[0051] such flavored polymeric compositions, which are substantially free of a plastic flavor; and

[0052] polymeric articles molded or extruded from such flavored thermoplastic polymeric compositions;

[0053] such polymeric articles, which exhibit an optimized flavor sensation upon placement in a use environment;

[0054] such polymeric articles, which exhibit an optimized flavor sensation upon placement in a use environment and without consuming, dissolving, mastication or destruction of such article;

[0055] such polymeric articles, which exhibit enhanced flavorant and flavor enhancing agent migration such that 0-80 percent of the flavorant and flavor enhancing agent are retained at one hour in a use environment, 80-40 percent of the flavorant and flavor enhancing agent are retained at ten hours in a use environment and 40-20 percent of the flavorant and flavor enhancing agent are retained at one hundred hours in a use environment.

[0055a] In one aspect, there is provided a polymeric article molded or extruded from a flavored thermoplastic composition comprising:

(a) 0.1 to 50 wt% of one or more flavor enhancing agent with respect to the total weight of the composition, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor, and is selected from the group consisting of sucralose, stevia extracts, acesulfame K and maltodextrin;

(b) 0.01 to 10 wt% of one or more flavorant with respect to the total weight of the composition, wherein the flavorant is heat stable and provides an aroma component of flavor;

(c) one or more thermoplastic polymers selected from the group consisting of polyethylene, polypropylene, and copolymers and terpolymers thereof, wherein:

(i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, destruction, mastication, or fully or partially dissolving the polymeric article; and

(ii) the flavor enhancing agent and the flavorant are selected to be thermally stable when blended in the thermoplastic polymer at a processing temperature of 100 to 180 °C; and

(d) optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, and UV stabilizers;

wherein:

(i) the flavor enhancing agent and the flavorant are blended throughout the thermoplastic polymer;

(ii) the taste component of flavor and the aroma component of flavor are released from the polymeric article without the article being consumed, destructed, masticated or fully or partially dissolved;

(iii) 100 to 80 % of flavor intensity of the flavorant and flavor enhancing agent perceived when the polymeric article is placed in a use environment are retained at one hour, 80 to 40 % of the flavor intensity of the flavorant and flavor enhancing

agent perceived in a use environment are retained at ten hours, and 40 to 20 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at one hundred hours;

(iv) the article is substantially free of plastic flavor; and

(v) the article is selected from the group consisting of dental appliance, dental mold, retainer and mouthguard.

[0055b] In one aspect, there is provided a process for producing a polymeric article comprising:

(a) selecting one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;

(b) selecting one or more flavor enhancing agent, wherein the flavor enhancing agent is heat stable, provides a taste component of flavour, and is selected from the group consisting of sucralose, stevia extracts, acesulfame K and maltodextrin;

(c) selecting one or more thermoplastic polymers from the group consisting of polyethylene, polypropylene, and copolymers and terpolymers thereof; wherein:

(i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, destruction, mastication or fully or partially dissolving the polymeric article; and

(ii) the flavor enhancing agent and the flavorant are selected to be thermally stable when blended in the thermoplastic polymer at a processing temperature of 100 to 180 °C;

(d) blending 0.01 to 10 wt% of the selected one or more flavorant(s) and 0.1 to 50 wt% of the selected one or more flavor enhancing agent(s) with respect to the total weight of the composition and the selected one or more thermoplastic polymers, and optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical

brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments and UV stabilizers, to obtain a flavored thermoplastic composition; and

(e) molding or extruding the flavored thermoplastic composition to obtain the polymeric article;

wherein:

(i) the flavor enhancing agent and the flavorant are blended throughout the thermoplastic polymer;

(ii) the taste component of flavor and the aroma component of flavor are released from the polymeric article without the article being consumed, destructed, masticated or fully or partially dissolved;

(iii) 100 to 80 % of flavor intensity of the flavorant and flavor enhancing agent perceived when the polymeric article is placed in a use environment are retained at one hour, 80 to 40 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at ten hours, and 40 to 20 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at one hundred hours;

(iv) the article is substantially free of plastic flavor; and

(v) the article is selected from the group consisting of dental appliance, dental mold, retainer and mouthguard.

[0055c] In one aspect, there is provided a flavored article produced by the process as defined herein.

DETAILED DESCRIPTION OF THE INVENTION

[0056] It has been discovered that a polymeric article which is not intended to be consumed, significantly destructed, masticated or fully or partially dissolved to release flavor can be rendered to provide an optimized flavor by using "flavor enhancing agents" alone or, preferably, in combination with flavorants. This composition optimizes the flavor of a polymeric article by providing both the

CLAIMS

We Claim:

1. A flavored thermoplastic composition comprising:
   (a) one or more flavor enhancing agent, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor;
   (b) one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;
   (c) one or more thermoplastic polymer selected from the group consisting of polyolefins, polyolefin copolymers or terpolymers, polyolefin plastomers or elastomers, and thermoplastic polyolefins, wherein (i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, significant destruction, mastication, or fully or partially dissolving the flavored thermoplastic composition, and (ii) a processing temperature of the thermoplastic polymer does not exceed the thermal stability of the flavor enhancing agent and the flavorant; and
   (d) optionally, an additive selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, UV, stabilizers and combinations thereof;

   wherein,

   the taste component of flavor and the aroma component of flavor are released from the thermoplastic composition without being consumed, significantly destructed, masticated or fully or partially dissolved; and

   the flavor enhancing agent and the flavorant are blended throughout the thermoplastic polymer.

2. The flavored thermoplastic composition of claim 1, in the form of a masterbatch, a dry-powder or liquid concentrate.

3. The flavored thermoplastic composition of claim 1, wherein the flavorant is selected from natural and artificial fruit, mint, and chocolate flavors.

4. The flavored thermoplastic composition of claim 1, wherein the flavor enhancing agent and flavorant are suitable for human consumption.

5. The flavored thermoplastic composition of claim 1, wherein the flavor enhancing agent is selected for its ability to provide sweetness, sourness, bitterness, saltiness, coolness, umami, fatty acid, or acidity.

6 The flavored thermoplastic composition of claim 5, wherein the sweetness flavor enhancing agent is selected from sucrose, fructose, glucose, sorbitol, maltodextrin, xylitol, aspartame, saccharin, sucralose, acesulfame K, mannitol, erythritol, isomalt, lactitol, maltitol, cyclamates, stevia extracts, agave nectar and any combination thereof.

7. The flavored thermoplastic compositions of claim 5, wherein the cooling flavor enhancing agent is selected from the group consisting of menthol derivatives, menthyl lactate, and N,2,3,-trimethyl-2-isopropylbutanamide.

8. The flavored thermoplastic composition of claim 1, wherein the flavor enhancing agent providing for acidity is selected from citric acid, ascorbic acid, malic acid and fumaric acid.

9. The flavored thermoplastic composition of claim 1, wherein the flavorant and flavor enhancing agent migrate and release or are experienced/perceived without consuming, dissolving, mastication or destruction of an article made from the composition.

10. The flavored thermoplastic compositions of claim 9, wherein the polymer is selected for its ability to provide flavorant and flavor enhancing agent migration such that 100-80 percent of the flavorant and flavor enhancing agent are retained at one hour in a use environment, 80-40 percent of the flavorant and flavor enhancing agent are retained at ten hours in a use environment and 40-20 percent of the flavorant and flavor enhancing agent are retained at one hundred hours in a use environment.

11. The flavored thermoplastic composition of claim 1, substantially free of a plastic flavor.

12. A polymeric article molded or extruded from a flavored thermoplastic composition of claim 1.

13. The polymeric article of claim 12, which exhibits an optimized flavor sensation upon placement in a use environment.

14. The polymeric article of claim 12, which exhibits an optimized flavor sensation upon placement in a use environment and without consuming, dissolving, mastication or destruction of such article.

15. The polymeric article of claim 12, which exhibits enhanced flavorant and flavor enhancing agent migration such that 100-80 percent of the flavorant and flavor enhancing agent are retained at one hour in a use environment, 80-40 percent of the flavorant and flavor enhancing agent are retained at ten hours in a use environment and 40-20 percent of the flavorant and flavor enhancing agent are retained at one hundred hours in a use environment.

16. A process for producing a flavored thermoplastic composition for molded or extruded articles comprising:

selecting one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;

selecting one or more flavor enhancing agent, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor;

selecting one or more thermoplastic polymers from the group consisting of polyolefins, polyolefin copolymers or terpolymers, polyolefin plastomers or elastomers, and thermoplastic polyolefins wherein (i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant *without consumption, significantly destruction, mastication or fully or* partially dissolving the flavored thermoplastic composition, and (ii) a processing temperature of the thermoplastic polymer does not exceed the thermal stability of the flavor enhancing agent and the flavorant;

blending the selected one or more flavorant(s) and one or more flavor enhancing agent(s) and one or more thermoplastic polymers, and optionally one or more additives selected from the group consisting of antioxidants,

antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, and UV stabilizers;

wherein,

the taste component of flavor and the aroma component of flavor are released from the thermoplastic composition without being consumed, significantly destructed, masticated or fully or partially dissolved; and

the flavor enhancing agent and the flavorant are blended throughout the one or more polymers.

17. A flavored thermoplastic composition which is compounded by the process of claim 16.

18. A flavored thermoplastic composition comprising:

one of more flavor enhancing agent, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor;

one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;

one or more thermoplastic polymer selected from the group consisting of polyolefins, polyolefin copolymers or terpolymers and thermoplastic polyolefins, wherein (i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, significantly destruction, mastication or fully or partially dissolving the flavored thermoplastic composition, and (ii) a processing temperature of the thermoplastic polymer does not exceed the thermal stability of the flavor enhancing agent and the flavorant; and

optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, and UV stabilizers;

wherein,

the taste component of flavor and the aroma component of flavor are released from the thermoplastic composition without being consumed, significantly destructed, masticated or fully or partially dissolved; and

the flavor enhancing agent and the flavorant are blended throughout the one or

more polymers.

19. A flavored thermoplastic composition comprising:

one or more heat stable flavor enhancing agents selected from the group consisting of sucralose, stevia extracts, acesulfame K, maltodextrin and combinations thereof;

one or more heat stable flavorants; and

one or more thermoplastic polymers selected from the group consisting of polyolefins, and polyolefin copolymers and terpolymers; and

optionally one or more additives selected from the group consisting of antioxidents, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, and UV stabilizers.

20. A flavored thermoplastic composition comprising:

one or more flavor enhancing agents selected from the group consisting of sucralose, stevia extracts, acesulfame K, maltodextrin and combinations thereof;

one or more flavorants; and

a thermoplastic polymer selected from the group consisting of low density polyethylene, ethylene methacrylate copolymer and linear low density polyethylene; and

optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments and UV stabilizers.

21. A *method for enhancing the flavor in a flavored thermoplastic composition for molded or* extruded articles comprising the step of:

blending one or more flavor enhancing agent, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor;

one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;

with one or more thermoplastic polymer selected from the group consisting of polyolefins, polyolefin copolymers or terpolymers and polyolefin plastomers or elastomers,

and optionally one or more additives selected from the group consisting of antioxidants, *antistatics*, *antifogs*, *antimicrobials*, *slips*, *antiblocks*, *minerals*, *fillers*, *optical* brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments and UV stabilizers;

to form a flavored thermoplastic composition,

wherein,

the taste component of flavor and the aroma component of flavor are released from the thermoplastic composition without being consumed, significantly destructed, masticated or fully or partially dissolved; and

the one or more flavor enhancing agent and the flavorant are blended throughout the one or more polymers.

22. The method of claim 21 wherein said polymer is selected from the group consisting of low density polyethylene, ethylene methacrylate copolymer and linear low density polyethylene and said flavor enhancing agent is selected from the group consisting of sucralose, stevia extracts, acesulfame K, maltodextrin and combinations thereof.

23. The method of claim 21 wherein said flavorant is selected from the group consisting of natural and artificial fruit, mint and chocolate flavors.

24. The composition of claim 1 wherein said polymer is selected from the group consisting of low density polyethylene, ethylene methacrylate copolymer and linear low density polyethylene.

CLAIMS

We Claim:

The claims defining the invention are as follows:

1. A polymeric article molded or extruded from a flavored thermoplastic composition comprising:

(a) 0.1 to 50 wt% of one or more flavor enhancing agent with respect to the total weight of the composition, wherein the flavor enhancing agent is heat stable and provides a taste component of flavor, and is selected from the group consisting of sucralose, stevia extracts, acesulfame K and maltodextrin;

(b) 0.01 to 10 wt% of one or more flavorant with respect to the total weight of the composition, wherein the flavorant is heat stable and provides an aroma component of flavor;

(c) one or more thermoplastic polymers selected from the group consisting of polyethylene, polypropylene, and copolymers and terpolymers thereof, wherein:

(i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, destruction, mastication, or fully or partially dissolving the polymeric article; and

(ii) the flavor enhancing agent and the flavorant are selected to be thermally stable when blended in the thermoplastic polymer at a processing temperature of 100 to 180 °C; and

(d) optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments, and UV stabilizers;

wherein:

(i) the flavor enhancing agent and the flavorant are blended throughout the thermoplastic polymer;

(ii) the taste component of flavor and the aroma component of flavor are released from the polymeric article without the article being consumed, destructed, masticated or fully or partially dissolved;

(iii) 100 to 80 % of flavor intensity of the flavorant and flavor enhancing agent perceived when the polymeric article is placed in a use environment are retained at one hour, 80 to 40 % of the flavor intensity of the flavorant and flavor enhancing

agent perceived in a use environment are retained at ten hours, and 40 to 20 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at one hundred hours;

(iv) the article is substantially free of plastic flavor; and

(v) the article is selected from the group consisting of dental appliance, dental mold, retainer and mouthguard.

2. The polymeric article of claim 1, wherein the flavored thermoplastic composition is in the form of a pellet-shaped masterbatch, a dry-powder or a concentrated liquid.

3. The polymeric article of claim 1 or claim 2, wherein the thermoplastic polymer is selected from the group consisting of low density polyethylene, ethylene methyl acrylate (EMA) and linear low density polyethylene.

4. The polymeric article of any one of claims 1 to 3, wherein the flavorant is selected from the group consisting of natural fruit, artificial fruit, natural mint, artificial mint, natural chocolate and artificial chocolate flavors.

5. The polymeric article of any one of claims 1 to 4, wherein the flavor enhancing agent and flavorant are suitable for human consumption.

6. The polymeric article of any one of claims 1 to 5, wherein the flavoured thermoplastic composition contains two or more flavor enhancing agents.

7. The polymeric article of claim 6, wherein the flavor enhancing agents are sucralose and maltodextrin.

8. The polymeric article of any one of claims 1 to 7, wherein the polymeric article is tested to measure the percentage of the flavor intensity in running water.

9. The polymeric article of any one of claims 1 to 8, wherein the polymeric article is selected from the group consisting of monolayered article, coextruded multi-layered article and an article formed by overmolding the flavoured thermoplastic composition.

10. The polymeric article of any one of claims 1 to 9, wherein the amount of flavor enhancing agent is 5 to 50 wt% with respect to the total weight of the composition.

11. The polymeric article of claim 10, wherein the amount of flavour enhancing agent is 5 to 20 wt% with respect to the total weight of the composition.

12. The polymeric article of any one of claims 1 to 11, wherein the amount of flavorant is 0.01 to 1 wt% with respect to the total weight of the composition.

13. A process for producing a polymeric article comprising:

(a) selecting one or more flavorant, wherein the flavorant is heat stable and provides an aroma component of flavor;

(b) selecting one or more flavor enhancing agent, wherein the flavor enhancing agent is heat stable, provides a taste component of flavour, and is selected from the group consisting of sucralose, stevia extracts, acesulfame K and maltodextrin;

(c) selecting one or more thermoplastic polymers from the group consisting of polyethylene, polypropylene, and copolymers and terpolymers thereof; wherein:

(i) the thermoplastic polymer allows migration of the flavor enhancing agent and flavorant without consumption, destruction, mastication or fully or partially dissolving the polymeric article; and

(ii) the flavor enhancing agent and the flavorant are selected to be thermally stable when blended in the thermoplastic polymer at a processing temperature of 100 to 180 °C;

(d) blending 0.01 to 10 wt% of the selected one or more flavorant(s) and 0.1 to 50 wt% of the selected one or more flavor enhancing agent(s) with respect to the total weight of the composition and the selected one or more thermoplastic polymers, and optionally one or more additives selected from the group consisting of antioxidants, antistatics, antifogs, antimicrobials, slips, antiblocks, minerals, fillers, optical

brighteners, foaming agents, nucleating agents, impact modifiers, dispersing aids, release agents, waxes, colorants, pigments and UV stabilizers, to obtain a flavored thermoplastic composition; and

(e) molding or extruding the flavored thermoplastic composition to obtain the polymeric article;

wherein:

(i) the flavor enhancing agent and the flavorant are blended throughout the thermoplastic polymer;

(ii) the taste component of flavor and the aroma component of flavor are released from the polymeric article without the article being consumed, destructed, masticated or fully or partially dissolved;

(iii) 100 to 80 % of flavor intensity of the flavorant and flavor enhancing agent perceived when the polymeric article is placed in a use environment are retained at one hour, 80 to 40 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at ten hours, and 40 to 20 % of the flavor intensity of the flavorant and flavor enhancing agent perceived in a use environment are retained at one hundred hours;

(iv) the article is substantially free of plastic flavor; and

(v) the article is selected from the group consisting of dental appliance, dental mold, retainer and mouthguard.

14. The process of claim 13, wherein the flavored thermoplastic composition is in the form of a pellet-shaped masterbatch, a dry-powder or a concentrated liquid.

15. The process of claim 13 or claim 14, wherein step (d) is performed by melt processing the composition, dry-mixing the flavorant, the flavor enhancing agent and the optional additive into a polymer powder, or mixing the flavorant, the flavor enhancing agent and the optional additive into a liquid polymer.

16. The process of any one of claims 13 to 15, wherein the thermoplastic polymer is selected from the group consisting of low density polyethylene, ethylene methyl acrylate (EMA) and linear low density polyethylene.

17. The process of any one of claims 13 to 16, wherein the article is selected from the group consisting of monolayered article, coextruded multi-layered article and an overmolded article.

18. The process of any one of claims 13 to 17, wherein the amount of flavor enhancing agent is 5 to 50 wt% with respect to the total weight of the composition.

19. A flavored article produced by the process of any one of claims 13 to 18.