CASE STUDY
ENABLE™ mPE RESIN FOR GREENHOUSE FILM

Enable™ mPE resin-based greenhouse films from Tianhe help farmers to increase yield and improve quality of crops. Farmers in China are generating increased income due to new, advanced greenhouse films. The films are based on ExxonMobil Chemical's Enable™ metallocene polyethylene (mPE) resin which delivers outstanding transparency, an increase in light penetration, and excellent mechanical strength, to withstand weather extremes.

Utilizing metallocene PE to Revolutionize Greenhouse Film

Conventional green house films traditionally used by farmers across China pose a series of problems which include insufficient light transmission, limited or no anti-dripping and anti-fogging capabilities. Using the advanced resin metallocene PE by ExxonMobil Chemical, Shandong Tianhe Plastic Co. Ltd. (Tianhe) developed a coated, seepage-proof and de-misting film which will assist farmers overcome these pertinent problems.

Introduced last year, the greenhouse films were developed by Shandong Tianhe Plastic Co. Ltd. (Tianhe) working with ExxonMobil Chemical, a global leader in metallocene polyethylene (mPE) film technology and application expertise. The Enable™ mPE resin-based flexible films overcome a number of persistent problems encountered by farmers using conventional PE films including: poor crop growth caused by insufficient sunlight; poor film resistance to natural disasters due to lack of tear and dart strength; and inferior pest control resulting from dripping and misting inside the greenhouse.

Persistent Problems

Prior to this breakthrough, film fabricators were troubled by the low light transmission rate of conventional PE films, as it allows less natural lighting into the greenhouse. This has, in turn, led to insufficient photosynthesis and poorer crop growth. They also are uncomfortable with the anti-dripping and anti-fogging performance of these films.

For many years, manufacturers added surface additives to greenhouse films to create a water membrane on the inside of the film to prevent dripping, and used anti-fogging reagents to eliminate mist inside the greenhouse. Gaining widespread acceptance in China, these "built-in" greenhouse films also improved the light transmission rate of the greenhouse, increasing crop production and enhancing quality. However, they could only retain the anti-dripping and anti-fogging properties for three to six months, so they had to be changed every season, increasing resource consumption and waste.

Further, the mechanical properties of these films are hard to cope with harsh weather conditions such as high wind, heavy snowfall or even high temperatures. These conditions can cause a considerable degree of uncertainty regarding crop production and the farmers' income.

Picture: Farmer tending greenhouse tomatoes, this greenhouse is using Enable™ mPE resin-based film supplied by Shandong Tianhe Plastic Co. Ltd.

Solution

To resolve these challenges, ExxonMobil Chemical recommended Tianhe use Enable™ mPE resin, which has been proven to deliver outstanding performance for greenhouse films compared with conventional films.

"The optical properties of greenhouse films produced using Enable™ mPE resin allow more light penetration for healthier crop production. And, the excellent mechanical strength means they are better at withstanding extreme weather conditions," said Mr. David Zhu, Asia Pacific Polyolefins Products Technology Engineer, ExxonMobil Chemical. "Additionally, as Enable™ mPE is a single resin solution, it provides added-value to film manufacturers through simpler film formulations for reduced inventory management costs."

Given its ease of processing and bubble stability, Enable™ mPE resin-based film also can reduce energy consumption, as well as offer stable production during extrusion to enhance processing speed and increase volume.

Enable™ mPE resin has allowed Tianhe to produce greenhouse films with enhanced light transmittance and better aging properties to withstand weather extremes through the entire life of the greenhouse.
Mr. Sun Tianzhi, General Manager of Tianhe states, “ExxonMobil Chemical's Enable™ mPE resin is a high quality, value-for-money resin well-suited for the production of large greenhouse films due to its combination of outstanding optical, mechanical and processing properties.

With the benefits of Enable™ mPE resin and improvements in Tianhe’s processing techniques, the anti-dripping and anti-fogging properties of greenhouse are now consistent with the lifespan of greenhouse films”, Last year alone, Tianhe’s sale of this product experienced 20 percent year-on-year growth. In addition, they have been able to reduce the thickness of the membranes by 20 percent, thereby reducing the transportation, warehousing and management costs.

Benefit to Farmers
Having worked together for a number of years, and visited local farmers to learn of their problems first-hand, ExxonMobil Chemical’s technical experts and Tianhe staff are starting to hear of the successes being enjoyed by farmers using the new Enable ™ mPE resin-based greenhouse film.

Ju Zuolin, a farmer in Jingzhi Village in Anqiu City has been using the new greenhouse film for the past year. His 58m-by-10m greenhouse helped him generate RMB 44,000 in the past year, an increase of 15 percent compared with the same period last year.

Since using the new greenhouse films, the quantity and quality of their produce has increased dramatically. Ju Zuolin has saved considerably on the use of pesticides, thereby extending the lifespan of the greenhouse. He estimated that only changing the greenhouse once every three years would save about RMB 3,400. As he also saves RMB 600 each year on pesticides, his total annual savings are about RMB 1,700. Add to this the additional RMB 6,000 he earned due to the increased quantity and quality of his produce and the benefits of the greenhouse film become clear.

Meanwhile, farmers in Shouguang City in Shandong Province, a major vegetable producing region of China, are starting to understand the benefits of the new greenhouse films. This area supplies the majority of out-of-season vegetables to Tianjin and Beijing, with farmers growing them in greenhouse. Of this year’s newly-built greenhouse, 65 percent of the farmers in Jiusan Village in Shouguang City chose to use Tianhe’s new coated seepage-proof and de-misting greenhouse films, rather than conventional greenhouse films.

The new greenhouse films will greatly enhance the volume and value of greenhouse-grown vegetables while reducing the farmer’s outlay. Tianhe expects that over the next three years, these films will rapidly grow in use, with conventional greenhouse films gradually being phased out. Tianhe will continue to actively work with ExxonMobil Chemical to ensure its contribution to the advancement of greenhouses in China.

Pictures: Examples of good growth in agricultural greenhouse using Enable™ mPE resin-based film supplied by Shandong Tianhe Plastic Co. Ltd.

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