Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2496123 C 2011/04/05

(11)(21) 2 496 123

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(86) Date de dépôt PCT/PCT Filing Date: 2002/09/25
(87) Date publication PCT/PCT Publication Date: 2004/04/08
(45) Date de délivrance/Issue Date: 2011/04/05
(85) Entrée phase nationale/National Entry: 2005/02/16
(86) N° demande PCT/PCT Application No.: JP 2002/009862
(87) N° publication PCT/PCT Publication No.: 2004/028273

(51) Cl.Int./Int.Cl. *A23K 1/16* (2006.01), *A23K 1/18* (2006.01), *C11C 3/00* (2006.01)

(72) Inventeurs/Inventors:
SUZUKI, YOHICHI, JP;
OTSUJI, KAZUYA, JP

(73) Propriétaire/Owner:
KAO CORPORATION, JP

(74) Agent: SMART & BIGGAR

(54) Titre : ALIMENT POUR ANIMAUX DOMESTIQUES
(54) Title: PET FOOD OR FEED

(57) Abrégé/Abstract:
Provided is a pet food or feed which contains an oil or fat composition having the following components (A) and (B): (A) 10 wt.% or more of diglycerides which contain, as constituent fatty acids, 50 wt.% or more of unsaturated C_{14-24} fatty acids and 40 wt.% or less of unsaturated fatty acids having at least 20 carbon atoms and at least 4 carbon-carbon double bonds; and (B) 20 wt.% or less of free fatty acids, wherein a weight ratio of the diglycerides to monoglycerides satisfies the following equation: diglycerides/monoglycerides ≥ 1. The pet food or feed according to the present invention is reduced in an offensive odor derived from animal proteins, particularly meats, and therefore, does not make pet owners or neighbors feel uncomfortable. It can be prepared without a cumbersome step, only by substituting the part or whole of its oil or fat for a specific oil or fat composition of the present invention.

77890-3

ABSTRACT

Provided is a pet food or feed which contains an oil or fat composition having the following components (A) and (B):

(A) 10 wt.% or more of diglycerides which contain, as constituent fatty acids, 50 wt.% or more of unsaturated C_{14-24} fatty acids and 40 wt.% or less of unsaturated fatty acids having at least 20 carbon atoms and at least 4 carbon-carbon double bonds; and

(B) 20 wt.% or less of free fatty acids, wherein a weight ratio of the diglycerides to monoglycerides satisfies the following equation:

diglycerides/monoglycerides $\geq$ 1.

The pet food or feed according to the present invention is reduced in an offensive odor derived from animal proteins, particularly meats, and therefore, does not make pet owners or neighbors feel uncomfortable. It can be prepared without a cumbersome step, only by substituting the part or whole of its oil or fat for a specific oil or fat composition of the present invention.

Description

PET FOOD OR FEED

Field of the Invention

The present invention relates to a pet food or feed reduced in an odor attributed to animal proteins, particularly to meats.

Background of the Invention

A pet food market is growing owing to the recent pet boom, but various problems are also increasing, on the other hand. Due to changes in housing conditions or life style, the number of pet owners are increasing in both respects of their pets being fed indoors and outsides. Under such situations, the offensive odor emitted from remains of a pet food brings uncomfortable feeling not only to pet owners but also to neighbors and the number of such a problem is on the rise.

With regards to a feed, heightening of its protein content and calorie has been promoted in order to raise its nutritional efficiency. This accelerates emission of an offensive odor originating from proteins, particularly animal proteins. Moreover, the greater the breeding scale

or breeding density, the more serious the problem of an offensive odor becomes for neighbors.

A number of deodorants or aromatics for eliminating the odor due to pets such as dogs and cats are now put on the market. Cat litters and litter boxes imparted with a deodorizing function were developed to mask the foul odor of feces and urine. Japanese Patent Application Laid-Open No. 74455/1988 proposed a cat food free of unsaturated fatty acids which are causative of the odor of feces while having cyclodextrin incorporated therein. Although this cat food is capable of controlling the rancid odor emitted from fish oil and the odor of feces, there are problems such as high cost and insufficient effects. Also proposed (in Japanese Patent Application Laid-Open No. 284865/1994) is a pet food having cranberry incorporated therein to mask the odor of feces and urine. However, this pet food has a drawback that cranberry therein emits an odor. Meanwhile, there remains no proposal to overcome the problem of an offensive odor emitted from the remains of a pet food in a feeding station. This problem is common not only to pets but also to livestock.

On the other hand, spraying of a commercially available deodorant or aromatic directly to a pet food or

feed is not preferred from the viewpoint of safety.

A pet food or feed is composed mainly of meats, grains, oils and fats, and water.

Meats to be used as a raw material are beef, pork, fish meat, chicken, mutton and lamb and the like. In practice, scraps of these meats, meat-and-bone meal and organs are incorporated in a pet food or feed in the form of meat meal or fish meal. As grains, soybean, wheat, rice and corn have been used, while as oils and fats, either animal ones or vegetable ones have been used.

Pet food or feed is usually produced by grinding, kneading and extrusion of such raw materials and provided in the kibble shapes. It is also provided as a bar of jerky or a biscuit, or sometimes as dry powder. Heat treatment is necessary for the production of these products, and the production of canned food still requires heat treatment after the process of filling the cans.

The foul odor of a pet food or feed is presumed to come from animal proteins, particularly meats, or degraded substances thereof. A preparation process of a pet food or feed includes a heating step, which is conducted for the purpose of sterilization and improvement in shelf life. Upon heating, sulfur-containing compounds (such as

thiazines or thiolanes) or nitrogen containing compounds (such as amines, pyrroles or piazines), each a degraded product of animal proteins, are generated from the meat. These sulfur-containing or nitrogen-containing compounds cause much discomfort, so they are presumed to cause an offensive odor of a pet food or feed.

The addition of an enzyme or citric acid thereto was proposed as a method for deodorizing meats in the processing of livestock meats or fishery products (Japanese Patent Applications Laid-Open Nos. 44066/1979, 44067/1979, 9468/1985 and 15367/1991). However, it is not suited for pet food or feed production because such addition increases the cost and makes the preparation step cumbersome, while addition of citric acid reinforces an acid taste, thereby deteriorating palatability. The followings are known techniques relating to addition of monoglyceride and diglyceride to pet food and feed.

It is revealed that addition of a medium chain fatty acid diglyceride to a feed is effective for prevention or treatment of protozoan diseases (US 5462967 or EP 0519458B), but its effects against an offensive odor are not sufficient. In Japanese Patent Applications Laid-Open Nos. 174342/1989, and 2537/1989, it is described that

monoglycerides and diglycerides derived from higher unsaturated fatty acids such as docosahexaenoic acid (DHA) or eicosapentaenoic acid (EPA) bring about effects for promoting fish appetite or attracting fish. Monoglycerides or diglycerides themselves contain DHA or EPA much, so it is difficult to say that they have sufficient effects against an offensive odor when used on land in forms of pet food and feed. U.S Patent No. 4228195 proposed a preparation process of a pet food by using fatty acid monoglycerides including succinylated monoglyceride, but it does not refer to an odor.

SUMMARY OF THE INVENTION

The present invention provides a pet food or feed reduced in an offensive odor attributed to animal proteins, particularly meats, without a cumbersome step.

The present inventor has found that an oil or fat containing a specific diglyceride markedly reduces an offensive odor attributed to animal proteins, particularly meats.

The present invention thus provides a pet food or feed which contains an oil or fat composition having the following components (A) and (B):

(A) 10 wt.% or more of diglycerides which contain, as constituent fatty acids, 50 wt.% or more of unsaturated C_{14-24} fatty acids and 40 wt.% or less of unsaturated fatty acids having at least 20 carbon atoms and at least 4 carbon-carbon double bonds; and

(B) 20 wt.% or less of free fatty acids, wherein a weight ratio of the diglycerides to monoglycerides satisfies the following equation:

diglycerides/monoglycerides $\geq$ 1.

The present invention also provides an offensive odor controlling agent of a pet food or feed which contains the above-described oil or fat composition; and a method for ameliorating the offensive odor of a pet food or feed, which contains incorporating the above-described oil or fat composition in the pet food or feed.

The present invention also provides a pet food or feed which contains the following components (C) and (D):

(C) 0.2 to 60 wt.% of animal proteins containing myosin or actin; and

(D) 1 to 30 wt.% of an oil or fat composition composed of 10 wt.% or more of diglycerides which contain, as constituent fatty acids, 50 wt.% or more of unsaturated C_{14-24} fatty acids and 40 wt.% or less of unsaturated fatty

acids having at least 20 carbon atoms and at least 4 carbon-carbon double bonds, and 20 wt.% or less of free fatty acids, wherein a weight ratio of the diglycerides to monoglycerides satisfies the following equation:

diglycerides/monoglycerides ≥ 1.

The pet food or feed according to the present invention is reduced in an offensive odor attributed to animal proteins, particularly meats, and therefore, does not cause discomfort. It can be prepared without any cumbersome step, only by replacing a part or the whole of the oil or fat component of the pet food and feed of the present invention with a specific oil or fat composition of the present invention.

It is known that diglycerides tend not to accumulate as a body fat (US 6004611). A pet food or feed having some or all of its oil/fat content replaced with diglycerides can be expected to have such an effect.

77890-3

In one aspect, the invention relates to a pet food or feed, which comprises: 0.2 to 60 wt.% of an animal protein comprising myosin or actin; and 1 to 30 wt.% of an oil or fat composition comprising 10 wt.% or more (based on the oil or fat composition) of a diglyceride which comprises as constituent fatty acids, 50 wt.% or more of an unsaturated C_{14-24} fatty acid and 40 wt.% or less of an unsaturated fatty acid having at least 20 carbon atoms and at least 4 carbon-carbon double bonds, 20 wt.% or less (based on the oil or fat composition) of a free fatty acid, and a monoglyceride, wherein a weight ratio of the diglyceride to the monoglyceride is ≥ 1.

In a further aspect, the invention relates to a pet food or feed, which comprises: 0.2 to 60 wt.% of animal proteins containing myosin and actin; 1 to 30 wt.% of an oil or fat composition composed of: (i) 15 to 99 wt.% of diglycerides whose constituent fatty acids are composed of: 50 to 99 wt.% of unsaturated C_{14-24} fatty acids and having 1, 2 or 3 carbon-carbon double bonds; 0 to 10 wt.% of unsaturated C_{20-24} fatty acids having at least 4 carbon-carbon double bonds; and the remainder of C_{14-24} saturated fatty acids; (ii) 0 to 20 wt.% of free fatty acids; (iii) monoglycerides; and (iv) triglycerides which contain, as constituent fatty acids, saturated or unsaturated C_{14-24} fatty acids; optionally, 0.1 to 30% by weight of phytosterol; and at least one other ingredient selected from the group consisting of vegetable proteins, grains, brans, starch cakes, saccharides, vegetables, vitamins and minerals, wherein the diglycerides and the monoglycerides are contained at a diglyceride/monoglyceride weight ratio of at least 1.

77890-3

DETAILED DESCRIPTION OF THE INVENTION

In the present invention, the term "pet food" means pet food for pets such as dogs and cats, whereas the term "feed" means feed for animals such as pigs, poultry and fish.

The oil or fat composition to be used in the pet food or feed of the present invention contains 10 wt.% (which will hereinafter be described "%", simply) or more, preferably 15 to 99%, more preferably 30 to 99%, even more preferably 50 to 95%, still more preferably 60 to 95% of diglycerides in order to suppress an offensive odor derived particularly from meats. As constituent fatty acids, the diglycerides contain 50% or more, preferably 70 to 99%, more preferably 80 to 98% of unsaturated C_{14-24} fatty acids. Such diglycerides have marked effects for suppressing an offensive odor, are readily available and is easy in handling. The amount of constituent fatty acids having less than 14 carbon atoms is preferably 0.5% or less in consideration of effects and palatability. Incorporation of 15 to 90% of α-linolenic acid is preferred for exhibition of physiological effects of ω3 fatty acids. The diglycerides preferably contain, as constituent fatty acids, 40% or less, preferably 20% or less, more preferably 10% or less, more preferably 0 to 5%, even more preferably 0 to 2% of unsaturated fatty acids which have at least 20 carbon atoms and have at least 4 carbon-carbon double bonds such as EPA, DHA or arachidonic acid, from the viewpoints of oxidation stability and odor

control. The remaining constituent fatty acids of the diglycerides are preferably saturated C_{14-24} fatty acids.

In consideration of palatability, a weight ratio of diglycerides to monoglycerides contained in the oil or fat composition satisfies the following equation: diglycerides (DG)/monoglycerides (MG) ≥ 1, preferably DG/MG = 2 to 1000, more preferably DG/MG = 10 to 500, especially DG/MG = 40 to 300.

The diglycerides as described above can be obtained, for example, by ester exchange reaction of glycerin with an oil or fat selected from oils or fats having, as constituent fatty acids, unsaturated C_{14-24} fatty acids (ex. safflower oil, olive oil, cotton seed oil, corn oil, rapeseed oil, soybean oil, palm oil, sunflower oil, linseed oil, sesame oil; lard, tallow, fish oil or milk fat, or fractionated, randomized, hydrogenated or ester exchanged oil thereof) in the presence of a hydroxide of an alkali metal or an alkaline earth metal; or by esterifying reaction of glycerin with a fatty acid mixture having a high content of unsaturated fatty acids derived from the above-described oils or fats. The above-described oils or fats may be used in combination. Excess monoglycerides formed by the reaction can be removed by

separating means such as molecular distillation or chromatography. Although these reactions may be conducted by the chemical reaction using an alkali catalyst as described above, reaction effected under mild conditions through an enzyme such as 1-, 3-position-selective lipase or the like is preferred for oxidation stability and preference.

The content of free fatty acids in the oil or fat composition to be used in the pet food or feed of the present invention is 20% or less, preferably 10% or less, more preferably 5% or less, even more preferably 2% or less, still more preferably 1% or less in consideration of its tendency to emit an offensive odor from the oil or fat composition and palatability.

As another component in the oil or fat composition, triglycerides (TG) can be mentioned. Examples of them include animal and vegetable oils or fats. Triglycerides preferably have, as constituent fatty acids, saturated or unsaturated C_{14-24} fatty acids. It is more preferred that they contain 50 to 100%, preferably 70 to 100%, more preferably 80 to 100% of unsaturated C_{14-24} fatty acids.

Addition of an antioxidant to the oil or fat composition is preferred. Examples of the antioxidant

include tocopherol, vitamin C, vitamin C fatty acid esters, phospholipids, polyphenols, BHT, BHA, TBHQ, and natural antioxidant components. To 100 parts by weight of the oil or fat composition, the antioxidant is added preferably in an amount of 0.01 to 0.5 part by weight, more preferably 0.02 to 0.3 part by weight.

The pet food or feed of the present invention is prepared by mixing the oil or fat composition (Component (D)) and an animal protein containing myosin or actin (Component (C)).

The animal protein containing myosin or actin, defined as Component (C) of the pet food or feed of the present invention, is a protein contained in livestock meats such as beef, pork, chicken, mutton and lamb, and fish meat, and serves as an essential component for the growth of pets or poultry. Example of the meat containing animal protein include livestock or animal meats such as beef, pork, mutton, lamb, rabbit meat, and kangaroo meat and byproducts or processed products thereof; meats of birds such as chicken, turkey, quail and ostrich, and byproducts or processed products thereof; products obtained by rendering the above-exemplified raw meats such as meat balls, meat bone meals and chicken meals; and fish

meats such as bluefin tuna, bonito, Japanese horse mackerel, sardine, common scallop, turban shell and fish meal. The pet food or feed contains 0.2 to 60%, preferably 1 to 30%, of Component (C).

The protein as defined herein is that determined from a nitrogen content by the Kjeldahl nitrogen determination method (5.5 to 6.4, the Standard Tables of Food Composition in Japan), whereas the animal protein is found from the amount of myosin or actin quantified by densitometry based on comparison with a sample of known concentration by SDS-electrophoresis (SDS-PAGE). Animal proteins in meats contain 25 to 35% of myosin and 12 to 13% of actin. The pet food or feed of the present invention contains 0.05 to 21.0% of myosin and 0.02 to 7.8% of actin.

The pet food or feed of the present invention contains 0.2 to 60% of Component (C) and 1 to 30% of Component (D), preferably 1 to 30% of Component (C) and 1 to 20% of Component (D). Component (D) may be substituted for the part or whole of the existing oil content in the pet food or feed.

A weight ratio of the animal protein to the diglycerides in the pet food or feed of the present

invention preferably satisfies the following equation: animal proteins/diglycerides = 100/0.1 to 1/150, more preferably 100/1 to 1/30, even more preferably 10/1 to 1/4, when effects on and offensive odor suppressing nutritional balance are taken into consideration.

The pet food or feed of the present invention may further contain phytosterol. To the feed, addition of phytosterol in an amount of 0.1% or more, especially 0.5% or more is preferred from the standpoint of imparting better cholesterol lowering effects. The upper limit of the phytosterol content may fall within a range of 0.1 to 30%. Phytosterols usable here include free compounds such as α-sitosterol, β-sitosterol, stigmasterol, campesterol, α-sitostanol, β-sitostanol, stigmastanol, campestanol and cycloartenol, and esters thereof such as fatty acid esters, ferulic acid esters, and cinnamic acid esters.

The base of the pet food or feed of the present invention is prepared by mixing Components (C) and (D), phytosterol which is to be added as needed, and vegetable proteins, grains, brans, starch cakes, saccharides, vegetables, vitamins and minerals. Examples of the vegetable proteins include soybean protein, those of the grains include wheat, barley, rye, milo, and corn, those

of brans include rice bran and wheat bran, and those of the starch cakes include soybean cake. The total content of the vegetable proteins, grains, brans and starch cakes is preferably 5 to 95% of the pet food or feed. Examples of the saccharides include oligosaccharide, sugar, sucrose and molasses and their content is preferably 2 to 80%. As the vegetables, vegetable extracts are usable and the vegetable content is preferably 1 to 30%. Examples of the vitamins include A, B_1, B_2, D, E, niacin, pantothenic acid and carotene and their content is preferably 0.05 to 10%. Examples of the minerals include calcium, phosphorus, sodium, potassium and iron and their content is preferably 0.05 to 10%. In addition, the pet food or feed of the present invention may contain additives ordinarily employed such as gelling agent, shape retainer, pH regulator, seasoning, antiseptic and nutrition supplement. During preparation, heating while purging with an inert gas such as nitrogen or deaerating is effective and is therefore preferred for controlling oxidation of the oil or fat composition (D).

Examples

Example 1

An offensive odor controlling agent of the feed

according to the present invention having the following composition was prepared.

Oil or Fat Composition 1

By using Lipozyme IM (product of Novo Nordisk A/S), 650 parts by weight of rapeseed oil fatty acid and 107 parts by weight of glycerin were esterified at 40°C for 5 hours at 0.07 hPa, followed by the removal of the lipase by filtration. The resulting reaction mixture was then molecularly distilled at 235°C. The residue was washed with water and then deodorized at 235°C for 1 hour, whereby Oil or Fat Composition 1 was obtained.

Oil or Fat Composition 2

By using Lipozyme IM (product of Novo Nordisk A/S), 650 parts by weight of perilla oil fatty acid and 107 parts by weight of glycerin were esterified at 40°C for 6 hours at 0.07 hPa, followed by the removal of the lipase by filtration. The resulting reaction mixture was then molecularly distilled at 215°C. The residue was washed with water and then deodorized at 215°C for 2 hours, whereby Oil or Fat Composition 2 was obtained.

Oil or Fat Composition 3

By using Lipozyme IM (product of Novo Nordisk A/S), 650 parts by weight of rapeseed hydrogenated oil (IV=75)

and 107 parts by weight of glycerin were esterified at 50°C for 4 hours at 0.07 hPa, followed by the removal of the lipase by filtration. The resulting reaction mixture was then molecularly distilled at 235°C. The residue was washed with water and then deodorized at 235°C for 1 hour. The resulting product was mixed with purified rapeseed oil (product of Nisshin Oil Mills, Ltd.) at a weight ratio of 3:7, whereby Oil or Fat Composition 3 was obtained.

Oil or Fat Composition 4

Rapeseed oil (product of Nisshin Oil Mills, Ltd.) was designated as Oil or Fat 4 and used as a comparative product.

The glyceride composition and the diglyceride fatty acid composition of each of these oil or fat compositions were described below.

Table 1: Glyceride composition

(%)

Oil or fat composition	1	2	3	4
Triglycerides	13.5	17.0	74.4	98.5
Diglycerides	85.1	82.3	25.2	1.1
Monoglycerides	1.1	0.6	0.3	0.4
Free fatty acids	0.3	0.1	0.1	0.0

* Each oil was reacted with trimethylsilylation agent (a silylating agent TH, Kanto Chemical Co., Ltd.) and the resulting silylated oils were analyzed by use of GLC equipped with a capillary column (DBTM-1, product of J & W) and hydrogen flame ionization detector.

Table 2: Fatty acid composition of diglycerides and triglycerides

(%)

Oil or fat composition		1	2	3	4
Diglyce rides	C16:0	3.7	5.4	3.8	3.7
	C18:0	1.8	3.4	12.0	1.8
	C18:1	57.0	18.3	78.7	60.3
	C20:1	1.7	0.0	2.3	2.5
	C22:1	1.0	0.0	0.0	1.4
	C18:2 ω6	21.9	15.2	0.2	20.5
	C18:3 ω3	10.5	56.5	0.0	8.4
Trigly cerides	C16:0	6.2	5.5	3.9	3.7
	C18:0	2.6	3.4	1.8	1.8
	C18:1	57.1	18.5	51.7	58.8
	C20:1	1.7	0.0	1.5	2.0
	C22:1	1.0	0.0	0.9	1.0
	C18:2 ω6	21.8	15.7	21.2	21.9
	C18:3 ω3	10.4	54.8	16.6	8.4

* Triglyceride fraction and diglyceride fraction were collected from each oil by subjecting the oils to column chromatography (Wako gel C-200, product of Wako Pure Chemical Industries, Ltd.), eluting triglycerides from the column with hexane, and then eluting diglycerides from the column with hexane/ether (70:30, v/v). The resulting each fraction was analyzed by GLC according to the method described in "2.4.1.2-1996, Preparation of methyl esters of fatty acids" and "2.4.2.2-1996, Fatty acid composition" of "Standard Analytical Methods for Fats and Oils" (edited by the Japan Oil Chemists' Society).

Example 2

Pet foods for dogs as shown in Table 3 were prepared using the agents (oil or fat compositions) for controlling the offensive odor of the feed prepared in Example 1.

Table 3

(%)

Composition	Invention product 1	Invention product 2	Invention product 3	Comparative product 1
Corn	15	15	15	15
Meat meal	8	8	8	8
Wheat flour	26	26	26	26
Defatted soybean	20	20	20	20
fish powder	16	16	16	16
Beat pulp	4	4	4	4
Bone meal	2	2	2	2
Vitamins minerals	4	4	4	4
Lard	3	3	3	3
Oil or fat composition 1	2	-	-	-
Oil or fat composition 2	-	2	-	-
Oil or fat composition 3	-	-	2	-
Oil or fat composition 4	-	-	-	2
Animal proteins	11	11	11	11
Myosin *	3.3	3.3	3.3	3.3
Actin*	1.4	1.4	1.4	1.4

*Content (%) in the pet food.

Measuring method: Myosin and actin were quantified using SDS-PAGE and an animal protein content was determined based on the amount quantified by SDS-PAGE. Described specifically, samples and a standard sample of known concentration were each subjected to SDS-PAGE. The resulting gel was taken out and dyed with bromophenol blue. The dyed amount was then measured by a densitometry (product of Amersham Pharmacia Biotech). After preparation of a calibration curve, myosin and actin were quantified. Based on these amounts, the animal protein content was calculated.

A panel of 5 experts made an organoleptic evaluation of the odor of each of the pet foods based on the following evaluation criteria.

Average scores of the five experts are shown in Table 4. The advantage of the invention can be recognized when an average score is 0.5 or more than that of the comparative product.

5: No odor

4: Almost no odor

3: Slight odor but not uncomfortable

2: A little offensive odor

1: An offensive odor

As evidenced by result in Table 4, an offensive odor of any one of the invention products was reduced compared with that of the comparative product.

Table 4

	Invention product 1	Invention product 2	Invention product 3	Comparative Product 1
3 Hours after opening of pet food package (allowed to stand at 20°C)	3.2	3.4	3.0	2.2

Example 3

Pig Feeds as shown in Table 5 were prepared.

Table 5

(%)

Composition	Invention product 4	Invention product 5	Invention product 6	Comparative product 2
Corn	45	45	45	45
Meat meal	15	15	15	15
Wheat flour	14	14	14	14
Defatted soybean	10	10	10	10
Fish meal	3	3	3	3
Beat pulp	4	4	4	4
Bone meal	2	2	2	2
Vitamins·minerals	3	3	3	3
Oil or fat composition 1	4	-	-	-
Oil or fat composition 2	-	4	-	-
Oil or fat composition 3	-	-	4	-
Oil or fat composition 4	-	-	-	4
Animal proteins	5	5	5	5
Myosin*	1.4	1.4	1.4	1.4
Actin*	0.4	0.4	0.4	0.4

* Content (%) in the feed.

In a similar manner to Example 2, organoleptic evaluation of the odor was carried out.

Table 6

	Invention Product 4	Invention product 5	Invention product 6	Comparative Product 2
3 Hours after opening of feed package (allowed to stand at 20°C)	3.8	4.4	3.6	2.8

Any one of the invention products is ameliorated in an offensive odor compared with the comparative product.

77890-3

CLAIMS:

1. A pet food or feed, which comprises:

0.2 to 60 wt.% of an animal protein comprising myosin or actin; and

1 to 30 wt.% of an oil or fat composition comprising 10 wt.% or more, based on the oil or fat composition, of a diglyceride which comprises as constituent fatty acids, 50 wt.% or more of an unsaturated C_{14-24} fatty acid and 40 wt.% or less of an unsaturated fatty acid having at least 20 carbon atoms and at least 4 carbon-carbon double bonds, 20 wt.% or less, based on the oil or fat composition, of a free fatty acid, and a monoglyceride,

wherein a weight ratio of the diglyceride to the monoglyceride is ≥ 1.

2. The pet food or feed of claim 1, wherein the constituent fatty acids of the diglyceride are comprised of 15 to 90 wt.% of α-linolenic acid.

3. The pet food or feed of claim 1 or 2, wherein the oil or fat composition comprises 15 to 99 wt.% of the diglyceride.

4. The pet food or feed of claim 1 or 2, wherein the oil or fat composition comprises 30 to 99 wt.% of the diglyceride.

5. The pet food or feed of any one of claims 1 to 4, wherein the constituent fatty acids of the diglyceride comprise 70 to 99 wt.% of the unsaturated C_{14-24} fatty acid.

77890-3

6. The pet food or feed of any one of claims 1 to 5, wherein the weight ratio of the diglyceride to the monoglyceride is from 2 to 1,000.

7. The pet food or feed of any one of claims 1 to 6, wherein the weight ratio of the diglyceride to the monoglyceride is from 10 to 500.

8. The pet food or feed of any one of claims 1 to 7, wherein the free fatty acid is contained in an amount of 10% or less based on the oil or fat composition.

9. The pet food or feed of any one of claims 1 to 7, wherein the free fatty acid is contained in an amount of 0 to 5% based on the oil or fat composition.

10. The pet food or feed of any one of claims 1 to 9, wherein the oil or fat composition further comprises a triglyceride.

11. The pet food or feed of claim 10, wherein the triglyceride is comprised of a saturated or unsaturated C_{14-24} fatty acid.

12. The pet food or feed of any one of claims 1 to 11, having a weight ratio of the animal protein to the diglyceride of 100/0.1 to 1/150.

13. The pet food or feed of any one of claims 1 to 11, having a weight ratio of the animal protein to the diglyceride of 100/1 to 1/30.

14. The pet food or feed of any one of claims 1 to 13, further comprising a phytosterol.

15. A pet food or feed, which comprises:

77890-3

0.2 to 60 wt.% of animal proteins containing myosin and actin;

1 to 30 wt.% of an oil or fat composition composed of:

(i) 15 to 99 wt.% of diglycerides whose constituent fatty acids are composed of:

50 to 99 wt.% of unsaturated C_{14-24} fatty acids and having 1, 2 or 3 carbon-carbon double bonds;

0 to 10 wt.% of unsaturated C_{20-24} fatty acids having at least 4 carbon-carbon double bonds; and

the remainder of C_{14-24} saturated fatty acids;

(ii) 0 to 20 wt.% of free fatty acids;

(iii) monoglycerides; and

(iv) triglycerides which contain, as constituent fatty acids, saturated or unsaturated C_{14-24} fatty acids;

optionally, 0.1 to 30% by weight of phytosterol; and

at least one other ingredient selected from the group consisting of vegetable proteins, grains, brans, starch cakes, saccharides, vegetables, vitamins and minerals,

wherein the diglycerides and the monoglycerides are contained at a diglyceride/monoglyceride weight ratio of at least 1.

16. The pet food or feed according to claim 15, wherein the constituent fatty acids of the diglycerides are C16:0, C18:0, C18:1, C20:1, C22:1, C18:2ω6 and C18:3ω3.

77890-3

17. The pet food or feed according to claim 16, wherein the triglycerides contain as their fatty acids, C16:0, C18:0, C18:1, C20:1, C22:1, C18:2ω6 and C18:3ω3.

18. The pet food or feed according to any one of claims 15 to 17, wherein the diglycerides are contained in an amount of 50 to 95 wt.% based on the oil or fat composition; and the constituent fatty acids of the diglycerides contain 80 to 98 wt.% of the unsaturated C_{14-24} fatty acids having 1, 2 or 3 carbon-carbon double bonds.