

WHAT IS CLAIMED IS

Claim 1. A biodegradable aqueous dispersion for coating food contact substrates, the dispersion comprising:

from about 35 to about 75 weight percent water; and

from about 25 to about 65 weight percent of polyhydroxyalkanoates.

Claim 2. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion comprises from about 25 to about 65 weight percent poly-3-hydroxybutyrate-co-3-hydroxyhexanoate ("P(3HB-co-3HHx)").

Claim 3. The biodegradable aqueous dispersion of Claim 2, wherein the P(3HB-co-3HHx) comprises from about 75 to about 99 mole percent hydroxybutyrate and from about 1 to about 25 mole percent hydroxyhexanoate.

Claim 4. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion comprises from about 1 to about 25 weight percent of at least one polyhydroxyalkanoate comprising from about 25 to about 50 mole percent of hydroxyvalerate, hydroxyhexanoate, hydroxyoctanoate, and/or hydroxydecanoate.

Claim 5. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion comprises polyhydroxyalkanoates having a weight average molecular weight from about 50,000 Daltons to about 2.5 million Daltons.

Claim 6. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion comprises particles having an average particle size from about 10 nm to about 50 μm .

Claim 7. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion has an average solid content from about 25 percent to about 65 percent solids.

Claim 8. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.01 weight percent to about 5.0 weight percent of at least one surfactant selected from the group consisting of polysorbates, aromatic polyethylene oxides, sorbitan derivatives, block copolymers of poly(ethylene oxide) and poly(propylene oxide), poly(glycol ethers), poly(vinyl alcohol), alkyl sulfates, alkyl phosphates, stearates, and mixtures thereof.

Claim 9. The biodegradable aqueous dispersion of Claim 8, wherein the at least one surfactant has a hydrophilic-lipophilic balance which is greater than 10.

Claim 10. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.01 weight percent to about 5.0 weight percent of at least one rheology modifier selected from the group consisting of polysaccharides, acrylate-based emulsion copolymers, viscosity depressants, and viscosity enhancers.

Claim 11. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.01 weight percent to about 2.5 weight percent of at least one wetting and dispersing agent.

Claim 12. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.01 weight percent to about 0.5 weight percent of at least one biocide or biostatic agent.

Claim 13. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.1 weight percent to about 5.0 weight percent of at least one coalescing agent selected from the group consisting of bio-succinic acid based coalescing solvent, 2,2,4-trimethyl-1,3-pentanediol monoisobutyrate, dimethyl carbonate, methanol, ethanol, ketones, acetates, and or mixtures thereof.

Claim 14. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 1 weight percent to about 35 weight percent of at least one filler selected from the group consisting of clays, calcium carbonate, talc, kaolinite, montmorillonite, bentonite, silica, chitin, titanium dioxide, nano clay, or mixtures thereof.

Claim 15. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.5 weight percent to about 15 weight percent of at least one plasticizer selected from the group consisting of sebacates, citrates, fatty esters of adipic, succinic, and glucaric acids, lactates, alkyl diesters, citrates, alkyl methyl esters, dibenzoates, propylene carbonate, caprolactone diols having a number average molecular weight from 200-10,000 g/mol, poly(ethylene) glycols having a number average molecular weight of 400-10,000 g/mol, esters of vegetable oils, long chain alkyl acids, adipates, glycerol, isosorbide derivatives or mixtures thereof.

Claim 16. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.1 weight percent to about 5 weight percent of at least one nucleating agent selected from the group consisting of sulfur, erythritols, pentaerythritol,

dipentaerythritols, artificial sweeteners, stearates, sorbitols, mannitols, polyester waxes, compounds having a 2:1;2:1 crystal structure chemicals, and mixtures thereof.

Claim 17. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.01 weight percent to about 5 weight percent of at least one crosslinking agent selected from the group consisting of calendula oil, stabilized ammonium zirconium carbonate, anionic hydroxylated zirconium polymers, potassium zirconium carbonate, anionic hydroxylated zirconium polymers, zinc tetraamine carbonate, and mixtures thereof.

Claim 18. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises from about 0.05 to about 1 weight percent of at least one defoamer selected from the group consisting of polyether siloxanes, polyamide particles, and mixtures thereof.

Claim 19. The biodegradable aqueous dispersion of Claim 1, wherein the dispersion further comprises:

from about 0.01 weight percent to about 5.0 weight percent of at least one surfactant;

from about 0.01 weight percent to about 5.0 weight percent of at least one rheology modifier;

from about 0.01 weight percent to about 2.5 weight percent of at least one wetting and dispersing agent; and

from about 0.01 weight percent to about 0.5 weight percent of at least one biocide or biostatic agent.

Claim 20. A biodegradable food service item comprising:

a biodegradable substrate having at least one food contact surface; and

a coating applied over the at least one food contact surface,

wherein the coating is applied as a biodegradable aqueous dispersion, comprising

from about 35 to about 75 weight percent water; and

from about 25 to about 65 weight percent of polyhydroxyalkanoates.

Claim 21. The biodegradable food service item of Claim 20, wherein the biodegradable substrate comprises a biodegradable plate, cup, bowl, fiber tray, or eating utensil.

Claim 22. The biodegradable food service item of Claim 20, wherein the coating is applied over the at least one food contact surface at a coating weight, on a dry basis, from about 2 to about 25 grams per square meter.

Claim 23. The biodegradable food service item of Claim 20, wherein the coating exhibits a Cobb water absorption value, measured according to TAPPI Standard T441, of less than 20 grams per square meter.

Claim 24. The biodegradable food service item of Claim 20, wherein the coating exhibits Kit Test grease resistance value, measured according to TAPPI Standard T559 cm-12, of greater than Kit Value 5.