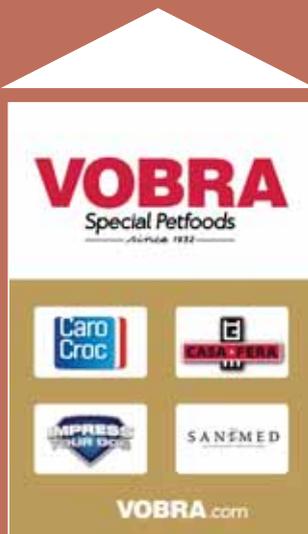




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# Fat Content in Dog Food

*Light foods often make a low-fat claim. A few veterinary diets are described as low in fat. Evaluation of those foods requires a look past the low-fat claim and determining how much dietary fat the product actually contains. The US National Academies recommend that adult dogs consume 12% of their daily calories from fat. This is equivalent to 5% crude fat in a complete, dry dog food. Foods labeled low-fat normally contain more than 12 energy% fat.*

*The analysis panel of dog food declares the (minimum) content of crude fat. Crude fat refers to the components extracted from the food with a liquid that dissolves lipids, a wide variety of substances that share their relative insolubility in water. Due to their fatty acid composition, certain fats, called oils, are liquid at room temperature, whereas others are solid. The essential fatty acids (linoleic and alpha-linolenic acid) are synthesized by plants, but not by animal tissues and must be supplied in the dog's diet.*

*Crude-fat content of regular dry dog food ranges from 8 to 18% by weight, or 20 to 45% by calories. Quite some canned foods, deep-frozen foods and freeze-dried foods comprise more than 45% of calories from fat. Such high dietary fat levels may contribute to the development of obesity. In young and adult dogs, free access to a high-fat diet leads to additional body-weight gain and body-fat content.*

*Apart from obesity, experimental, unrestricted high-fat feeding of dogs has also been found to induce inflammation of the pancreas, high blood pressure and abnormal heart function. The laboratory studies are complemented by observations in pet dogs, indicating that obesity increases the risk of pancreatitis and hypertension. It is prudent to adjust portion size to dog weight and avoid foods with more than 40 energy% fat.*

## Dietary fat

The recommended fat allowance for adult dogs is 3.3 g/MJ of metabolizable energy (1), which is equivalent to 12.2 energy% or 5 weight% of fat in dry food (1.5 MJ/100 g). Commercial dog foods are rich in fat and differ considerably. The fat ranges are as follows: dry, extruded foods, 20-45 energy%; canned foods, 35-65%; deep-frozen foods, 50-70%; freeze-dried foods, 35-75%. More energy from fat implies less from carbohydrates and/or protein.

High-fat content in kibbles, applied topically or internally, might pursue



enhanced palatability (2). In three-way choice tests with dry or wet foods, dogs preferred the fattiest products (3). When offered wet foods with macronutrient ratios of 22:22:56, 45:53:2 and 22:71:7 (protein:fat:carbohydrate ratio by percentages of dietary calories), the dogs selected a ratio of 30:63:7. Another reason for high-fat is positioning of a low-carbohydrate nutritional profile (4-6).

## Body fat

Puppies aged two months were fed one of three diets in which corn starch was isoenergetically exchanged with lard (7). The wet, semipurified diets were offered ad libitum. After 8 months, the high-fat diets

(20:38:42, 25:55:20) had increased body-weight gain by 23 and 30%, and body-fat content by 65 and 86%, when compared with the low-fat diet (25:13:62).

Free access, for 25 weeks, to a wet, high-fat food (20:51:29), in place of a lower-fat food (18:23:59), produced a two-fold increase in weight gain and fat accretion in adult dogs (8). The foods contained isoenergetic amounts of either tallow or corn starch. Fattening on free-choice high-fat diets is explained by efficient incorporation of dietary fatty acids into adipose tissue and higher caloric intake.

## Pancreatitis

A high-fat, protein-deficient diet induced pancreatitis in dogs (9). The diet had an energetic macronutrient ratio of 5:79:16 and included lean meat, lard, sucrose, vitamins A and D, B vitamins, bone ash, salts and cellulose. After 35 days, 11 out of the 13 dogs displayed macroscopic and microscopic abnormalities of the pancreas, pointing at pancreatitis.

In dogs fed one of four test diets for six weeks, pancreatitis was induced by infusion of bile and trypsin through the major pancreatic duct (10). All six dogs fed the high-fat diet (21:62:17) showed a severe clinical response and pancreatic lesions. Such a pronounced impact was not seen in the other diet groups (26:21:53, 87:6:7, 8:7:85).

## Fat-fed dog model

The high-fat diets that elicited pancreatitis also caused weight gain (9, 10). High-fat diet models of canine obesity are associated with hypertension (11-13), aberrant heart function (14, 15) and mild type 2 diabetes (16, 17). Typically, the dog models were fed ad libitum on commercial diets mixed with high amounts of tallow or lard.

It is clear that experimentally induced canine obesity results in disorders, but it is unclear whether the causative factor is



the high-fat diet or the excess body fat. Epidemiological studies in pet dogs found that overweight is statistically correlated to pancreatitis (18, 19) and hypertension (20, 21), suggesting that body fat is an etiological factor.

## Veterinary diets

Therapeutic low-fat diets contain 12 to 19 energy% fat and address exocrine pancreatic insufficiency, pancreatitis, hypertriglyceridemia and lymphangiectasia. Diet efficacy is plausible, but not backed by controlled clinical trials with fat intake as variable. There is experimental support for fat restriction in pancreatitis (9, 10) and hypertriglyceridemia (22, 23), but not in exocrine pancreatic efficiency (24). Veterinary weight reduction diets, which are marketed as low in calories, have about 13 to 28 energy% fat.

List of references is available on request from the author (beynen@freeler.nl)

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