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CLA in dog food

CLA (conjugated linoleic acid) stands for derivatives of linoleic acid with narrower arrangement of unsaturation, hence the adjective conjugated. The dog's body contains a tiny amount of CLA that is derived from food and gut bacterial production. CLA is a featured ingredient in a few commercial dog foods. The eye-catcher is added as synthetic substance, generally made from sunflower or safflower oil, or as natural constituent of kangaroo cuts. CLA-enhanced foods claim to aid body-weight management, promote muscle mass and lower body fat.

High amounts of manufactured CLA can be considered safe for dogs, including those accidentally chewing into the owner's bottle with CLA pills. One form of CLA, the so-called trans-10, cis-12 isomer, has been identified as the active principle that modifies body composition. Dog foods with CLA claim do not declare the content of active CLA. A rough approximation indicates that kangaroo-based and CLA-supplemented foods may contain 10- and 100-fold more active CLA than regular, dry dog foods.

Dry foods with 100-fold enrichment in active CLA have been shown to suppress percentage body fat in dogs with free or time-limited access to food. Simultaneously, muscle mass was favored as the percentages of body fat and non-fat (lean mass) are complementary. The relationship between the quantity of active CLA and body-fat response is unknown. Nevertheless, it is safe to say that dosage through foods containing kangaroo is ineffective.

The observed effect of high intake of synthetic CLA on body composition is rather small and would, according to its predicted impact on longevity, only slightly benefit dogs. Against this background, one should keep in mind that portion-controlled feeding of any adequate food can potentially regulate dog's body condition.

Metabolism

Regular dog foods contain absorbable CLA. Oral administration of synthetic CLA raised plasma CLA concentrations in dogs (1, 2). Canine CLA metabolism is ill-defined, but data from other species might apply. It is conceivable that CLA-producing bacteria in the dog's intestine (3) convert ingested linoleic acid into available CLA (4). Possibly, the dog synthesizes CLAs from C 18:1 trans fatty acids of dietary origin (5, 6).

In dogs fed regular diets, analysed plasma CLA concentrations differed considerably, within and between studies (1, 2). CLA undergoes beta-oxidation, desaturation and elongation since the pathways' metabolites were found in dog blood plasma, and heightened by supplemental CLA (1). Incubated liver slices (7) and isolated hepatocytes from rats (8) readily oxidized CLA to carbon dioxide and ketone bodies.

Dietary CLA

Animal ingredients in dog food furnish CLA. Vegetable oils are devoid of detectable CLA (9), but their linoleic acid constituent is hydrogenated by anaerobic bacteria in the rumen and/or gastrointestinal tract of animals, leading to CLA isomers. Upon absorption, the CLAs are oxidized or incorporated into body lipids. Total fatty acids in beef and lamb meat contain 0.2 to 1% c9,t11 CLA (10), while the c9,t11:t10,c12 ratio is more than 10 (11-13). Synthetic CLA preparations differ, but may contain 60 to 80% CLA, consisting of equal amounts of the c9,t11 and t10,c12 isomers.

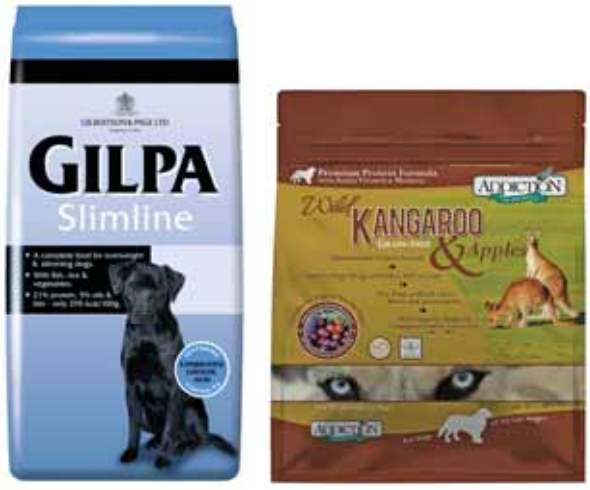
Data on CLA analyses in dog food are unavailable. Content estimates can be made for dry foods containing 30% animal meal having 10% crude fat. The amount of t10,c12 CLA (g/100 g fatty acids) is about 0.03% for meals from beef, lamb, pork and poultry, and perhaps 10-fold greater for kangaroo meal (11-19). The respective petfoods would then comprise about 10 and 100 mg t10,c12 CLA /kg. Two commercial dry foods with synthetic CLA could have 384 and 1400 mg t10c12 CLA/kg.

Safety

Two commercial CLA preparations were tested in dogs for periods of 6 or 11 months (20-22). Health indicators remained unchanged on dry diets containing up to 3.6 g CLA (50% c9,t11 and 10,c12) per kg.

Mouse model

Body fat in mice is relatively sensitive to dietary CLA (23), which causes considerable losses of body fat and heat (24, 25). The t10,c12 rather than the c9,t11 isomer is effective in mice (26, 27), but the underlying mechanism is not forthright (28).



Body fat

In five studies (29-33), dogs had free or time-limited access to food without or with added synthetic CLA. The supplement generally reduced fat deposition. Three articles (29, 32, 33) reported both CLA intake and percentage body fat. Test foods contained about 1400 mg t10,c12 CLA/kg. Baseline body weight was 15 kg. On average, the control and test dogs gained 1.2 and 0.5 kg body weight, and 4.4 and 1.3 %units body fat. The CLA effect, 3.1 %units less body-fat accretion, corresponds with a 0.6-point decrease on a 1 to 9 body-condition scale, which would extend longevity by a few months (34).

In a weight-loss study, supplemental CLA (5300 mg total CLA/kg dry food) induced additional body-fat loss in dogs on a low-protein diet, but not when on a high-protein diet (35, 36). A supplement combination, including CLA, tended to stimulate fat loss in dieting dogs (37).

Miscellaneous

CLA fed to dogs left apparent macronutrient digestibility unchanged (30, 38, 39), non-systematically affected serum cholesterol and triglycerides (33, 40, 41) and increased lymphocyte proliferation (41). T10,c12 CLA had seemingly beneficial effects on isolated canine leukocytes (42-44) and mammary cells (45). Body fat in cats was unaffected by feeding a high-protein, dry diet with 2000 mg t10,t12 CLA/kg (46).

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

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