



OWNER FACTSHEET

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Commercially manufactured diets

Introduction

Commercially manufactured diets have been popular for many years, with the first produced in 1860 in the UK. In light of the wide variety of diets now available, we as veterinary professionals would like to provide guidance about the advantages and disadvantages of such foods.

Our advice to pet owners should always be based on:

- Sound scientific evidence, whenever available
- Excellent clinical reasoning
- Informed risk management.

This is so we can help you make decisions about what to feed your pet. As well as ensuring that minimum nutritional requirements are met, the chosen diet should ideally provide optimal (or ideal) nutrition to promote the good health of your pet.

Whatever the type of food you wish to feed, it should meet the following requirements:

- **Complete and balanced nutrition** – the diet should provide every nutrient that your pet needs, in the correct quantities for the pet and not in excessive amounts
- **Digestible** – the nutrients must be bioavailable to the pet consuming the food
- **Palatable** – the food must be appealing to your pet so that they will consume it
- **Not fed in excess** – excessive amounts of energy from any food will lead to obesity. Controlling the amount of food is strongly advised to maintain an ideal body condition score. Further information on body condition scoring is available from the World Small Animal Veterinary Association (WSAVA) (www.wsava.org)
- **Safe** – the food must be safe to feed, being free of anything that may cause harm to you or your pet (e.g. toxic compounds or organisms (pathogens) that cause disease)
- **Achievable** – the recommendation must be within your financial and time budget.

Sustainability of food sources is also of increasing concern for both humans and pets because, if current consumption continues, there will be a food shortage within the next 50 years.

What are commercially manufactured diets?

Commercially manufactured diets are pet foods produced on an industrial scale and widely distributed to stockists for convenient purchasing. The diets, at every stage of production, are usually subjected to testing and analysis for nutritional adequacy, product consistency and pathogen elimination – although the extent and nature of this will depend on the diet and the manufacturing company. Many manufacturers also research dietary formulations, with purpose-formulated diets now available for specific life stages and medical conditions. This allows optimal nutrition, above the minimum nutritional requirements, to be delivered to pets.

Types of commercially manufactured diet

Commercially manufactured diets are produced in three main forms:

- Dry, most often in kibble form
- Wet, of which subtypes can include:
 - Chunks in gravy
 - Chunks in jelly



- Loaf
- Pate
- Uncooked, raw diets (for further information, see 'Raw diets').

The forms differ depending on moisture content, intended preservation method and processing methods of the ingredients.

- Dry foods:
 - Low moisture content – typically 3–11%
 - Generally higher starch content – necessary for the kibble to hold its shape
 - Produced most commonly via an extrusion method:
 - Extrusion uses pressure and temperature to rapidly cook the ingredients (20–60 seconds). It is widely used as it increases the digestibility and palatability of the food
 - Extrusion is also used to kill pathogenic bacteria
 - Sold in bags of varying size (500 g to 15 kg).
- Wet foods:
 - High moisture content – 60–87%
 - Available in tins, trays and pouches
 - Uses heat and pressure to preserve the ingredients, but each method depends on packaging type.
- Uncooked:
 - Variable moisture content depending on the specific diet:
 - Tend to have a higher moisture content (similar to wet foods)
 - Dry foods with added freeze-dried ingredients are also available
 - Ingredients are preserved by freezing or freeze-drying before thawing or rehydration prior to feeding.

In the UK and abroad, no matter what the diet, the form that it comes in or the scale of production, commercially manufactured diets must meet basic standards and criteria for production, packaging, formula reliability and pathogen control.

What are the advantages of feeding a commercially manufactured diet?

Diet claim	Available evidence
Assured nutritional adequacy	<ul style="list-style-type: none"> ■ Many of the larger pet food manufacturers additionally undertake feeding trials and/or laboratory analyses to ensure that their diets deliver complete and balanced nutrition to your pet. In Europe, a claim that a diet is 'complete' can be based on a computer formulation alone ■ Requirements in the UK are set by the European Pet Food Industry Federation (FEDIAF) ■ Nutrition should not be merely adequate; nutrition should be optimal for the pet consuming the food, meaning that commercially manufactured diets are frequently formulated to a specification well above basic nutritional requirements
Specialized nutrition	<ul style="list-style-type: none"> ■ Through scientific development, therapeutic diets are now available for a wide range of conditions, including renal disease, skin disease, diabetes mellitus, obesity and hyperthyroidism ■ For some conditions, the correct therapeutic diet can eliminate signs of the disease
Assured safety	<ul style="list-style-type: none"> ■ More than 50 individual pieces of EU legislation govern the production of commercially manufactured diets ■ Foods should: <ul style="list-style-type: none"> ● Be high quality ● Be free from pathogens ● Deliver complete and balanced nutrition ■ Occasional failures in pathogen control procedures have been documented in a small number of cases, including: <ul style="list-style-type: none"> ● <i>Salmonella</i> spp. – found in uncooked commercially manufactured diets ● <i>Listeria</i> – found in uncooked commercially manufactured diets ● <i>Mycobacterium bovis</i> – found in uncooked commercially manufactured cat food ■ Occasional formulation errors, where nutrients have not been correctly balanced, have been recorded, including: <ul style="list-style-type: none"> ● Low thiamine levels in cat food – dry kibble ● Excess vitamin D – wet food ■ Very occasionally, fatal toxic components have been found in a very small number of cases, including: <ul style="list-style-type: none"> ● Melamine contamination of a large number of commercially manufactured diets in North America in 2007. No pet foods were affected outside North America



Diet claim	Available evidence
Assured safety <i>continued</i>	<ul style="list-style-type: none"> ■ Compared with other diet types (e.g. raw diets or home-prepared cooked diets), pathogenic infection and nutritional imbalances are far less frequent, especially when considering the number of pets fed this type of diet annually ■ It is estimated that 95% of dog owners and 98% of cat owners are thought to feed their pet a commercially manufactured diet as part of or as the whole diet
Advantages of the different diet types	<ul style="list-style-type: none"> ■ Dry kibble: <ul style="list-style-type: none"> ● Cost-effective ● Proportionally less packaging quantity needed <ul style="list-style-type: none"> - More environmentally friendly than wet products ● Can be produced in large volumes rapidly ● Distribution can be quick and effective, so foods are conveniently available ● Suitable for pets who prefer to have food constantly available, as it spoils less rapidly than fresh or wet foods ■ Wet products: <ul style="list-style-type: none"> ● Increased palatability due to high moisture content. This can be advantageous for picky eaters, but some pets may have a preference for other diet types (e.g. dry) ● Higher moisture intake, which is advantageous for: <ul style="list-style-type: none"> - Cats in their senior years - Pets with specific diseases requiring increased water intake (e.g. kidney disease or lower urinary tract disease) ● Often sold in single-serving packages, so food waste is low and fresh food can be given at each meal, promoting consistent palatability. However, this produces more packaging waste ● Cat owners have been found to prefer to provide mixed food to their cats, with 50% of cats now thought to be fed some wet and some dry foods daily ■ Uncooked: <ul style="list-style-type: none"> ● Commercially manufactured uncooked products have some advantages over home-prepared raw diets or home-prepared cooked diets, as they undergo freezing or freeze-drying, which decreases the <i>Campylobacter</i> colony count. However, this process will not completely eradicate <i>Campylobacter</i> or other pathogens, some of which are unaffected by freezing. The freezing of uncooked pet foods does not guarantee food safety, as is commonly thought ● High-pressure pasteurization is also used to reduce pathogenic risk; however, further research is required to determine its efficacy ● For further information, see 'Raw diets'
Low preparation time	<ul style="list-style-type: none"> ■ No need for significant preparation of food ■ No cooking required
Good digestibility	<ul style="list-style-type: none"> ■ All commercially manufactured diets should meet the minimum levels for digestibility. This can be tested during feeding trials ■ Wet products are typically highly digestible, whilst dry foods are typically less digestible
Product consistency	<ul style="list-style-type: none"> ■ Recipes for commercially manufactured diets should be created by professional formulators trained in the commercial formulation of pet foods. Ideally, the formulation should have been developed in consultation with an appropriately qualified individual <ul style="list-style-type: none"> ● Appropriate qualifications include: <ul style="list-style-type: none"> - PhD in animal nutrition - Diplomate of the American College of Veterinary Nutrition (ACVN) - Diplomate of the European College of Veterinary Comparative Nutrition (ECVCN) ● Many of the larger pet food manufacturers employ such individuals full time ■ Some formulations are fixed formula recipes, whereby manufacturers guarantee product consistency, so there is no variation between batches ■ Others use variable formula (or open formula) diets, which are less expensive since raw materials can be varied based on cost and availability: <ul style="list-style-type: none"> ● Constituents of the diet may change from batch to batch, reflecting variations in the cost and availability of ingredients to the producer ● Although uncommon, variations in ingredients can have negative effects on pets who are less tolerant of dietary changes, potentially resulting in digestive disturbances ■ Information on the type of formula used should be easily obtained from the manufacturer or the pet food label



Diet claim	Available evidence
Good pet satisfaction	<ul style="list-style-type: none"> ■ Satisfaction with the diet is guaranteed by many commercially manufactured diet producers, through: <ul style="list-style-type: none"> ● Product consistency ● High palatability
Conveniently purchased and stored	<ul style="list-style-type: none"> ■ Commercially manufactured diets can be purchased readily from various outlets (including pet shops and supermarkets) and online ■ Commercially manufactured diets are packaged to protect the food from damage wherever possible and to ensure ease of storage in your home
Variety	<ul style="list-style-type: none"> ■ A wide variety of types are available ■ A wide variety of flavours are available ■ This is so you can easily choose a flavour or type your pet prefers
Cost-effective	<ul style="list-style-type: none"> ■ When compared with all other diet types (including raw diets and home-prepared cooked diets), commercially manufactured diets in a dry form are the most cost-effective ■ Wet-diet types are often more expensive than dry-diet types, but are still significantly cheaper than a home-prepared cooked diet (by 4 to 30 times, depending on the diet types used for comparison). For further information, see 'Home-prepared cooked diets'

What are the disadvantages of feeding a commercially manufactured diet?

Disadvantage claim	Available evidence
The high calorie content of dry food is to blame for pet obesity	<ul style="list-style-type: none"> ■ Dry commercially manufactured diets usually have a greater energy content on a gram-for-gram basis than wet diets, which increases the risk of overconsumption if portions are not accurately measured out ■ An association between feeding dry food and overweight status has been identified in two studies in cats, although other studies have shown no association ■ Associations between overweight status and both free-choice feeding and leaving food out all day have also been reported ■ Dry food should therefore be portioned out using digital scales and fed according to the manufacturer's feeding guidelines. Caution should be exercised when leaving dry food out in case this leads to overfeeding. Your pet should also be weighed and assessed for body condition score regularly throughout life; although this would apply for any diet type
Processed foods are bad for humans, so must be bad for pets too Ultra-processed foods are harmful	<ul style="list-style-type: none"> ■ There is some emerging evidence that ultra-processed foods might have detrimental effects on human health, including associations with cancer and obesity, but further work is required to determine the reasons for such associations. Commercially manufactured pet foods are not equivalent to ultra-processed foods in humans because they are designed to be complete and balanced to meet maintenance energy requirements
Processed foods are 'unnatural' – dogs and cats should eat only 'natural' foods	<ul style="list-style-type: none"> ■ Guidance for the term 'natural' is that it must be obtained exclusively (or at least 95%) from the source material (e.g. of vegetable or animal origin). This is not an official or regulated definition ■ Therefore, depending on the ingredients used, commercially manufactured diets can also be defined as 'natural' according to the above definition
Commercially manufactured diets cause adverse behaviours (e.g. jumping up, digging, chewing and hyperactivity)	<ul style="list-style-type: none"> ■ There is no evidence for these claims
Commercially manufactured diets are often recalled as they contain 'toxic' ingredients	<ul style="list-style-type: none"> ■ Although a handful of products each year will be recalled (as with many human food products), the threat of imbalance or deficiency is significantly less when compared with either home-prepared cooked or raw diets ■ Truly toxic components in pet foods have been found in only extremely rare cases (see above)
Commercially manufactured diets are sold using clever marketing and cannot be trusted	<ul style="list-style-type: none"> ■ Although marketing terms are allowed, these are regulated and limited so as not to mislead pet owners



Disadvantage claim	Available evidence
Additives and preservatives in commercially manufactured diets are bad	<ul style="list-style-type: none"> ■ The additives and preservatives used to preserve pet foods, as with all other ingredients, are under the strict control of the European Commission (EC). Each one has been thoroughly tested for safety and is continually monitored. Now that the UK has left the European Union, new standards are being set in accordance with the EC ■ The presence of preservatives adds to the convenience of a reasonable shelf life (i.e. for a number of months or beyond). Without preservatives this would not be possible ■ Additives also include vitamins and minerals, which make these diets complete and balanced
Dogs and cats cannot digest the carbohydrate content of commercially manufactured diets	<ul style="list-style-type: none"> ■ There is no evidence for this ■ Both cats and dogs can effectively utilize carbohydrates in their diet ■ In addition, raw materials that deliver carbohydrates are a source of many essential nutrients to pets. Materials rich in carbohydrates can also be useful sources of proteins, essential fatty acids, vitamins, minerals and fibre
Commercially manufactured diets cause cancer	<ul style="list-style-type: none"> ■ There is no scientific evidence to support this claim
Commercially manufactured diets have increased the incidence of dental disease	<ul style="list-style-type: none"> ■ To date, there is no scientific evidence to support this claim ■ Further, the regular mechanical cleaning of your pet's teeth with a brush and appropriate pet toothpaste is the best way to maintain good dental health
The cooking process of commercially manufactured diets destroys the nutrients in the ingredients, causing deficiencies	<ul style="list-style-type: none"> ■ Whilst some ingredients can be destroyed by cooking, the bioavailability of other ingredients can be increased ■ Although some damage may occur during cooking, especially to proteins, the manufacturing process means that any deficiency is accounted for and adjustments are made so a complete and balanced diet is still delivered
Wet food should not be left out for pets who prefer to feed <i>ad libitum</i>	<ul style="list-style-type: none"> ■ Due to its high moisture content, wet food should not be left available to your pet for more than 30 minutes, as it will start to spoil
The cost of wet food is higher	<ul style="list-style-type: none"> ■ Feeding dry commercially manufactured diets is the most economical, whilst feeding wet products alone is considerably more expensive and might be prohibitive for some owners (e.g. those with large or giant breeds). That said, the cost of feeding a commercially available wet food is usually less than that associated with feeding a home-prepared cooked diet or raw diet
Problems with sticking to instructions (compliance)	<ul style="list-style-type: none"> ■ As with any diet, compliance will vary ■ As commercially manufactured diets should be correctly balanced, there is reduced concern regarding nutrient deficiency or excess if the guidelines are poorly complied with ■ Problems may arise if a commercially manufactured diet is fed in excess (may contribute to pet obesity) ■ Adherence to the manufacturer's feeding guidelines is therefore recommended to prevent under- or overfeeding. However, it should be remembered that there will be considerable variation in the number of calories required by each individual pet ■ Food should also be correctly portioned out each day using digital scales ■ Treats and snacks will unbalance the diet and add calories, which are not accounted for in the recommended amount to feed on the label

Can commercially manufactured diets provide balanced nutrition?

Yes, provided that:

- The recipe has been designed, overseen or approved by an appropriately qualified person. Commercial manufacturers should be able to provide, on request, information on who has designed, overseen or approved the diet's formulation
- Nutritional adequacy has been confirmed, ideally through feeding trial or laboratory analysis
- Extra foods or treats are not given in amounts that unbalance the diet.

What safety measures are there for feeding commercially manufactured diets?

Hygiene

Basic hygiene is essential for the safe feeding of any diet and the following should be routine to decrease the risk of bacterial contamination:



- Containers and packaging should be inspected for any damage or contamination that may affect the food
- Any product with damaged packaging should not be purchased or should be discarded
- Basic hand washing after handling pet food and bowls should be observed
- Hand hygiene and regular cleaning of preparation areas and bowls should always be observed.

Considerations for feeding commercially manufactured diets in healthy dogs and cats

Commercially manufactured diets are complete and balanced and, provided that the correct amount is fed, can be a healthy option for dogs and cats.

Considerations for feeding commercially manufactured diets in dogs and cats with various diseases

Many different diseases have specific nutritional requirements and there are therapeutic diets available to manage such diseases and their specific requirements. Optimal nutrition during a disease state may be pivotal to the survival of the individual. For example:

- Kidney disease:
 - Kidney disease requires a diet low in phosphorus. Phosphorus restriction has been proven to prolong life for such patients
- Obesity:
 - Commercially manufactured diets specifically designed for weight loss are widely available. The best of these diets restrict the number of calories delivered by the food without compromising nutrition. They are also frequently formulated to keep your pet satisfied during the weight-loss process. Diets higher in protein and fibre have been shown to be the most effective. To formulate a home-prepared cooked diet or a raw diet that fulfils the same criteria is extremely challenging, and should not be attempted by anyone other than an appropriately qualified individual
 - 'Light diets' have a marginal calorie restriction compared with a standard maintenance diet. They often contain slightly greater amounts of dietary fibre. These diets are suitable for those predisposed to weight gain. They are also a suitable choice for any pet whose activity level is decreased. It is not advisable to use these diets for any pet that is $\geq 10\%$ above their ideal weight
- Adverse reactions to food:
 - For cases where an adverse food reaction is suspected, hydrolysed diets or novel protein diets can be used to perform either an elimination feeding trial or for long-term management of clinical signs, whether dermatological or gastrointestinal.

Conclusion

Feeding commercially manufactured diets has become increasingly popular in recent years. Therefore, it is important that you consider all the pros and cons when making decisions about what to feed your pet, no matter the diet type. Decisions will be made 'on balance' for your individual pet. Provided assurance of nutritional adequacy is confirmed, commercially manufactured diets can be fed safely. However, care should be taken, particularly with dry food, to ensure that it is not fed to excess. If you are in any doubt, please seek advice from your veterinary practice.

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