SUMMARY

[005a] In a first aspect, the present disclosure refers to a biodegradable food service item comprising:

a biodegradable substrate having at least one food contact surface, wherein the substrate comprises from 75 weight percent to 95 weight percent cellulosic fibers on a dry basis; and

a coating applied over the at least one food contact surface, wherein the coating comprises from ~~about~~ 25 to ~~about~~ 60 weight percent of at least one biodegradable polymer,

~~wherein the biodegradable substrate further comprises from about 25 to about 60 weight percent of the at least one biodegradable polymer, from about 0.1 to about 2.0 weight percent of a surfactant, from about 0.1 to about 2.0 weight percent of a rheology modifier, optionally from about 0.1 to about 1.0 weight percent defoamer, optionally from about 1 to about 20% of a filler, and from about 0.001 to about 2.0 weight percent of a biocide dispersed within the substrate.~~wherein the biodegradable substrate is formed from an aqueous slurry comprising cellulosic fibers and from 10 to 70 weight percent of a biodegradable aqueous dispersion,

wherein the biodegradable aqueous dispersion comprises from 25 to 60 weight percent of the at least one biodegradable polymer.

[005b] In another aspect, the present disclosure refers to a method for making a biodegradable food service item, the method comprising the steps of:

providing a biodegradable aqueous dispersion which comprises water, from ~~about~~ 25 weight percent to ~~about~~ 60 weight percent of at least one biodegradable polymer, from ~~about~~ 0.1 to ~~about~~ 2.0 weight percent of a surfactant, from ~~about~~ 0.1 to ~~about~~ 2.0 weight percent of a rheology modifier, optionally from ~~about~~ 0.1 to ~~about~~ 1.0 percent of a defoamer, optionally from ~~about~~ 1 to ~~about~~ 20% filler, and from ~~about~~ 0.001 to ~~about~~ 2.0 weight percent of at least one biocide;

forming a layer of an aqueous slurry over a mold, wherein the aqueous slurry comprises water and from ~~about~~ 10 to ~~about~~ 60 weight percent cellulosic fibers and from 10 to 70 weight percent of the biodegradable aqueous dispersion;

molding the aqueous slurry, using a combination of heat and pressure, wherein the heat and pressure from the molding step at least partially dries the slurry to form a biodegradable substrate;

applying an amount of the biodegradable aqueous dispersion over the substrate to form a layer of the dispersion over a first surface of the substrate; and

curing the dispersion layer so as to form a film coating over the first surface of the biodegradable substrate.

WHAT IS CLAIMED IS

Claim 1. A biodegradable food service item comprising:

a biodegradable substrate having at least one food contact surface, wherein the substrate comprises from 75 weight percent to 95 weight percent cellulosic fibers on a dry basis; and

a coating applied over the at least one food contact surface, wherein the coating comprises from ~~about~~ 25 to ~~about~~ 60 weight percent of at least one biodegradable polymer,

~~wherein the biodegradable substrate further comprises from about 25 to about 60 weight percent of the at least one biodegradable polymer, from about 0.1 to about 2.0 weight percent of a surfactant, from about 0.1 to about 2.0 weight percent of a rheology modifier, optionally from about 0.1 to about 1.0 weight percent defoamer, optionally from about 1 to about 20% of a filler, and from about 0.001 to about 2.0 weight percent of a biocide dispersed within the substrate~~wherein the biodegradable substrate is formed from an aqueous slurry comprising cellulosic fibers and from 10 to 70 weight percent of a biodegradable aqueous dispersion,

wherein the biodegradable aqueous dispersion comprises from 25 to 60 weight percent of the at least one biodegradable polymer.

Claim 2. The biodegradable food service item of Claim 1, wherein the at least one biodegradable polymer is selected from the group consisting of polyhydroxyalkanoates, polylactic acid, polycaprolactone, polybutylene succinate, polybutylene succinate adipate, polybutylene adipate terephthalate, and mixtures thereof.

Claim 3. The biodegradable food service item of Claim 1, wherein the at least one biodegradable polymer comprises polyhydroxyalkanoates.

Claim 4. The biodegradable food service item of Claim 3, wherein the polyhydroxyalkanoates have a weight average molecular weight from ~~about~~ 50,000 to ~~about~~ 2.5 million Daltons.

Claim 5. The biodegradable food service item of Claim 1, wherein the biodegradable substrate comprises a biodegradable plate, cup, bowl, takeout container, straw, or eating utensil.

Claim 6. The biodegradable food service item of Claim 1, wherein at least a portion of the cellulosic fibers are derived from sugarcane, bagasse, wheatgrass, or recycled wood pulp.

Claim 7. The biodegradable food service item of Claim 1, wherein the coating is applied

over the at least one food contact surface at a coat weight, on a dry basis, from ~~about~~ 5 to ~~about~~ 50 grams per square meter.

Claim 8. The biodegradable food service item of Claim 1, wherein the coating exhibits a Cobb water absorption value, measured according to TAPPI Standard T441, of less than 25 grams per square meter.

Claim 9. The biodegradable food service item of Claim 1, wherein the coating exhibits Kit Test grease resistance value, measured according to TAPPI Standard T559 cm-12, of greater than Kit Value 5.

Claim 10. A method for making a biodegradable food service item, the method comprising the steps of:

providing a biodegradable aqueous dispersion which comprises water, from ~~about~~ 25 weight percent to ~~about~~ 60 weight percent of at least one biodegradable polymer, from ~~about~~ 0.1 to ~~about~~ 2.0 weight percent of a surfactant, from ~~about~~ 0.1 to ~~about~~ 2.0 weight percent of a rheology modifier, optionally from ~~about~~ 0.1 to ~~about~~ 1.0 percent of a defoamer, optionally from ~~about~~ 1 to ~~about~~ 20% filler, and from ~~about~~ 0.001 to ~~about~~ 2.0 weight percent of at least one biocide;

forming a layer of an aqueous slurry over a mold, wherein the aqueous slurry comprises water and from ~~about~~ 10 to ~~about~~ 60 weight percent cellulosic fibers, and from 10 to 70 weight percent of the biodegradable aqueous dispersion;

molding the aqueous slurry, using a combination of heat and pressure, wherein the heat and pressure from the molding step at least partially dries the slurry to form a biodegradable substrate;

applying an amount of the biodegradable aqueous dispersion over the substrate to form a layer of the dispersion over a first surface of the substrate; and

curing the dispersion layer so as to form a film coating over the first surface of the biodegradable substrate.

~~Claim 11. The method of Claim 10, wherein the aqueous slurry further comprises from about 10 to about 70 weight percent of the biodegradable aqueous dispersion.~~

Claim ~~12~~11. The method of Claim 10, wherein the aqueous dispersion is spray coated over at least one surface of the molded slurry layer.

Claim ~~13~~12. The method of Claim 10, wherein the slurry is molded at a temperature

from ~~about~~ 85 °C to ~~about~~ 170 °C and a pressure from ~~about~~ 1000 psi to ~~about~~ 100,000 psi.

Claim ~~14~~13. The method of Claim 10, wherein the slurry has a solids content from ~~about~~ 10 to ~~about~~ 85 weight percent when initially formed over the mold.

Claim ~~15~~14. The method of Claim 10, wherein the aqueous dispersion has a solids content from ~~about~~ 25 to ~~about~~ 60 weight percent when applied over the slurry layer.

Claim ~~16~~15. The method of Claim 10, wherein the at least one biodegradable polymer is selected from the group consisting of polyhydroxyalkanoates, polylactic acid, polycaprolactone, polybutylene succinate, polybutylene succinate adipate, polybutylene adipate terephthalate, and mixtures thereof.

Claim ~~17~~16. The method of Claim 10, wherein the at least one biodegradable polymer comprises polyhydroxyalkanoates.

Claim ~~18~~17. The method of Claim 16~~17~~, wherein the polyhydroxyalkanoates have a weight average molecular weight from ~~about~~ 50,000 to ~~about~~ 2.5 million Daltons.