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- (73) Patenthaver: **Hill's Pet Nutrition, Inc., 400 Southwest 8th Street, Topeka, KS 66603, USA**
- (72) Opfinder: **ZICKER, Steven, Curtis, 3017 Oxford Road, Lawrence, Kansas 66049, USA**
FRIESEN, Kim, Gene, 2140 Southwest Arvonla Place, Topeka, Kansas 66614, USA
YAMKA, Ryan, Michael, 12449 SW K4 Highway, Topeka, Kansas 66610, USA
- (74) Fuldmægtig i Danmark: **Zacco Denmark A/S, Arne Jacobsens Allé 15, 2300 København S, Danmark**
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DESCRIPTION

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application Serial No. 60/640,567, filed December 30, 2004.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates generally to non-therapeutic methods for improving the trainability and/or cognitive function of a growing animal.

Description of the Related Art

[0003] Companion animals such as dogs and cats frequently require differing diets depending on their life stage (age), size, body composition, and breed. Both dog and cat nutrient requirements can be separated into three different categories, based on age: growing dogs (or cats), adult dogs (or cats), and senior dogs (or cats). Dogs are further separated into different categories for regular breed dogs versus large-breed dogs.

[0004] Essential fatty acids, consisting of omega-3 and omega-6 polyunsaturated fatty acids, are critical nutrients for the health of an animal. These nutrients, however, either cannot be made by animals or cannot be made in sufficient amounts to elicit benefits and therefore must be consumed in an animal's diet. See, e.g., Hornstra, G., et al., "Essential fatty acids in pregnancy and early human development", Eur. J. Obs. & Gyn. and Reprod. Biology, 61:57-62 (1995). It has previously been postulated that Docosahexaenoic Acid ("DHA"), an omega-3 polyunsaturated fatty acid, is effective in increasing the maze-learning ability and brain functions in aged mice. See, Lim, S.-Y., "Intakes of dietary docosahexaenoic acid ethyl ester and egg phosphatidylcholine improve maze-learning ability in young and old mice", J. Nutr., 130:1629-1632 (2000).

[0005] Rogers discusses the theory of the potential use of antioxidants to slow the deterioration of cognitive function, particularly in the elderly. See Rogers, P., "A healthy body, a healthy mind: long-term impact of diet on mood and cognitive function", Proceedings of the Nutrition Society, 60:135-143 (2001).

[0006] Ziesel discusses the effects of choline supplementation on the memory of developing rats. Embryonic and newborn rats given choline during specific time periods during their development reportedly experienced improved memory. See Zeisel, S., "Choline: needed for normal development of memory", J. Am. Col. Nutrition, 19:528S-531S (2000).

[0007] U.S. Patent No. 6,426,100 discloses a process for improving bone modeling and chondrocyte functioning in a growing canine. The process involves feeding a growing canine pet food comprising polyunsaturated fatty acids, including DHA and eicosapentaenoic acid ("EPA"), in specific amounts or ratios.

[0008] Despite the studies and developments relating to improving cognitive abilities, there continues to be a need for new methods for enhancing trainability and cognition in growing companion animals.

SUMMARY OF THE INVENTION

[0009] The present invention provides a non-therapeutic method for improving the trainability and/or cognitive function of a growing animal comprising feeding the animal a composition comprising: at least 10% by weight protein; at least 4% by weight fat; docosahexaenoic acid ("DHA") in an amount of from 0.05% to 0.4% by weight; and at least one antioxidant selected from the group consisting of at least 250 ppm vitamin E, at least 5 ppm vitamin C, at least 600 ppm taurine and at least 0.05 ppm beta-carotene.

[0010] The present invention also provides a non-therapeutic method for improving the trainability and/or cognitive function of a growing animal comprising feeding the animal a composition comprising docosahexaenoic acid ("DHA") in an amount of from 0.05% to 0.4% by weight; at least one antioxidant selected from the group consisting of vitamin E, vitamin C, taurine, and beta-carotene; and at least one nutrient selected from the group consisting of choline, thiamine, egg powder, manganese, methionine, cysteine, L-carnitine, lysine, and mixtures thereof.

[0011] The present invention is defined by the claims. Subject matter outside the scope of the claims is provided for comparison only.

[0012] Other and further objects, features, and advantages of the present invention will be readily apparent to those skilled in the art.

DETAILED DESCRIPTION OF THE INVENTION

[0013] The present application describes non-therapeutic methods for improving the trainability and/or cognitive function of a growing animal. The methods comprise feeding the animal a composition comprising at least about 10% by weight protein, at least about 4% by weight fat, docosahexaenoic acid ("DHA") in an amount of from 0.05% to 0.4% by weight; and at least one antioxidant selected from the group consisting of at least 250 ppm vitamin E, at least 5ppm vitamin C, at least 600 ppm taurine and at least 0.05 ppm beta-carotene. Alternatively, the method comprises a non-therapeutic method for improving the trainability and/or cognitive function of a growing animal comprising feeding the animal a composition comprising docosahexaenoic acid ("DHA") in an amount of from 0.05% to 0.4% by weight; at least one antioxidant selected from the group consisting of vitamin E, vitamin C, taurine, and beta-carotene; and at least one nutrient selected from the group consisting of choline, thiamine, egg powder, manganese, methionine, cysteine, L-carnitine, lysine, and mixtures thereof. The methods are useful for enhancing trainability and/or improving cognitive function in a growing animal. Without being bound by theory, the benefits of the invention may be the result of physiological effects from the addition of DHA to a growing animals' diet. Similarly, the antioxidants, choline, and other nutrients may play a role in enhancing a growing animal's quality of life.

[0014] "Enhanced quality of life" means an improvement in one or more characteristics selected from the group consisting of trainability, cognitive function, motor skills, coordination or agility, retinal development, protection of cartilage, maintenance of muscle mass, and skin and pelage quality. The methods of the present invention improve an animal's quality of life by enhancing trainability and/or cognitive function.

[0015] When the compositions are administered to a growing animal, the animal experiences an enhanced quality of life, e.g., exhibits or experiences one or more of enhanced trainability; improved cognitive function. Methods for determining these measurements of quality of life are known to skilled artisans. For example, trainability can be measured by various means, including cognitive testing with problem solving tasks, magnetic resonance imaging, and neurology exams; cognitive functions can be measured by various means, including cognitive testing with problem solving tasks, magnetic resonance imaging, and neurology exams; motor skills, coordination, or agility can be measured by various means, including cognitive testing with problem solving tasks, maze tests, and motor neuron evoked potential; retinal development can be measured by various means, including electroretinograms to assess visual functionality; cartilage protection can be measured by various means, including an analysis of arthritis biomarkers such as type II collagen synthesis, matrix metalloproteinase, osteocalcin, alkaline phosphatase activity, COMP, and fragments of cartilage damage; maintenance of muscle mass can be measured by various means, including an analysis of body composition; skin and pelage quality can be measured by various means, including clinical studies with follow-up questions to participating pet owners; and digestibility can be measured by various means, including clinical studies with follow-up questions to participating pet owners and animal feeding to determine the percentage of nutrients digested.

[0016] The methods of the invention are useful for enhancing the trainability and/or cognitive function for a variety of animals, including non-human animals such as non-human primates (e.g., monkeys, chimpanzees, etc.), companion animals (e.g., dogs, cats, horses, etc.), farm animals (e.g., goats, sheep, swine, cattle, etc.), laboratory animals (e.g., mice, rats, etc.), birds (e.g., domestic birds such as canaries, parrots, etc. and commercial birds such as chickens, ducks, turkeys, etc.), rodents (e.g., hamsters, guinea pigs, gerbils, rabbits, hedgehogs, ferrets, chinchillas, etc.), and wild, exotic, and zoo animals (e.g., wolves, bears, deer, etc.). In various embodiments, the animal is a cat, a dog, or a horse.

[0017] The compositions described are designed to enhance digestibility improve chewability. Canine and feline foods are typically formulated based on life stage (age), size, body composition, and breed. Thus, some embodiments of the present invention include compositions that are formulated to address specific nutritional differences between regular or small breed

dogs, large breed dogs, and cats.

[0018] As used herein, a "large breed" canine is a dog that weighs more than 55 pounds when an adult.

[0019] As used herein, "growing animals" means animals that are in the growth stage of life. For small or regular breed canines, as well as for felines, the growth stage is from birth to one year of age. For large breed canines, the growth stage is from birth to about one or 1.5 years of age.

[0020] The invention provides methods utilizing a variety of compositions containing omega-3 polyunsaturated fatty acid. The compositions include foods, supplements, treats, and toys (typically chewable and consumable toys). The methods also provide the compositions to the designated animals over a period of time that is long enough to effectuate the improved quality of life.

[0021] The compositions of the present invention have an omega-3 polyunsaturated fatty acid content of from 0.05% to 0.4% by weight or from about 0.1% to about 0.24% by weight. The omega-3 polyunsaturated fatty acid is docosahexaenoic acid ("DHA").

[0022] In some embodiments, the composition containing omega-3 polyunsaturated fatty acid is a food. Although both liquid and solid foods are provided, solid foods are typically preferred. Foods include both dry foods and wet foods. Some of the non-polyunsaturated fatty acid components of the food, and their preferred proportions, include those listed in Table 1.

Table 1

Component	Proportion of the composition (% of dry weight of composition or parts per million)
Protein	from about 10% to about 70%, or from about 30% to about 45%, or from about 22% to about 32% or from about 43% to about 45% or from about 30% to about 32%
Fat	from about 4% to about 50%, or from about 9% to about 30%, or from about 8% to about 25% or from about 8% to about 20% or from about 14% to about 18% or from about 25% to about 28% or from about 20% to about 23%
Antioxidant	from about 0 ppm to about 7500 ppm, or from about 0.05 ppm to about 3600 ppm, or from about 250 to about 3600, or from about 250 ppm to about 1650 ppm, or from about 5 ppm to about 225 ppm, or from about 0.05 ppm to about 2.4 ppm

[0023] A described method may comprise feeding a growing animal a composition in an amount effective to enhance the animal's quality of life. Such compositions generally comprise:

1. (a) at least about 0.05% (or from about 0.1 % to about 6%, or from about 0.2% to about 1%, or from about 0.2% to about 0.62%, or from about 0.1% to about 0.24%) of at least one omega-3 polyunsaturated fatty acid, and
2. (b) at least one of the following:
 1. (i) from about 10% to about 70% (or from about 30% to about 45%, or from about 22% to about 32% or from about 43% to about 45% or from about 30% to about 32%) protein,
 2. (ii) from about 4% to about 50% (or from about 9% to about 30%, or from about 8% to about 25% or from about 8% to about 20% or from about 14% to about 18% or from about 25% to about 28% or from about 20% to about 23%) fat, and
 3. (iii) at least about 0.05 ppm (or from about 0.05 ppm to about 7500 ppm, or from about 250 to about 3600, or from about 250 ppm to about 1650 ppm, or from about 5 ppm to about 225 ppm, or from about 0.05 ppm to about 2.4 ppm) of an antioxidant.

[0024] A described method may comprise feeding a growing regular breed canine a composition in an amount effective to enhance the canine's quality of life. The composition comprises:

1. (a) at least one of the following:
 - (iv) at least about 0.05% by weight (or from about 0.05% to about 0.40%, or from about 0.1 % to about 0.40%, or from about 0.1 % to about 0.24%) DHA, and
 - (v) at least about 0.1 % by weight (or from about 0.1 % to about 1%, or from about 0.2% to about 1%, or from about 0.2% to about 0.62%) of a mixture of DHA and EPA,
1. (a) at least about 10% (or from about 10% to about 50%, or from about 22% to about 32%, or from about 22% to

- about 30%, or from about 30% to about 32%) protein,
- 2. (b) at least about 4% (or from about 4% to about 35%, or from about 8% to about 23%, or from about 8% to about 20%, or from about 20% to about 23% fat, and
- 3. (c) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1000 ppm) vitamin E,
 - (vi) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C,
 - (vii) at least about 600 ppm (or from about 600 ppm to about 3600 ppm, or from
 - (viii) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene.

[0025] A described method may comprise feeding a growing large breed canine a composition in an amount effective to enhance the canine's quality of life. The composition comprises:

1. (a) at least one of the following:
 1. (i) at least about 0.05% by weight (or from about 0.05% to about 0.40%, or from about 0.1 % to about 0.40%, or from about 0.1 % to about 0.24%) DHA, and
 2. (ii) at least about 0.1 % by weight (or from about 0.1 % to about 1%, or from about 0.2% to about 1%, or from about 0.2% to about 0.62%) of a mixture of DHA and EPA,
- (b) at least about 10% (or from about 10% to about 50%, or from about 22% to about 32%, or from about 22% to about 30%, or from about 30% to about 32%) protein,
- (c) at least about 4% (or from about 4% to about 30%, or from about 8% to about 18%, or from about 8% to about 14%, or from about 14% to about 18% fat, and
- (d) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1000 ppm) vitamin E,
 - (xii) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C,
 - (x) at least about 600 ppm (or from about 600 ppm to about 3600 ppm, or from about 1260 ppm to about 3600 ppm, or from about 1260 ppm to about 2400 ppm) taurine, and
 - (xi) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene.

[0026] A described method may comprise feeding a growing feline a composition in an amount effective to enhance the feline's quality of life. The composition generally comprises:

1. (a) at least one of the following:
 1. (i) at least about 0.05% (or from about 0.05% to about 0.40%, or from about 0.1% to about 0.40%, or from about 0.1% to about 0.24%) DHA, and
 2. (ii) at least about 0.1% (or from about 0.1% to about 1%, or from about 0.2% to about 1%, or from about 0.2% to about 0.62%) of a mixture of DHA and EPA, (b) at least about 15% (or from about 15% to about 70%, or from about 30% to about 45%, or from about 30% to about 43%, or from about 43% to about 45%) protein, (c) at least about 4% (or from about 4% to about 45%, or from about 9% to about 28%, or from about 9% to about 25%, or from about 25% to about 28% fat, and (d) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1100 ppm) vitamin E,

(xii) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C, (xiii) at least about 500 ppm (or from about 600 ppm to about 3000 ppm, or from about 1000 ppm to about 3000 ppm, or from about 1000 ppm to about 2150 ppm) taurine, and (xiv) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene.

[0027] In an embodiment of the invention, the method comprises feeding a growing animal a composition in an amount effective to enhance the animal's trainability and cognitive function. The composition comprises:

1. (a) DHA wherein the DHA content is from 0.05% to 0.4% by weight (or from about 0.1 % to about 0.24%), and
2. (b) at least one of the following:
 - (i) from about 10% to about 70% (or from about 30% to about 45%, or from about 22% to about 32% or from about 43% to about 45% or from about 30% to about 32%) protein,
 - (xv) from about 4% to about 50% (or from about 9% to about 30%, or from about 8% to about 25% or from about 8% to about 20% or from about 14% to about 18% or from about 25% to about 28% or from about 20% to about 23%) fat,
 - (xvi) at least about 0.05 ppm (or from about 0.05 ppm to about 7500 ppm, or from about 250 to about 3600, or from about 250 ppm to about 1650 ppm, or from about 5 ppm to about 225 ppm, or from about 0.05 ppm to about 2.4 ppm) antioxidant, and
 - (xvii) at least about 500 ppm (or from about 500 ppm to about 7500 ppm, or from about 1200 ppm to about 7500 ppm, or from about 1200 ppm to about 5000 ppm, or from about 2400 to about 5000 ppm) choline.

[0028] In another embodiment, the method comprises feeding a growing regular breed canine a composition in an amount effective to enhance the canine's trainability and cognitive function. The composition comprises:

1. (i) from 0.05% to 0.40% (or from about 0.1 % to about 0.40%, or from about 0.1 % to about 0.24%) DHA,
- (b) at least about 10% (or from about 10% to about 50%, or from about 22% to about 32%, or from about 22% to about 30%, or from about 30% to about 32%) protein,
- (c) at least about 4% (or from about 4% to about 35%, or from about 8% to about 23%, or from about 8% to about 20%, or from about 20% to about 23% fat,
- (d) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1000 ppm) vitamin E,
 - (xviii) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C,
 - (xix) at least about 600 ppm (or from about 600 ppm to about 3600 ppm, or from about 1260 ppm to about 3600 ppm, or from about 1260 ppm to about 2400 ppm) taurine, and
 - (xx) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene,
 - (e) at least about 500 ppm (or from about 500 ppm to about 7500 ppm, or from about 1200 ppm to about 7500 ppm, or from about 1200 ppm to about 5000 ppm, or from about 2400 to about 5000 ppm) choline,
 - (f) at least about 0.5 ppm (or from about 0.5 ppm to about 75 ppm, or from about 1.0 ppm to about 75 ppm, or from about 1.0 ppm to about 50 ppm) thiamine, and
 - (g) at least about 0.5% (or from about 0.5% to about 5%, or from about 1% to about 5%, or from about 1% to about 3%) egg powder.

[0029] In another embodiment, the method comprises feeding a growing large breed canine a composition in an amount effective to enhance the canine's trainability and cognitive function. The composition comprises:

1. (i) from 0.05% to 0.40% (or from about 0.1% to about 0.40%, or from about 0.1% to about 0.24%) DHA,
- (b) at least about 10% (or from about 10% to about 50%, or from about 22% to about 32%, or from about 22% to about 30%, or from about 30% to about 32%) protein,
- (c) at least about 4% (or from about 4% to about 30%, or from about 8% to about 18%, or from about 8% to about 14%, or from about 14% to about 18% fat,
- (d) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1000 ppm) vitamin E,
 - (xix) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C,
 - (xxii) at least about 600 ppm (or from about 600 ppm to about 3600 ppm, or from about 1260 ppm to about 3600 ppm, or from about 1260 ppm to about 2400 ppm) taurine, and
 - (xxiii) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene, (e) at least about 500 ppm (or from about 500 ppm to about 7500 ppm, or from about 1200 ppm to about 7500 ppm, or from about 1200 ppm to about 5000 ppm, or from about 2400 to about 5000 ppm) choline,
 - (f) at least about 0.5 ppm (or from about 0.5 ppm to about 75 ppm, or from about 1.0 ppm to about 75 ppm, or from about 1.0 ppm to about 50 ppm) thiamine, and
 - (g) at least about 0.5% (or from about 0.5% to about 5%, or from about 1% to about 5%, or from about 1% to about 3%) egg powder.

[0030] In another embodiment, the method comprises feeding a growing feline a composition in an amount effective to enhance the feline's trainability and cognitive function. The composition comprises:

1. (i) from 0.05% to 0.40% (or from about 0.1 % to about 0.40%, or from about 0.1 % to about 0.24%) DHA,
- (b) at least about 15% (or from about 15% to about 70%, or from about 30% to about 45%, or from about 30% to about 43%, or from about 43% to about 45%) protein,
- (c) at least about 4% (or from about 4% to about 45%, or from about 9% to about 28%, or from about 9% to about 25%, or from about 25% to about 28% fat,
- (d) at least one of the following:
 - (i) at least about 250 ppm (or from about 250 ppm to about 1500 ppm, or from about 500 ppm to about 1500 ppm, or from about 500 ppm to about 1100 ppm) vitamin E,
 - (xxiv) at least about 5 ppm (or from about 5 ppm to about 225 ppm, or from about 10 ppm to about 225 ppm, or from about 10 ppm to about 150 ppm) vitamin C,
 - (xxv) at least about 500 ppm (or from about 600 ppm to about 3000 ppm, or from about 1000 ppm to about 3000 ppm, or from about 1000 ppm to about 2150 ppm) taurine, and
 - (xxvi) at least about 0.05 ppm (or from about 0.05 to about 3.0 ppm, or from about 0.1 ppm to about 3.0 ppm, or from about 0.1 ppm to about 1.6 ppm) beta-carotene.
 - (e) at least about 500 ppm (or from about 500 ppm to about 7500ppm, or from about 1200 ppm to about 7500 ppm, or from about 1200 ppm to about 5000 ppm, or from about 2400 to about 5000 ppm) choline,
 - (f) at least about 0.5 ppm (or from about 0.5 ppm to about 75 ppm, or from about 1.0 ppm to about 75 ppm, or from about

1.0 ppm to about 50 ppm) thiamine, and

(g) at least about 0.5% (or from about 0.5% to about 5%, or from about 1% to about 5%, or from about 1% to about 3%) egg powder.

[0031] The compositions for use in the method of the present invention may further comprise at least one nutrient selected from the group consisting of manganese, methionine, cysteine, mixtures of methionine and cysteine, L-carnitine, lysine, and arginine. Specific preferred amounts for each component in a composition will depend on a variety of factors including, for example, the species of animal consuming the composition; the particular components included in the composition; the age, weight, general health, sex, and diet of the animal; the animal's consumption rate, and the like. Thus, the component amounts may vary widely, and may even deviate from the preferred proportions given herein.

[0032] The omega-3 fatty acids may be obtained from a variety of sources. One convenient source is fish oils from, for example, menhaden, mackerel, herring, anchovy, and salmon. DHA and EPA are typical fatty acids present in such fish oils, and, together often make up a significant portion of the oil, such as from about 25% to about 38% of the oil.

[0033] When the composition is an animal food, vitamins and minerals preferably are included in amounts required to avoid deficiency and maintain health. These amounts are readily available in the art. The National Research Council (NRC), for example, provides recommended amounts of such ingredients for farm animals. See, e.g., Nutrient Requirements of Swine (10th Rev. Ed., Nat'l Academy Press, Wash. D.C., 1972/98), Nutrient Requirements of Poultry (9th Rev. Ed., Nat'l Academy Press, Wash. D.C., 1994), Nutrient Requirements of Horses (Fifth Rev. Ed., Nat'l Academy Press, Wash. D.C., 1989), etc. And the American Feed Control Officials (AAFCO), for example, provides recommended amounts of such ingredients for dogs and cats. See American Feed Control Officials, Inc., Official publication, pp. 126-140 (2003). Examples of vitamins useful as food additives include vitamin A, B1, B2, B6, B12, C, D, E, K, H (biotin), K, folic acid, inositol, niacin, and pantothenic acid. Examples of minerals and trace elements useful as food additives include calcium, phosphorus, sodium, potassium, magnesium, copper, zinc, chloride, and iron salts.

[0034] The methods of the present invention include compositions that may further contain other additives known in the art. Preferably, such additives are present in amounts that do not impair the purpose and effect provided by the invention. Examples of additives include, for example, substances with a stabilizing effect, processing aids, substances that enhance palatability, coloring substances, and substances that provide nutritional benefits.

[0035] Stabilizing substances include, for example, substances that tend to increase the shelf life of the composition. Potentially suitable examples of such substances include, for example, preservatives, antioxidants, synergists and sequestrants, packaging gases, stabilizers, emulsifiers, thickeners, gelling agents, and humectants. Examples of emulsifiers and/or thickening agents include, for example, gelatin, cellulose ethers, starch, starch esters, starch ethers, and modified starches.

[0036] Additives for coloring, palatability, and nutritional purposes include, for example, colorants (e.g., iron oxide, such as the red, yellow, or brown forms); sodium chloride, potassium citrate, potassium chloride, and other edible salts; vitamins; minerals; and flavoring. Such additives are known in the art. See, e.g., U.S. Patent No. 3,202,514. See also, U.S. Patent No. 4,997,671. Flavorants include, for example, dairy product flavorants (e.g., milk or cheese), meat flavorants (e.g., bacon, liver, beef, poultry, or fish), oleoresin, pinacol, and the various flavorants identified in the trade by a FEMA (Flavor Extract Manufacturers Association) number. Flavorants help provide additional palatability, and are known in the art. See, e.g., U.S. Patent No. 4,997,672. See also, U.S. Patent No. 5,004,624. See also, U.S. Patent No. 5,114,704. See also, U.S. Patent No. 5,532,010. See also, U.S. Patent No. 6,379,727. The concentration of such additives in the composition typically may be up to about 5% by weight. In some embodiments, the concentration of such additives (particularly where such additives are primarily nutritional balancing agents, such as vitamins and minerals) is from about 0% to about 2.0% by weight. In some embodiments, the concentration of such additives (again, particularly where such additives are primarily nutritional balancing agents) is from about 0% to about 1.0% by weight.

[0037] Supplements include, for example, a feed used with another feed to improve the nutritive balance or performance of the total. Supplements include compositions that are fed undiluted as a supplement to other feeds, offered free choice with other parts of an animal's ration that are separately available, or diluted and mixed with an animal's regular feed to produce a complete feed. The AAFCO, for example, provides a discussion relating to supplements in the American Feed Control Officials, Inc. Official Publication, p. 220 (2003). Supplements may be in various forms including, for example, powders, liquids, syrups, pills, encapsulated compositions, and the like.

[0038] Treats include, for example, compositions that are given to an animal to entice the animal to eat during a non-meal time. Treats for canines include, for example, dog bones. Treats may be nutritional, wherein the composition comprises one or more nutrients, and may, for example, have a composition as described above for food. Non-nutritional treats encompass any other treats that are non-toxic.

[0039] Toys include, for example, chewable toys. Toys for dogs include, for example, artificial bones. There a wide range of suitable toys currently marketed. See, e.g., U.S. Pat. No. 5,339,771 (and references disclosed in U.S. Pat. No. 5,339,771). See also, e.g., U.S. Pat. No. 5,419,283 (and references disclosed in U.S. Pat. No. 5,419,283). It should be recognized that this invention provides both partially consumable toys (e.g., toys comprising plastic components) and fully consumable toys (e.g., rawhides and various artificial bones). It should be further recognized that this invention provides toys for both human and non-human use, particularly for companion, farm, and zoo animal use, and particularly for dog, cat, or bird use.

[0040] A "food" is a nutritionally complete diet for the intended recipient animal (e.g., domestic cat or domestic dog). A "nutritionally complete diet" is a diet that includes sufficient nutrients for maintenance of normal health of a healthy animal on the diet. The method of the invention utilizes compositions that are not intended to be restricted by any specific listing of proteinaceous or fat ingredients or product form. The compositions can be prepared in, for example, a dry, canned, wet, or intermediate moisture form using conventional pet food processes. In some embodiments, the moisture content is from about 10% to about 90% of the total weight of the composition. In other embodiments, the moisture content is from about 65% to about 75% of the total weight of the composition.

[0041] In preparing a composition for use with the methods of the present invention, any ingredient (e.g., fish oil) generally may, for example, be incorporated into the composition during the processing of the formulation, such as during and/or after mixing of other components of the composition. Distribution of these components into the composition can be accomplished by conventional means. In one embodiment, ground animal and poultry proteinaceous tissues are mixed with the other ingredients, including fish oils, cereal grains, other nutritionally balancing ingredients, special-purpose additives (e.g., vitamin and mineral mixtures, inorganic salts, cellulose and beet pulp, bulking agents, and the like); and water that is sufficient for processing is also added. These ingredients preferably are mixed in a vessel suitable for heating while blending the components. Heating of the mixture may be effected using any suitable manner, such as, for example, by direct steam injection or by using a vessel fitted with a heat exchanger. Following the addition of the last ingredient, the mixture is heated to a temperature range of from about 50°F (10°C) to about 212°F (100°C). In some embodiments, the mixture is heated to a temperature range of from about 70°F (21°C) to about 140°F (60°C). Temperatures outside these ranges are generally acceptable, but may be commercially impractical without use of other processing aids. When heated to the appropriate temperature, the material will typically be in the form of a thick liquid. The thick liquid is filled into cans. A lid is applied, and the container is hermetically sealed. The sealed can is then placed into conventional equipment designed to sterilize the contents. This is usually accomplished by heating to temperatures of greater than about 230°F (110°C) for an appropriate time, which is dependent on, for example, the temperature used and the composition.

[0042] Methods of the present invention include compositions that can be prepared in a dry form using conventional processes. In one embodiment, dry ingredients, including, for example, animal protein sources, plant protein sources, grains, etc., are ground and mixed together. Moist or liquid ingredients, including fats, oils, animal protein sources, water, etc., are then added to and mixed with the dry mix. The mixture is then processed into kibbles or similar dry pieces. Kibble is often formed using an extrusion process in which the mixture of dry and wet ingredients is subjected to mechanical work at a high pressure and temperature, and forced through small openings and cut off into kibble by a rotating knife. The wet kibble is then dried and optionally coated with one or more topical coatings which may include, for example, flavors, fats, oils, powders, and the like. Kibble also can be made from the dough using a baking process, rather than extrusion, wherein the dough is placed into a mold before dry-heat processing.

[0043] As noted previously, this invention provides methods for enhancing the quality of life of an animal. The method comprises feeding a growing animal a composition that is effective in enhancing the animal trainability and cognitive ability of the animal. The compositions are also designed to enhance digestibility and to be easier to chew. Canine and feline foods are typically formulated based on life stage (age), size, body composition, and breed. In the methods of this invention, some embodiments of the compositions address specific nutritional differences between regular breed dogs, large breed dogs, and cats.

[0044] Also described are kits suitable for improving the quality of life of a growing animal. The kits comprise in separate containers in a single package or in separate containers in a virtual package, as appropriate for the kit component, at least one of omega-3 polyunsaturated fatty acid and one or more of (1) one or more different omega-3 polyunsaturated fatty acids, (2) one or more ingredients suitable for consumption by an animal that can be used to produce a composition comprising at least about 10%

by weight protein and at least about 4% by weight fat, and (3) instructions for how to combine the omega-3 polyunsaturated fatty acid(s) and other kit components produce a composition suitable for improving the quality of life of a growing animal. When the kit comprises a virtual package, the kit is limited to instructions in a virtual environment in combination with one or more physical kit components. The kit contains omega-3 polyunsaturated fatty acid(s) and other components in amounts sufficient for improving the quality of life of a growing animal. Typically, omega-3 polyunsaturated fatty acid(s) and the other suitable kit components are admixed just prior to consumption by an animal. The kits may contain the kit components in any of various combinations and/or mixtures. In one embodiment, the kit contains a packet containing one or more omega-3 polyunsaturated fatty acids and a container of food consistent with the present invention for consumption by an animal. The kit may contain additional items such as a device for mixing omega-3 polyunsaturated fatty acid(s) and other ingredients or a device for containing the admixture, e.g., a food bowl. In another embodiment, omega-3 polyunsaturated fatty acid(s) are mixed with additional nutritional supplements such as vitamins and minerals that promote good health in an animal.

[0045] Also described is a means for communicating information about or instructions for one or more of (1) using omega-3 polyunsaturated fatty acid(s) in combination with specific amounts of protein and fat for improving the quality of life of a growing animal, (2) admixing omega-3 polyunsaturated fatty acid(s) with the other components of the present invention, and (3) using the kits of the present invention for improving the quality of life of a growing animal. The means comprises a document, digital storage media, optical storage media, audio presentation, or visual display containing the information or instructions. In certain embodiments, the communicating means comprises a document, digital storage media, optical storage media, audio presentation, or visual display containing the information or instructions. Preferably, the communication means is a displayed web site or a brochure, product label, package insert, advertisement, or visual display containing such information or instructions. Useful information includes one or more of (1) methods and techniques for combining and administering omega-3 polyunsaturated fatty acid(s) and other components and (2) contact information for animals or their caregivers to use if they have a question about the invention and its use. Useful instructions include amounts for mixing and administration amounts and frequency. The communication means is useful for instructing on the benefits of using the present invention and communicating the approved methods for administering the invention to an animal.

[0046] Also described is a use of a composition comprising at least about 10% by weight protein, at least about 4% by weight fat, and at least about 0.05% by weight of at least one omega-3 polyunsaturated fatty acid to prepare a medicament. Further described is the use of such composition to prepare a medicament for improving the quality of life of a growing animal. Generally, medicaments are prepared by admixing a compound or composition with excipients, buffers, binders, plasticizers, colorants, diluents, compressing agents, lubricants, flavorants, moistening agents, and other ingredients known to skilled artisans to be useful for producing medicaments and formulating medicaments that are suitable for administration to an animal.

[0047] All percentages expressed herein are on a weight by dry matter basis unless specifically stated otherwise.

[0048] This invention is not limited to the particular methodology, protocols, and reagents described herein because they may vary. Further, the terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the scope of the present invention. As used herein and in the appended claims, the singular forms "a," "an," and "the" include plural reference unless the context clearly dictates otherwise. The terms "comprise", "comprises", and "comprising" are to be interpreted inclusively rather than exclusively.

[0049] Unless defined otherwise, all technical and scientific terms and any acronyms used herein have the same meanings as commonly understood by one of ordinary skill in the art in the field of the invention. Although any methods and materials similar or equivalent to those described herein can be used in the practice of the present invention, the preferred methods, devices, and materials are described herein.

[0050] All patents, patent applications, and publications mentioned herein are incorporated herein by reference to the extent allowed by law for the purpose of describing and disclosing the compositions, compounds, methods, and similar information reported therein that might be used with the present invention. However, nothing herein is to be construed as an admission that the invention is not entitled to antedate such disclosure by virtue of prior invention.

EXAMPLES

[0051] This invention can be further illustrated by the following examples of preferred embodiments thereof, although it will be understood that these examples are included merely for purposes of illustration and are not intended to limit the scope of the invention unless otherwise specifically indicated.

Example 1

[0052] A composition formulated for growing regular breed canines is described in Table 1.

Table 1

Ingredient Composition for Canine Regular Puppy Growth	
Ingredient	% of composition
Starch	38.60
Animal Protein	28.93
Vegetable Protein	9.33
Animal/Vegetable Fat	7.70
Omega Fat	4.73
Fiber	5.50
Minerals	3.91
Vitamins	1.30

Example 2

[0053] A composition formulated for growing large breed canines is described in Table 2.

Table 2

Ingredient Composition for Canine Large Breed Growth	
Ingredient	% of composition
Starch	39.10
Animal Protein	24.53
Vegetable Protein	16.10
Animal/Vegetable Fat	4.38
Omega Fat	6.10
Fiber	5.50
Minerals	2.99
Vitamins	1.30

Example 3

[0054] A composition formulated for growing felines is described in Table 3 below.

Table 3

Ingredient Composition for Feline Growth	
Ingredient	% of composition
Starch	19.17
Animal Protein	39.00
Vegetable Protein	23.00
Animal/Vegetable Fat	12.00
Omega Fat	4.40
Fiber	0.50
Minerals	0.78

Ingredient Composition for Feline Growth	
Ingredient	% of composition
Vitamins	1.16

[0055] In the specification, there have been disclosed typical preferred embodiments of the invention and, although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being set forth in the following claims. Obviously many modifications and variations of the present invention are possible in light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

REFERENCES CITED IN THE DESCRIPTION

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P a t e n t k r a v

1. Ikke-terapeutisk fremgangsmåde til forbedring af træningsevnen og/eller den kognitive funktion af et dyr i vækst, omfattende at fodre dyret med en sammensætning omfattende:

mindst 10 vægt% protein;
mindst 4 vægt% fedt;

- 10 docosahexaensyre ("DHA") i en mængde på fra 0,05 % til 0,4 vægt%; og mindst én antioxidant udvalgt fra gruppen bestående af mindst 250 ppm E-vitamin, mindst 5 ppm C-vitamin, mindst 600 ppm taurin og mindst 0,05 ppm beta-caroten.

- 15 2. Ikke-terapeutisk fremgangsmåde til forbedring af træningsevnen og/eller den kognitive funktion af et dyr i vækst omfattende at fodre dyret med en sammensætning omfattende docosahexaensyre ("DHA") i en mængde på fra 0,05 % til 0,4 vægt%; mindst én antioxidant udvalgt fra gruppen bestående af E-vitamin, C-vitamin, taurin, og beta-caroten; og mindst ét næringsstof udvalgt fra gruppen bestående af cholin, thiamin, æggepulver, mangan, methionin, cystein, L-carnitin, lysin, og blandinger heraf.

- 25 3. Ikke-terapeutisk fremgangsmåde ifølge krav 2, hvorved antioxidanten i sammensætningen er udvalgt fra gruppen bestående af E-vitamin, hvori indholdet af E-vitamin er mindst ca. 250 ppm, C-vitamin, hvori indholdet af C-vitamin er mindst ca. 5 ppm, taurin, hvori taurinindholdet er mindst ca. 250 ppm, og beta-caroten, hvori beta-carotenindholdet er mindst ca. 0,05 ppm.

- 30 4. Ikke-terapeutisk fremgangsmåde ifølge krav 2, hvorved antioxidanten i sammensætningen består af E-vitamin, C-vitamin, taurin, og beta-caroten.

5. Ikke-terapeutisk fremgangsmåde ifølge krav 2, hvorved cholin-sammensætningen er mindst ca. 500 ppm.

6. Ikke-terapeutisk fremgangsmåde ifølge krav 2, hvorved sammensætningen, der gives til dyret i vækst, er en dyregodbid, et dyrelegetøj, eller et næringstilskud.