Function to disperse biomass evenly in plastic

- Contributing to the reduction in the amount of petroleum-derived resources used through promotion of utilization -

SANYO PRODUCT TOPICS

Process is underway to reduce the use of petroleum-based raw materials by combining biomass, a renewable organic resource, with plastics that are primarily made from petroleum-derived resources. This article introduces dispersants that not only improve plastic performance but also contribute to environment by ensuring that the biomass and plastic combine well.

Plastics are applied in a wide range of fields

In recent years, plastics with characteristics of being light and easy to process, have advanced in various performance features such as strength, heat resistance, and conductivity and are being used in a wide range of fields, including substitutes for metals to reduce weight. A substance called "filler" enhances the performance of these plastics. The strength of fiber-reinforced plastics (FRPs) that are used in automobile bodies, for example, is increased by mixing fillers such as glass fibers, carbon fibers, etc. into plastics.
However, the use of plastics, whose raw material is derived from petroleum, has been constantly increasing, and concerns about their effects on the environment have been expressed by many. Therefore, efforts to reduce the use of petroleum-derived raw materials by using biomass as a filler have been promoted in recent years.

Effective use of biomass to ensure both functions of plastic and environmental friendliness

Biomass refers to organic resources of biological origin, such as animals and plants in a broad sense, but plant-derived materials such as wood flour and rice bran are most often used as plastic fillers.
The use of biomass fillers has a significant advantage in terms of reducing the amount of petroleum resources used as biomass fillers can improve the strength of plastics. Plastics mixed with wood flour have also been widely used as construction materials and materials for wood decks. In addition, rice bran is often used in garbage bags and food storage bags and has contributed to the environment in terms of the effective use of by-products.
However, because biomass is hydrophilic, a property that conflicts with the hydrophobicity of plastics, it has poor "dispersibility," which indicates how uniformly biomass can be mixed with plastic, and simply putting them together does not provide sufficient performance.
Furthermore, the use of biomass creates issues such as lower yields and poor product appearance because the material becomes difficult to process and has poor formability. However, the dispersants 'UMEX Series' can combine the plastic with the biomass and improve dispersibility.

Products that bridge biomass and plastic

'UMEX' is a dispersant developed by Sanyo Chemical Industries that was launched in 1990. It was created as a product for accommodating a wide range of fillers, and it has been used in plastics combined with biomass in the early stages of their history.
The primary ingredient of 'UMEX' is a substance called acid-modified polyolefin. Since 'UMEX' contains both the acid that is compatible with the hydrophilic biomass and the polyolefin that is compatible with the hydrophobic plastic, adding just a small percent of the dispersant to the raw material can uniformly disperse the biomass filler in the plastic, increase the adhesiveness of the interface, and improve the molding property.
It is our company's "thermal degradation method" technology that enables this performance. By chemically bonding an acid after heating the polyolefin to reduce its molecular weight, the amount of acid bonded can be increased, and the viscosity when the plastic is melted is reduced. Through this mechanism, the dispersibility of the biomass filler is improved, and the adhesion between biomass and resin is increased.

Sanyo Chemical Industries has established the expertise on adjusting the amount of molecules and acids using this "thermal degradation method" and has a lineup of products suitable for various fillers such as glass fiber in addition to biomass.

Utilizing our technology to develop more environmentally friendly products

'UMEX' has been highly recognized for its quality since its launch, and it has become an essential product in the field of biomass composite plastics. It has been used as a standard dispersant for at least 10 years in experiments at universities and research institutions and has attracted further attention as an environmentally friendly product because of an increase in environmental awareness in the past few years.
Research is also underway at Sanyo Chemical Industries on products that can contribute not only to the handling of different biomass types that have emerged in recent years but also to the development of novel environmentally friendly products by applying the 'UMEX' technology and utilizing its products.
'UMEX' technology, which leads not only to improvements in plastic performance but also environmental protection such as reduction in the use of petroleum resources, is a technology that contributes to SDGs 9 "Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation," and 12 "Ensure sustainable consumption and production patterns."
'UMEX,' was developed by Sanyo Chemical Industries with future prospects in mind well before the rise in environmental conservation activities and the development of the SDGs. We will continue to contribute to the creation of an environmentally friendly society by further advancing the technologies we have developed thus far.

■Representative properties of 'UMEX Series'

	UMEX 1001	UMEX 1010	UMEX 100TS	UMEX 5200	UMEX 5600 (developed product)
Appearance	Yellow granule	Yellow granule	Light-yellow powder	Yellow granule	Yellow powder
Melting point (°C)	142	135	136	124	122
Melt viscosity (mPa·s)	15,000	6,000	120	20,000	3,000
Acid value (mgKOH/g)	26	52	3.5	11	17
Molecular weight (Mw)	45,000	30,000	9,000	70,000	40,000
Primary application	・Glass fiber dispersant	・Wood flour dispersant	・Hot melt adhesive ・Asphalt excipient	・Glass fiber dispersant	

Measurement method
Melting point: DSC method, melt viscosity (160°C): Type B viscometer, acid value: in accordance with JIS K0070, molecular weight: high-temperature GPC method

Please contact our company's sales representative when handling our company's products. It is also necessary to read the "Safety Data Sheet" (SDS) in advance.
It is the responsibility of the user to determine the suitability and safety of the product for intended use.