, in particular, is essential to maintain musculo-skeletal soundness, optimum metabolic activity, strong immune status and overall health in greyhounds racing between a relatively young age of 15 months to a mature age of between 3 and 4 years.¹⁵

Table 2: Recommended daily intake (RDI) for a 30 kg resting and racing greyhound on a combined meat and dry food diet. Updated from Kohnke 2002.¹⁵

Nutrient	Recommended daily intake (RDI)		Practical guidelines for feeding racing greyhounds.
	Resting	Racing	
Calcium	3570 mg	600-800 mg	Supplement meat-based diets to 75% of RDI, dry food diets to 30% RDI: essential in all young greyhounds in training for musculo-skeletal development.
Phosphorus	2670 mg	5000 mg	
Magnesium	246 mg	800-900 mg	Add 50% RDI to the diets of nervous or cramping greyhounds or hot weather.
Iron	20 mg	60 mg maximum	Add 50% RDI, especially to chicken or fish-based diets that are inherently low in iron.
Copper	1.8 mg	5 mg	Add 50% RDI, especially to chicken or fish-based diets that are inherently low in copper.
Zinc	21.6 mg	65 mg maximum	Add 50% RDI to dry foods if calcium is supplemented.
Manganese	3.0 mg	6.0 mg	Add 50% RDI to meat-based diets.
Selenium	100 ug/kg diet	200 ug/kg diet	Add 100% RDI to high meat diets, 50% to dry food diets (fish has high Se concentrations).
Iodine	0.36 mg	1.0 mg	Add 50% RDI to high carbohydrate diets to optimize metabolism.
Sodium	330 mg	3000-5000 mg maximum	Do not add extra if more than 300g dry food with 1% salt is fed; add 50% RDI to diet in hot weather.
Potassium	2670 mg	4500 mg maximum	Add 50% RDI in hot weather, cramping, nervous greyhounds.
Vitamin A (retinal)	2250 IU (0.675 mg)	3375 IU (1.0 mg)	Add 50% RDI to lean-meat diets.
Vitamin D (cholecalciferol)	240 IU (0.06 ug)	260 IU (0.09 ug)	Add 50% RDI to lean meat diets, or 360 IU (1.2 ug) when calcium is included in cereal-based dry food.
Vitamin E (tocopherol)	15 IU (15 mg)	30-100 IU (30-100 mg)	Freezing meat destroys vitamin E: add 50% RDI to meat diets and up to 100% RDI in fat-boosted diets or high fat dry diets. Do not exceed 400 IU daily as it may affect performance (Marshall 20002 – optimum 100 IU daily, pre-race 150-200 IU).
Thiamin (Vitamin B ₁)	600 ug	1.8 mg	Add at least 50% RDI to meat-based diets.
Riboflavin (Vitamin B ₂)	1.5 mg	4.5 mg	Add 100% RDI to fat-boosted diets.
Niacin	6.75 mg	20 mg	Add 50% RDI daily when racing regularly on high energy diets.
Pantothenate	6.0 mg	18 mg	Add 50% RDI to diets containing cooked foods (stews)
Pyridoxine (Vitamin B ₆)	0.6 mg	2.0 mg	Add 50% RDI to high protein dry foods.
Cyanocobalamin (Vitamin B ₁₂)	15 ug	45 ug	Add 100% RDI to chicken or fish-based diets, which are inherently low in vitamin B ₁₂ .
Folic acid (folacin)	120 ug	360 ug	Add 50% RDI to all racing diets.
Vitamin C	Internally synthesised	250-300 mg can be supplemented	Add 100% RDI when racing regularly, but not exceeding 300 mg daily. Limit 250mg daily. Pre-race 500mg. Supplementing with 1,000mg daily appeared to slow racing greyhounds (Marshall et 2002)

(Adapted from Kohnke, 2002)

Table 3 – Foods for Greyhounds

Average Value as Fed Per 100g – (Adopted and Updated from Kohnke 1989,² Hoskins & Kohnke 1994.¹⁴

	Metabolisable Energy (Kcals ME)	Crude Protein (%) (g)	Fat (%) (g)	Calcium mg	Iron mg
BEEF					
Lean (Skirt/Beef flap)	123	22.4	4.6	7.0	2.1
Semi Lean	185	19.5	12.5	6.5	2.0
Lean-Medium	2/0	18.9	12.5	6.0	1.9
Medium	268	17.9	21.2	6.5	1.6
Medium-Fatty	280	16.3	25	4.5	1.3
Fatty	330	15.0	30	4	1.2
CHICKEN					
Lean (meat only no skin)	107	20.3	5	6	0.6
Cull hen (meat only no skin)	165	19.0	10	5.5	0.45
Skin (boiled)	223	16.1	17.1	10	0.7
Cull hen (minced whole no feathers, gut out)	250	21.2	19.4	200 (with bone)	1.0
Necks (minced with bone)	233	13.2	18.6	800 (high proportion of bone)	1.2
Feet (washed, boiled, minced, whole)	96	15	5	2100	3.0
HORSE (meat only)	130 (average) (110-150)	18.0-20.6 (average)	4-9%	170-200	4.2-4.8
SHEEP Lamb (leg meat)	240	17.9	18.7	6.0	1.7
MUTTON (leg meat)	265	15.5	22	5.5	1.5
Whole carcass no bones minced	333	14.6	30.5	4.5	1.4
VEAL (meat lean average)	103	19.0	2.6	8.3	1.7
RABBIT (raw meat)	130	21.9	4.0	20.0	1.9
BEEF OFFAL					
Beef Heart (raw)	100	18.2	3.0	5.0	5.0
Beef Kidney	91	17.1	2.5	15	5.4
Beef Liver	157	20.0	8.6	6.0	5.8
Tongue	200	17.2	14.6	6.0	3.2
Beef Tripe (cooked)	83	14.4	2.8	19	0.3
SHEEP OFFAL					
Heart (raw)	122	17.8	5.6	5	3.9
Kidney	191	17.1	2.5	11	9.8
Liver	162	21.4	7.5	6	7.5
Tongue	200	15.3	15.5	7	1.9
FISH					
Average (not cod)	100	18.0	1.0	27	1.1
MILK					
Cows whole	65	3.3	3.5	120	0.05
Cows skimmed	59	3.6	0.1	120	-
Powdered Dry (non-fat)	363	35.9	0.8	1310	1.0
EGGS					
Whole eggs with shell	147	12.3	10.9	9546	2
Whites	36	3.6g/yolk	Trace	5.0	0.1
Yolk	58 (per yolk)	2.7g/yolk	12.2	45	0.4

	Metabolisable Energy (Kcals ME)	Crude Protein (%) (g)	Fat (%) (g)	Calcium mg	Iron mg
BREAD (Wholemeal/White)	216 (60/slice 28g)	8.8	2.7	23	2.5
White	233 (58.8/slice 25g)	7.8	1.7	100	1.7
FAT (fat trimmed from beef)	736 (147/18g tbsp)	5.2	78.8	Trace	0.2
Lard, Suet	902 (153/18g tbsp.)	-	100	-	-
Polyunsaturated Vegetable Oils	884 (150/17g tbsp)	-	-	-	-

Table 4: Energy Equation Calculations

Carbohydrate	Protein	Fat
3.5 Kcals ME/g	3.5 Kcals ME/g	8.7 Kcals ME/g

Calculating Carbohydrate Content of Dry Food

Protein %	+	Fat %	+	Ash (9%)	+	Moisture (10%)	+	CHO	=	100%
25%	+	15%	+	9%	+	10%	+	CHO	=	41%
25g		15g		-		-		41g		TOTAL
87.5 Kcal ME		130.5 Kcal ME						143 Kcal ME		361 Kcals ME/100g

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Please Note: Kohnke 1998: References 1-8 are taken from Kohnke JR. Nutrition for the Racing Greyhound. In Canine Sports Medicine and Surgery. Bloomberg, Dee and Taylor Saunders 1998 Ch. 38 p 328-336.

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