

Recommendation for Improving Ingeo™ Fiber and Nonwoven Hydrophilicity

Background

An additive package has been discovered through extensive testing at NatureWorks LLC facilities in Savage, MN that improves the hydrophilic properties of Ingeo™ fibers and nonwovens. Test results show wicking and absorbance improvements up to 45% using a vertical wicking test.

Additive Information

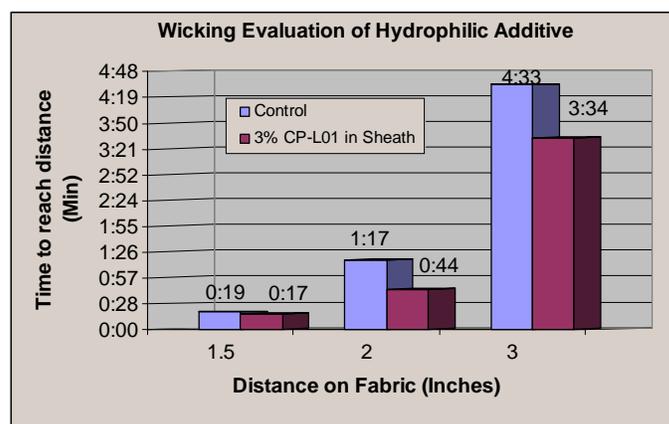
The additive is supplied by Polyvel, Inc. under the name CP-L01. It is 15% active in a masterbatch with Ingeo™ biopolymer as the carrier. In performance and evaluation testing, it was added to the sheath layer of the bicomponent yarn at an optimal level of 3%.

Performance Evaluation & Sample Information

A fully drawn flat yarn with a denier per filament equal to approximately 1.5 (215/144), was made using a bicomponent configuration. The yarn is composed of a 20% Ingeo™ biopolymer sheath and an 80% Ingeo™ biopolymer core. The yarn was then knitted into a sock using an FAK knitting machine. The sock samples were cut into one inch wide strips approximately six inches long.

Vertical Wicking Test Results

The one inch wide strips of sock were held vertically and placed into a dyed de-ionized water solution. A stop watch was then used to record the amount of time needed for the water to travel a pre-marked distance on the sock sample. A new sample was used for each distance test.



Contacts

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Ingeo™ innovations are made uniquely from NatureWorks® biopolymer



Product Stewardship Information

Food Contact

Ingeo™ is approved for food contact in various regions of the world including the USA and EU. However, migration testing for these products was done using rolled sheet. Depending on the application, the surface area of a fiber article may differ from the sheet sample tested. It is therefore the responsibility of the manufacturer of the finished food-contact article to determine that the use of a product is safe, lawful, and technically suitable for the intended application. Since the manufacture of the finished food-contact article is outside of NatureWorks LLC control, NatureWorks LLC makes no warranties, express or implied, and assumes no liability.

CP-L01 also has food contact approval in the US and EU. Contact Polyvel, Inc. for more information.

Compostability

Composting is a method of waste disposal that allows organic materials to be recycled into a product that can be used as a valuable soil amendment. Ingeo™ resins are comprised of poly (lactic acid), a repeating chain of lactic acid, which undergoes a 2-step degradation process. First, the moisture and heat in the compost pile attack the Ingeo™ polymer chains and split them apart, creating smaller polymers, and finally, lactic acid. Microorganisms in compost and soil consume the smaller polymer fragments and lactic acid as

nutrients. Since lactic acid is widely found in nature, a large number of organisms metabolize lactic acid. At a minimum, fungi and bacteria are involved in Ingeo degradation. The end result of the process is carbon dioxide, water and also humus, a soil nutrient. This degradation process is temperature and humidity dependent.

Regulatory guidelines and standards for composting revolve around four basic criteria: Material Characteristics, Biodegradation, Disintegration, and Ecotoxicity. Description of the requirements of testing can be found in the appropriate geographical area: DIN V 54900-1 (Germany), EN 13432 (EU), ASTM D 6400 (USA), and GreenPla (Japan).

NatureWorks LLC completed testing on samples of spunbond, spunlace and woven Ingeo(tm) fabric, all three samples passed the ASTM 6400D/EN 13432 standard. This testing was a sampling of the current typical fiber applications.

The addition of CP-L01 may or may not have an affect on compostability. Contact Polyvel, Inc for more information.

It is the responsibility of each customer to test their specific product for compliance with the standards to support relevant product claims.

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