SUMMARY

[0005a] In a first aspect, the present disclosure refers to a polymer composition comprising:

a first biodegradable copolymer, the first biodegradable copolymer comprising

from 84 to 99.5 mole percent monomer residues of 3-hydroxybutyrate,

from 0.1 to 1.0 mole percent monomer residues of a secondary monomer selected from the group consisting of 3-hydroxyvalerate, 4-hydroxyvalerate, and 5-hydroxyvalerate, and

from 0.4 to 15 mole percent monomer residues of a tertiary monomer selected from the group consisting of hydroxyalkanoate monomers having from 6 to 22 carbon atoms,

wherein the first biodegradable copolymer has a weight average molecular weight from 50,000 to 7.5 million Daltons.

[0005b] In another aspect, the present disclosure refers to a molded article comprising at least 50 weight percent of the polymer composition disclosed herein.

[0005c] In yet another aspect, the present disclosure refers to a fiber or filament comprising at least 50 weight percent of the polymer composition disclosed herein.

[0005d] In a further aspect, the present disclosure refers to a polymeric film comprising at least 50 weight percent of the polymer composition disclosed herein.

[0005e] In another aspect, the present disclosure refers to a dispersion comprising at least 50 weight percent of the polymer composition disclosed herein.

[0006] The above and other needs are met by a polymer composition in accordance with the current disclosure. According to one example, this polymer composition includes at least a first biodegradable copolymer. This first biodegradable copolymer is itself made up of: (1) from about 55 to about 99.5 mole percent monomer residues of 3-hydroxybutyrate, (2) monomer residues of a secondary monomer selected from the group consisting of 4-hydroxybutyrate, 3-hydroxyvalerate, 4-hydroxyvalerate, and 5-hydroxyvalerate, and (3)

WHAT IS CLAIMED IS

Claim 1. A polymer composition comprising:

a first biodegradable copolymer, the first biodegradable copolymer comprising

from 84 to 99.5 mole percent monomer residues of 3-hydroxybutyrate,

from 0.1 to 1.0 mole percent monomer residues of a secondary monomer selected from the group consisting of 3-hydroxyvalerate, 4-hydroxyvalerate, and 5-hydroxyvalerate, and

from 0.4 to 15 mole percent monomer residues of a tertiary monomer selected from the group consisting of hydroxyalkanoate monomers having from 6 to 22 carbon atoms,

wherein the first biodegradable copolymer has a weight average molecular weight from 50,000 to 7.5 million Daltons.

Claim 2. The polymer composition of Claim 1, wherein the secondary monomer comprises 3-hydroxyvalerate.

Claim 3. The polymer composition of Claim 1, wherein the secondary monomer comprises 5-hydroxyvalerate.

Claim 4. The polymer composition of Claim 1, wherein the tertiary monomer comprises 3-hydroxyhexanoate.

Claim 5. The polymer composition of Claim 1, wherein the tertiary monomer comprises 3-hydroxyoctanoate.

Claim 6. The polymer composition of Claim 1, wherein the tertiary monomer comprises 3-hydroxydecanoate

Claim 7. The polymer composition of Claim 1, wherein the polymer composition comprises from 50 weight percent to 95 weight percent of the first biodegradable copolymer and further comprises from 5 weight percent to 50 weight percent of a second biodegradable polymer selected from the group consisting of polybutylene adipate terephthalate, polybutylene succinate, polybutylene succinate-co-adipate, polylactic acid, mesolactide, polycaprolactone, polyglycolide, starches, cellulose esters, polysaccharides, polyvinyl alcohol, polyvinyl acetate, polymaleic acid, copolyesters of diols having 2 to 18 carbon atoms and diacids having 2 to 18 carbon atoms, and mixtures thereof.

Claim 8. The polymer composition of Claim 1, wherein the first biodegradable copolymer is blended or reactively extruded with the second biodegradable polymer

Claim 9. The polymer composition of Claim 1, wherein the first biodegradable copolymer is blended or reactively extruded with additional polyhydroxyalkanoates.

Claim 10. The polymer composition of Claim 1, wherein the polymer composition comprises from 50 weight percent to 95 weight percent of the first biodegradable copolymer and further comprises from 5 weight percent to 50 weight percent of a nonbiodegradable polymer selected from the group consisting of polyvinyl chloride, polypropylene, polyethylene, polyethylene terephthalate, and mixtures thereof.

Claim 11. The polymer composition of Claim 1, wherein the polymer composition further comprises from 1.0 weight percent to 40 weight percent of a filler selected from the group consisting of clays, calcium carbonate, talc, kaolinite, montmorillonite, bentonite, silica, chitin, titanium dioxide, nano clay, nanocellulose, or mixtures thereof.

Claim 12. The polymer composition of Claim 1, wherein the polymer composition further comprises from 0.5 weight percent to 25 weight percent of a plasticizer selected from the group consisting of sebacates, citrates, fatty esters of adipic, succinic, and glucaric acids, lactates, alkyl diesters having a having a main carbon chain of from 2 to 12 carbon atoms, alkyl methyl esters, dibenzoates, propylene carbonate, caprolactone diols having a weight average molecular weight from 200 to 10,000, polyethylene glycols diols having a weight average molecular weight from 400 to 10,000, esters of vegetable oils, long chain alkyl acids having from 10 to 20 carbon atoms, glycerol, isosorbide derivatives and mixtures thereof.

Claim 13. A molded article comprising at least 50 weight percent of the polymer composition of Claim 1.

Claim 14. A fiber or filament comprising at least 50 weight percent of the polymer composition of Claim 1.

Claim 15. A polymeric film comprising at least 50 weight percent of the polymer composition of Claim 1.

Claim 16. A dispersion comprising at least 50 weight percent of the polymer composition of Claim 1.